



Research in Engineering Education Symposium (REES)
Regional Conference in Engineering Education (RCEE)
& Research in Higher Education (RHED)
September 29 – October 3, 2025
Johor, Malaysia



A Strategic Pedagogical Approach Through Cross-Border Collaboration in Online Guest Lecture on the Atterberg Limit Test

Galuh Chrismaningwang^{*a,b}, Maxvallecia Frikandy^b, Lydia Novitriana Nur Hidayati^b, Achmad Basuki^b

Center for Engineering Education, Universitas Sebelas Maret, Surakarta, Indonesia^a

Department of Civil Engineering, Engineering Faculty, Universitas Sebelas Maret, Surakarta, Indonesia^b

Corresponding Author's Email: galuh@ft.uns.ac.id

ABSTRACT

BACKGROUND & CONTEXT

Engineering education is becoming more and more globalized through the use of cross-border online guest lectures. Although they offer chances for worldwide exposure, there is still little empirical proof of how well they deliver technical content.

PURPOSE OR GOAL

This study focused on students' perceptions of English-Medium Instruction (EMI), contextual understanding, and self-efficacy in order to assess the effect of an international guest lecture on the Atterberg Limit Test.

APPROACH OR METHODOLOGY

Forty Universitas Sebelas Maret undergraduate civil engineering students took part in a guest lecture that was co-delivered with a Malaysian partner. A post-lecture survey with open-ended and Likert-scale questions was used to gather data. For quantitative data, correlation analysis and paired t-tests were employed, and for qualitative responses, thematic analysis.

OUTCOMES

Students' self-efficacy and contextual understanding clearly improved, according to the findings. Students gave the lecture a high rating for its relevance and delivery, but there was no significant correlation between language barriers and learning effectiveness. Qualitative feedback pointed out certain difficulties, like communication and internet problems, but also highlighted advantages, like lucid explanations and beneficial exposure to the world.

CONCLUSIONS

According to the study, foreign guest lecturers can improve students' technical proficiency and self-assurance, and good instructional design can reduce language problems caused by EMI. While this method's limited scope and reliance on self-reported data require more extensive future research, it provides a scalable route to curriculum internationalization.

KEYWORDS

cross-border collaboration; online guest lecture; the atterberg limit test.

Introduction

A fundamental subject in civil engineering is soil mechanics, and the Atterberg Limit Test is frequently used to identify the critical water content of fine-grained soils and categorize how they behave under different moisture conditions (Fondjo et al., 2021). For evaluating foundation performance and ensuring infrastructure safety, the test's results are essential. However, soil mechanics education frequently fails to close the gap between theory and practice when it is primarily taught in physical laboratory settings. This restriction lowers the capacity of learners for the demands of a multicultural and interconnected engineering workforce (Omar & Fratta, 2024; M. Prince, 2004; M. J. Prince & Felder, 2006).

Integrating global viewpoints into the curriculum is essential because it enriches the educational experience and promotes intercultural competence, global awareness, and adaptability skills that are becoming increasingly valuable in today's engineering field (Gutierrez-Bucheli et al., 2022; Kjellgren & Richter, 2021; Zhan & Niu, 2023). Frameworks for accreditation like ABET, ASIIN, EUR-ACE, and IABEE emphasize an intense focus on constructive alignment and outcome-based education (OBE), highlighting the need for creative teaching strategies that match technical education with global competencies (ABET Engineering Accreditation Commission, 2023; Accreditation Agency for Degree Programmes in Engineering, Informatics/Computer Science & E.V., 2021; European-Accredited Engineer, 2021; Indonesian Accreditation Board for Engineering Education (IABEE), 2023).

In response to this demand, Universitas Sebelas Maret's Department of Civil Engineering has implemented strategic initiatives, including online guest lectures featuring experts from around the world. An expert in geotechnical engineering from Malaysia, for instance, was asked to conduct a virtual session on the Atterberg Limit Test. Such partnerships are now more possible through online platforms, which provide flexible chances for global interaction without regard to location (Caeiro-Rodriguez et al., 2021). Such initiatives enable students to access industry knowledge, practical insights, and diverse viewpoints from global experts, enhancing both their technical understanding and awareness of global engineering practices (Munoz-Escalona et al., 2022).

Despite the growing popularity of international online guest lectures (Khan & Abid, 2021; Mushtaha et al., 2022), There is currently little empirical data demonstrating their efficacy in raising students' understanding of technical engineering courses. There is still a lack of research on issues like language barriers, variations in teaching methods, and the limitations of digital infrastructure, particularly in developing nations. Furthermore, not enough research has been done on how much pedagogical design and content relevance influence student outcomes like contextual understanding and self-efficacy.

By evaluating the effect of a cross-border online guest lecture on the Atterberg Limit Test learning of Universitas Sebelas Maret civil engineering students, this study fills these gaps. In particular, it looks into (1) how self-efficacy and contextual understanding are improved, (2) how language barriers and English-Medium Instruction (EMI) affect learning effectiveness, and (3) how content relevance affects learning effectiveness. In order to improve technical proficiency and global preparedness, the results are intended to guide the development of upcoming foreign guest lectures and their incorporation into engineering curricula.

Literature Review

Guest Lecture Pedagogy

Guest lectures have become parts of modern engineering educations to offer students the opportunity to learn widely from industry experts, practitioners, professionals, and academics about real-world applications (Naji et al., 2021; M. Prince, 2004). Constructive alignment performs optimally when learning objectives, instructional strategies, and evaluations are clearly linked (M. J. Prince & Felder, 2006). Research shows that, in line with Self-Determination Theory, guest lectures help students become more autonomous, competent,

and related, which improves motivation and prepares them for the workforce (Pepple et al., 2025).

In a study by Payne et al. (2003), guest lectures are effective when the three stages requirements are fulfilled. The three stages include the preparation, the delivery, and the follow-up. While pre-reading or advance organizers may be used for preparation, guided Q&A or quick quizzes should be incorporated into the delivery to keep students' attention (Mahadewi & Pudjawan, 2021; Phan et al., 2024). Active participation, especially in online formats, improves student engagement and perceived relevance, according to recent research (Ma, 2025; Callahan et al., 2022). Reflections and simple assessments are examples of follow-up activities that strengthen memory and encourage deeper learning (Neves et al., 2021; Van den Beemt et al., 2022).

According to the literature, guest lectures have the greatest impact when they are interactive, in line with the goals of the course, and backed by organized planning and follow-up. According to research, student-centred strategies, like letting students plan and conduct guest lectures, not only increase engagement but also develop leadership and organizational abilities. This effectiveness is largely due to active learning (Cardullo et al., 2015). The cross-border guest lecture for this study is designed with these insights in consideration.

Cross-Border Online Collaboration

In higher education, cross-border online collaboration has become an effective method to improve students' digital collaboration competencies, intercultural skills, and global awareness while lowering the financial and practical obstacles of mobility (Araya & Collanqui, 2021; Eriksson et al., 2023). Collaborative Online International Learning (COIL), one of the most well-known frameworks for this strategy, places a strong emphasis on opportunities for structured cross-cultural interaction and co-design between educators in various nations (Hackett et al., 2023). Collaboration between educators from two or more higher education institutions (HEIs) in different nations who connect, co-design, and co-facilitate collaborative online learning projects for students enrolled in both institutions is a key element of COIL (Lowyck & Pöysä, 2001).

COIL-based activities allow students to combine technical knowledge with a global perspective in engineering education. According to earlier research, well-planned cross-border sessions improve cross-cultural teamwork, communication abilities, and involvement with real engineering problems (Munoz-Escalona et al., 2022). Furthermore, COIL principles can be incorporated into online guest lectures by ensuring co-planning between lecturers, intercultural exposure during delivery, and post-session reflection exercises. They are not just for collaborative projects.

A number of COIL principles were applied in this study. Universitas Sebelas Maret and a Malaysian partner collaborated to create the guest lecture, which was delivered in English as the primary language of instruction and featured interactive Q&A and discussion opportunities. Students were able to gain from cross-border interaction that improved their global competency in addition to technical insights on the Atterberg Limit Test through to this design.

Atterberg Limit Test

The Atterberg Limit Test is a fundamental test in geotechnical engineering (Fondjo et al., 2021). The liquid limit (LL), plastic limit (PL), and plasticity index (PI) are the key parameters in this test. The parameters are later used for soil classification which in turn supports engineering applications, in particular construction purposes (Bolton et al., 1964).

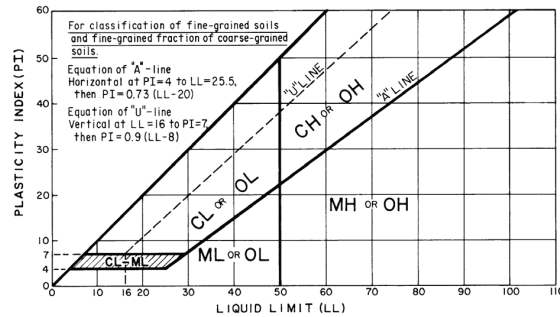


Figure 1: Plasticity chart (American Society for Testing and Materials (ASTM), 2011)

The plasticity chart, developed by Casagrande, uses LL and PI to classify fine-grained soils into different groups as shown in Figure 1. This chart later used as a standard by American Society for Testing and Materials (ASTM) to predict soil behaviour under various conditions, such as compressibility and shear strength (American Society for Testing and Materials (ASTM), 2011). For instance, soils with higher plasticity indices tend to exhibit greater plasticity and compressibility (Bolton et al., 1964).

Soil classification based on Atterberg limits aids in selecting appropriate materials for construction projects. For example, soils with low plasticity are often suitable for embankments and pavements, while highly plastic soils may require special handling to avoid structural issues (Bolton et al., 1964). Research has shown that Atterberg limits can be used to estimate strength and stiffness parameters. For example, the undrained shear strength and rigidity index can be correlated with the plasticity index. These correlations are particularly useful in preliminary geotechnical investigations where detailed tests are not feasible (Dehghanian & İpek, 2022).

In geotechnical engineering, parameters such as the compression index and coefficient of consolidation can be estimated using Atterberg limits test, assessing preliminary conditions of settlement and consolidation under applied loads (Dehghanian & İpek, 2022). Such expansivity parameter like the effective friction angle also could be calculated from derived plasticity index for slope stability and foundation design to prevent such environmental risks, for instance, landslides and erosions (Ahmed & Agaiby, 2020; Frikandy et al., 2024).

By introducing this test through cross-border guest lectures, students are exposed to professional viewpoints and real-world applications in geotechnical engineering in addition to theoretical knowledge.

Language Barriers in English-Medium Instruction (EMI)

Even though English as a Medium of Instruction (EMI) has become more common in higher education worldwide, non-native English speakers still face opportunities as well as challenges. Research has indicated that insufficient support for EMI can impede understanding, engagement, and engagement (Macaro et al., 2018; Horbacauskienė, 2022; Zhang, 2024). However, studies also highlight how scaffolding, visual aids, and the thoughtful application of bilingual resources can help to lessen these obstacles (Pun & Macaro, 2019; Galloway & Ruegg, 2020). These methods give students easier access to technical material while also reducing cognitive load.

In addition to its linguistic aspects, EMI is strongly related to higher education's larger internationalization goal. In addition to serving as a medium of instruction, it helps students become more prepared for multicultural work settings (Rose & Galloway, 2019). EMI provides additional benefits in cross-border guest lectures, especially when bolstered by regional linguistic similarities, like those between Bahasa Malaysia and Bahasa Indonesia, which can further lower barriers and improve student engagement.

Methodology

Study Design

This study adopted a quantitative survey design to assess the impact of cross-border collaborations in online guest lecture on civil engineering students' understanding of the Atterberg Limit Test. As survey used for capturing students' perception and learning outcomes, pedagogical innovations may evaluated in the end for engineering education research (Creswell, 2014; Johri & Olds, 2015).

Participants included 40 undergraduate students from a civil engineering program who attended the online guest lecture delivered by a Malaysian geotechnical expert. These students represented varying levels of academic progress and experience with previous guest lectures. Demographic information, including gender and prior exposure to international lectures, was collected. The documentation of the online learning process is shown in Figure 2.

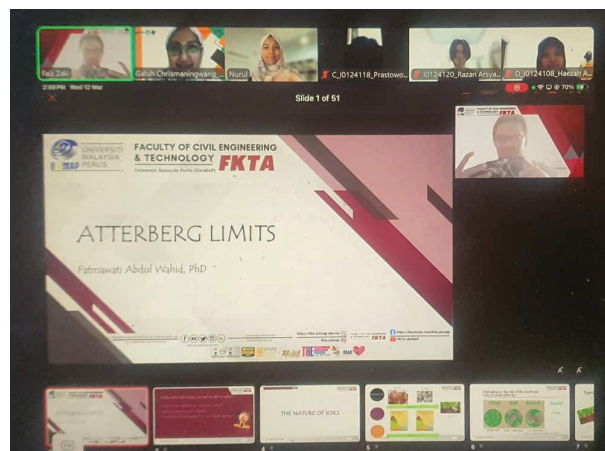


Figure 2: Documentation of the Pedagogy

Data Collection

A structured questionnaire was used to collect data right after the guest lecture. Three open-ended items and fifteen closed-ended items with a five-point Likert scale (1 being "strongly disagree" and 5 being "strongly agree") made up the instrument. "How confident are you in explaining the Atterberg Limit Test to others?" is an example of a Likert-scale question. and "To what extent did the lecture material relate to your academic needs?" For instance, "What did you consider the most positive aspect of this guest lecture?" and "What was the main challenge you experienced during the guest lecture?" are examples of open-ended questions.

While students were asked to evaluate their knowledge and self-assurance before and after the class, the answers were gathered retrospectively in one sitting right after the lecture. Memory bias may be triggered by this approach, which is recognized as a study limitation.

Data Analysis

Students' self-reported contextual understanding and self-efficacy were compared before and after the lecture using quantitative data and a paired t-test. Furthermore, correlation tests were used to investigate the connections among post-lecture contextual understanding, English-Medium Instruction (EMI), content relevance, and language barriers. Although this study employed Pearson's correlation coefficient, it should be noted that Likert-scale data are ordinal in nature. Since some academics contend that Spearman's rank correlation might be more appropriate, the use of Pearson correlation in this case is justified by treating the Likert scores as interval data, which is in line with methods used in earlier educational research.

Thematic analysis was used to examine the qualitative information gathered from open-ended responses. To find recurrent themes about the students' perceived advantages, difficulties, and recommendations for enhancing the guest lecture, an inductive thematic analysis approach was used. Two researchers manually coded in order to guarantee the accuracy of the interpretation.

Results and Discussion

Students' Contextual Understanding and Self-Efficacy

Students' self-reported knowledge of the Atterberg Limit Test and their comfort level in describing it both before and after the lecture are shown in Table 1.

Table 1: Pre- and Post-Lecture Self Reported Understanding and Confidence

Item	Pre-Lecture Mean	Post-Lecture Mean	% Increase	t-value	p-value
Understanding of Atterberg Limit Test	2.75	3.68	+18.5	5.87	<0.001
Confidence in explaining to others	2.48	3.38	+18.0	6.13	<0.001

Following the session, there was a significant improvement in both contextual understanding and confidence, as indicated in Table 1. This is in line with earlier research that emphasizes the value of focused instructional interventions in improving technical discipline conceptual learning (Borrego et al., 2015; Cymberknop and Armentano, 2018). By connecting theoretical knowledge to worldwide engineering practice, international exposure through guest lectures also adds value (Delaine et al., 2016). Bandura's (1997) theory, which states that vicarious experiences, like watching experts, enhance confidence and explanatory ability, can be used to explain the increase in self-efficacy. Phan et al. (2024) noted similar trends and discovered that students' confidence in communicating was enhanced by expert-led conversations.

Perceptions of Lecture Delivery and Learning Environment

Students assessed lecture quality, relevance, delivery, and EMI in addition to pre/post measures. According to Table 2, students scored the lecturer's delivery and the relevance of the material high marks (means > 4.0), demonstrating a strong fit with academic requirements. However, participation was lower (mean = 3.43), indicating fewer opportunities for interaction. Although language-related difficulties received a moderate rating (mean = 2.85), this did not result in a noticeably lower level of EMI effectiveness (mean = 3.13). This is consistent with research showing that scaffolded instruction and multimodal strategies can help reduce language barriers (Farid et al., 2023; Prabowo et al., 2024; Zhang, 2024).

Table 2: Students' Perception of Lecture Quality and EMI

Item	Mean score
Relevance of content to academic needs	4.25
Clarity of materials presented	4.03
Lecturer's delivery	4.13
Student participation in discussion	3.43
Quality of media and technology	4.00
Effectiveness compared to regular class	3.48
Comprehension of material in English	3.35
Effectiveness of EMI vs Bahasa Indonesia	3.13
Difficulty with technical terms in English	2.85
Importance of English for academic/professional use	4.43

Qualitative Feedback

The quantitative results were enhanced by open-ended answers. The flexibility of online participation, the clarity of the slides, and the chance to learn from an international lecturer were all valued by the students. Limited speaker-student interaction, erratic internet connectivity, and sporadic trouble understanding technical English terms were among the issues mentioned. Some students recommended using structured discussions or quizzes, which is in line with constructive alignment practices and reflects the ideas of active learning (Prince and Felder, 2006).

Implications and Limitations

The findings of this study show that cross-border guest lectures have the potential to be systematically incorporated into engineering curricula in addition to being successful as stand-alone interventions. By connecting global viewpoints with the main goals of the course, these initiatives can improve positive alignment when incorporated into project-based or collaborative learning frameworks. Students would be better prepared for global engineering practice and their intercultural engagement would be strengthened if these sessions were integrated into structured modules (Delaine et al., 2016).

However, it is important to recognize a number of limitations. Due to its single-class focus, reliance on self-reported perceptions, and use of retrospective pre/post measures gathered all at once, the study may have introduced recall bias. Students' experiences were additionally influenced by technical limitations like internet connectivity and differing degrees of English proficiency. Future studies would need to examine the long-term effects of cross-border guest lectures on professional competencies and learning outcomes, combine perception data with performance-based metrics, and enlarge to more participants from several institutions.

Conclusions

The effectiveness of a cross-border online guest lecture on the Atterberg Limit Test that was jointly given by Universitas Sebelas Maret and a Malaysian partner was assessed in this study. The findings confirmed the potential of such initiatives to improve technical competence and confidence in engineering education by showing significant improvements in students' contextual understanding and self-efficacy.

Although there were some mild difficulties with language and interaction, students expressed great satisfaction with the lecture's relevance, clarity, and delivery. The lack of a significant correlation between EMI and learning efficacy implies that, with the right teaching techniques, language barriers can be minimized.

All things considered, this study shows that cross-border guest lectures can be useful resources for internationalizing engineering programs and getting students ready for work in international settings. However, it is important to recognize the limitations, which include the single-class design, the use of self-reported data, and retrospective pre/post measures. Future research should use greater and more varied sample sizes, compare survey results to performance-based outcomes, and investigate the long-term effects of including international guest lectures in formal educational programs.

References

- ABET Engineering Accreditation Commission. (2023). Criteria for accrediting engineering programs: 2024–2025. <https://www.Abet.Org/Accreditation/Accreditation-Criteria/>.
- Accreditation Agency for Degree Programmes in Engineering, Informatics/Computer Science, the, & E.V., N. S. and M. (2021). *Criteria for the Accreditation of Degree Programmes ASIIN Quality Seal: Engineering, Informatics, Natural Sciences, Mathematics, Medicine and combinations with other subject areas*. 32.
- Ahmed, S., & Agaiby, S. (2020). Strength and Stiffness Characterization of Clays using Atterberg Limits.

- Transportation Geotechnics*, 25, 100420. <https://doi.org/10.1016/j.trgeo.2020.100420>
- American Society for Testing and Materials (ASTM). (2011). D2487-17e1: Standard Practice for Classification of Soils for Engineering Purposes (Unified Soil Classification System). *ASTM International*, 1–10. <https://doi.org/10.1520/D2487-11.2>
- Araya, R., & Collanqui, P. (2021). Are cross-border classes feasible for students to collaborate in the analysis of energy efficiency strategies for socioeconomic development while keeping CO2 concentration controlled? *Sustainability (Switzerland)*, 13(3), 1–20. <https://doi.org/10.3390/su13031584>
- Bairaktarova, D., Pilotte, M., & Tetzloff, I. (2014). Relevance-based learning in students' early engineering education experience. *2014 IEEE Frontiers in Education Conference (FIE) Proceedings*, 1–3. <https://doi.org/10.1109/FIE.2014.7044008>
- Bandura, A. (1997). Self-Efficacy: The Exercise of Control. In *New York, NY: W. H. Freeman*. (Vol. 43, Issue 9, pp. 1–602).
- Bolton, S. H., J., W. R., & Raymond, L. (1964). Clay Mineralogical Aspects of the Atterberg Limits. *Journal of the Soil Mechanics and Foundations Division*, 90(4), 107–131. <https://doi.org/10.1061/JSFEAQ.0000628>
- Borrego, M., Foster, M. J., & Froyd, J. E. (2015). What Is the State of the Art of Systematic Review in Engineering Education? *Journal of Engineering Education*, 104(2), 212–242. <https://doi.org/https://doi.org/10.1002/jee.20069>
- Caeiro-Rodríguez, M., Manso-Vázquez, M., Mikic-Fonte, F. A., Llamas-Nistal, M., Fernandez-Iglesias, M. J., Tsalapatas, H., Heidmann, O., De Carvalho, C. V., Jesmin, T., Terasmaa, J., & Sorensen, L. T. (2021). La enseñanza de las habilidades blandas en la formación de ingenieros: Una perspectiva europea. *IEEE Access*, 9, 29222–29242.
- Callahan, K. P., Peterson, C. N., Martinez-Vaz, B. M., Huisinga, K. L., Galport, N., Koletar, C., ... & Bell, E. (2022). External collaboration results in student learning gains and positive STEM attitudes in CUREs. *CBE—Life Sciences Education*, 21(4), ar74. <https://doi.org/10.1187/cbe.21-06-0167>
- Cardullo, V., Wilson, N., & Zygouris-Coe, V. (2015). *Enhanced Student Engagement through Active Learning and Emerging Technologies* (pp. 1–18). <https://doi.org/10.4018/978-1-4666-8363-1.ch001>
- Creswell, J. (2014). *Research design: qualitative, quantitative, and mixed methods approaches*.
- Cymberknop, L. J., & Armentano, R. L. (2018). Active Learning Approach to Enhance Engineering Education in Argentina: A Case of Study in Signals and Systems. *Creative Education*, 09(09), 1444–1456. <https://doi.org/10.4236/ce.2018.99107>
- Dehghanian, K., & Ipek, Ş. Ö. (2022). A survey on the relationships between Compression Index, coefficient of consolidation, and atterberg limits. *Journal of Sustainable Construction Materials and Technologies*, 7(4), 302–315. <https://doi.org/10.47481/jscmt.1161504>
- Delaine, D. A., Tull, R., Sigamoney, R., & Williams, D. N. (2016). Global Diversity and Inclusion in Engineering Education: Developing Platforms toward Global Alignment. *International Journal of Engineering Pedagogy (IJEP)*, 6(1), 56. <https://doi.org/10.3991/ijep.v6i1.5372>
- Eriksson, V., Holma, A. M., & Lind, F. (2023). Case-Based Learning in Collaboration Across Universities To Enhance Students' Understanding of Sustainability. *Proceedings of the International CDIO Conference*, 567–580.
- European-Accredited Engineer. (2021). *EUR ACE Guidelines*. 4(1), 30.
- Farid, F., Parveen, S., & Iqbal, A. (2023). Students Perceptions Regarding English as a Medium of Instruction and its Effects on Their Learning at the University Level. *Global Educational Studies Review*, VIII, 485–495. [https://doi.org/10.31703/gesr.2023\(VIII-I\).42](https://doi.org/10.31703/gesr.2023(VIII-I).42)
- Fateye, B., Rossman, N., King, A., & Otieno, S. (2023). Are preprofessional undergraduate students ready for authentic clinical case studies? An empirical study of students' perceived relevance and motivation. *Advances in Physiology Education*, 47(1), 43–51. <https://doi.org/10.1152/advan.00062.2022>
- Fondjo, A. A., Theron, E., & Ray, R. P. (2021). Estimation of optimum moisture content and maximum dry unit weight of fine-grained soils using numerical methods. *Walailak Journal of Science and Technology*, 18(16), 1–22. <https://doi.org/10.48048/wjst.2021.22792>
- Frikandy, M., Julian, J., Liu, K., Khadafi, M., Aswin, M., & Shiddiqi, A. (2024). *Karakteristik Tanah Ekspansif Di Beberapa Daerah Di Jawa Tengah : Literature Review*. 143–152.
- Galloway, N., & Ruegg, R. (2020). The provision of student support on English Medium Instruction programmes in Japan and China. *Journal of English for Academic Purposes*, 45, 100846. <https://doi.org/10.1016/j.jeap.2020.100846>
- Gutierrez-Bucheli, L., Kidman, G., & Reid, A. (2022). Sustainability in engineering education: A review of learning outcomes. *Journal of Cleaner Production*, 330, 129734.

- <https://doi.org/https://doi.org/10.1016/j.jclepro.2021.129734>
- Hackett, S., Janssen, J., Beach, P., Perreault, M., Beelen, J., & van Tartwijk, J. (2023). The effectiveness of Collaborative Online International Learning (COIL) on intercultural competence development in higher education. *International Journal of Educational Technology in Higher Education*, 20(1). <https://doi.org/10.1186/s41239-022-00373-3>
- Horbacauskiene, J. (2022). *Challenges to the Implementation of English as Medium of Instruction in a Technological University* (pp. 154–170). <https://doi.org/10.4018/978-1-7998-8888-8.ch006>
- Indonesian Accreditation Board for Engineering Education (IABEE). (2023). *Rules and Procedures for Evaluation and Accreditation*.
- Johri, A., & Olds, B. (2015). *Cambridge Handbook of Engineering Education Research*. <https://doi.org/10.1017/CBO9781139013451>
- Khan, Zeashan H, & Abid, Muhammad I. (2021). Distance learning in engineering education: Challenges and opportunities during COVID-19 pandemic crisis in Pakistan. *International Journal of Electrical Engineering & Education*, 0020720920988493. <https://doi.org/10.1177/0020720920988493>
- Kjellgren, B., & Richter, T. (2021). Education for a sustainable future: Strategies for holistic global competence development at engineering institutions. *Sustainability (Switzerland)*, 13(20). <https://doi.org/10.3390/su132011184>
- Lowyck, J., & Pöysä, J. (2001). Design of collaborative learning environments. *Computers in Human Behavior*, 17(5), 507–516. [https://doi.org/https://doi.org/10.1016/S0747-5632\(01\)00017-6](https://doi.org/https://doi.org/10.1016/S0747-5632(01)00017-6)
- Ma, M. (2025). Enhancing Student Engagement and Learning Outcomes Through Strategic Use of Guest Speakers in Advertising Education. *Journal of Advertising Education*, 29(1), 41-52. <https://doi.org/10.1177/10980482251325495>
- Macaro, E., Curle, S., Pun, J., An, J., & Dearden, J. (2018). A systematic review of English Medium Instruction in higher education. *Language Teaching*, 51(1), 36–76. <https://doi.org/10.1017/S0261444817000350>
- Mahadewi, L. P. P., & Pudjawan, K. (2021). The Effect of Guest Lecturers and Online Discussion Forum Towards Students' Communication Competencies on English for Educational Technologist Course. *Proceedings of the 2nd International Conference on Technology and Educational Science (ICTES 2020)*, 540(Ictes 2020), 163–167. <https://doi.org/10.2991/assehr.k.210407.231>
- Munoz-Escalona, P., de Crespo, Z. C., Marin, M. O., & Dunn, M. (2022). Collaborative online international learning: A way to develop students' engineering capabilities and awareness to become global citizens. *International Journal of Mechanical Engineering Education*, 50(1), 89–104. <https://doi.org/10.1177/0306419020934100>
- Mushtaha, E., Abu Dabous, S., Alsyuf, I., Ahmed, A., & Raafat Abdraboh, N. (2022). The challenges and opportunities of online learning and teaching at engineering and theoretical colleges during the pandemic. *Ain Shams Engineering Journal*, 13(6), 101770. <https://doi.org/https://doi.org/10.1016/j.asej.2022.101770>
- Naji, D. M., Akin, M. K., & Cabalar, A. F. (2021). Evaluation of seismic site classification for Kahramanmaraş City, Turkey. *Environmental Earth Sciences*, 80(3), 97. <https://doi.org/10.1007/s12665-021-09396-x>
- Neves, R. M., Lima, R. M., & Mesquita, D. (2021). Teacher competences for active learning in engineering education. *Sustainability*, 13(16), 9231. <https://doi.org/10.3390/su13169231>
- Omar, M., & Fratta, D. (2024). *Critical Evaluation of The Delivery of the Soil Mechanics Curriculum Evaluación crítica de la enseñanza de mecánica de suelos*.
- Payne, B. K., Melvina, S., & and Sun, I. (2003). Bringing the field into the criminal justice classroom: Field trips, ride-alongs, and guest speakers. *Journal of Criminal Justice Education*, 14(2), 327–344. <https://doi.org/10.1080/10511250300085821>
- Pepple, D. G., Akaighe, G. O., Sambo, A., George-Aremu, O., Bosah, G., & Trollman, H. (2025). Using guest lectures to enhance student employability: pedagogical considerations. *Cogent Education*, 12(1). <https://doi.org/10.1080/2331186X.2025.2452076>
- Phan, The Anh, Vu, Thi Hong Nhung, Vo, Ngoc Thao Nguyen, & Le, Thu-Hang. (2024). Enhancing Educational Outcomes Through Strategic Guest Speaker Selection: A Comparative Study of Alumni and Industry Experts in University Settings. *Business and Professional Communication Quarterly*, 23294906241263036. <https://doi.org/10.1177/23294906241263036>
- Prabowo, T. T., Sitthiworachart, J., & Sriwisathiyakun, K. (2024). Fostering student digital wellbeing through digital storytelling integrated with peer assessment. In *Education and Information Technologies* (Vol. 30, Issue 3). Springer US. <https://doi.org/10.1007/s10639-024-12950-2>
- Prince, M. (2004). Does active learning work? A review of the research. *Journal of Engineering Education*, 93(3), 223–231. <https://doi.org/10.1002/j.2168-9830.2004.tb00809.x>

- Prince, M. J., & Felder, R. M. (2006). Inductive Teaching and Learning Methods: Definitions, Comparisons, and Research Bases. *Journal of Engineering Education*, 95(2), 123–138. <https://doi.org/https://doi.org/10.1002/j.2168-9830.2006.tb00884.x>
- Pun, J., & Macaro, E. (2019). The effect of first and second language use on question types in English medium instruction science classrooms. *International Journal of Bilingual Education and Bilingualism*, 22(1), 64–77. <https://doi.org/10.1080/13670050.2018.1510368>
- Rose, H., & Galloway, N. (2019). Global Englishes and the internationalization of higher education: Current trends and future directions. *Journal of International Students*, 9(1), 273–287. <https://doi.org/10.32674/jis.v9i1.268>
- Van den Beemt, A., Groothuijsen, S., Ozkan, L., & Hendrix, W. (2023). Remote labs in higher engineering education: engaging students with active learning pedagogy. *Journal of Computing in Higher Education*, 35(2), 320–340.
- Zhan, Z., & Niu, S. (2023). Subject integration and theme evolution of STEM education in K-12 and higher education research. *Humanities and Social Sciences Communications*, 10(1), 1–13. <https://doi.org/10.1057/s41599-023-02303-8>
- Zhang, H. (2024). EMI in Chinese Universities from the Perspective of Students. *Journal of Education, Humanities and Social Sciences*, 42, 720–726. <https://doi.org/10.54097/5h4brk66>

Acknowledgement

The authors would like to express their sincere appreciation to Universiti Malaysia Perlis (UniMAP) for its invaluable partnership in facilitating the cross-border learning initiative. The collaboration, support, and shared expertise from UniMAP greatly enriched the learning experience and contributed significantly to the success of this program.

Copyright Statement

Copyright © 2025 Galuh Chrismaningwang, Maxvallecia Frikandy, Lydia Novitriana Nur Hidayati, Achmad Basuki: The authors assign to the Research in Engineering Education Network (REEN) and educational non-profit institutions a non-exclusive license to use this document for personal use and in courses of instruction provided that the article is used in full, and this copyright statement is reproduced. The authors also grant a non-exclusive license to REEN to publish this document in full on the World Wide Web (prime sites and mirrors), on portable media and in printed form within the REES and RCEE & RHEd 2025 proceedings. Any other usage is prohibited without the express permission of the authors.