Electric Vehicle Technology Course for Generation Z: Discussion-Based, Project-Based, and Laboratory Activities

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Abstract *- Generation Z, growing up in an era of constantly evolving technology and information, presents new challenges for the world of education. They are known as a digitally connected generation, quick to adapt to technological advancements, and in search of interactive experiences in learning. One excellent step in responding to these needs is using suitable learning methods. For the new mandatory course, Electric Vehicle Technology with a weight of 3 credits, in the Electrical Engineering Bachelor's Program at Universitas Islam Indonesia, a learning approach that matches the characteristics and preferences of Generation Z was used. In the odd semester of 2023/2024, two classes were opened for Electric Vehicle Technology, class A with 56 students and class B with 50 students. The combination of discussion-based learning methods, project-based learning, and laboratory activities was used in the learning process to meet the needs of Generation Z students in the Electric Vehicle Technology course. The assessment used consisted of summative and formative assessments. The scoring rubric was key in helping to categorize the value of the work done by students. The integration of assessment weights considers the contribution from each learning model. Overall, the application of discussion-based learning models, project-based learning, and laboratory activities together have created a stimulating learning environment and aroused student enthusiasm in the Electric Vehicle Technology course. With combined methods of learning, the course passing rate for each of the course's learning outcomes was higher than 80%. For class A, the overall course passing rate was 88%, while for class B, it was 84%.*

Keywords*: Z generation; Discussion; Project;*

INTRODUCTION

Based on Padhilah et al., (2023), the rapid growth of electric vehicles (EVs) in many areas of Indonesia has been a significant development. Recognizing the importance of equipping future engineers with the skills and knowledge necessary to support this transition, the Bachelor of Electrical Engineering Program at Islamic University of Indonesia has introduced a new course, Electric Vehicle Technology, in its 2022 curriculum. This course uses an outcome-based education approach; the Indonesian Accreditation Board for Engineering Education (IABEE) develops its criteria. One of the curriculum's learning implementations will use problem-based experiments and engineering design (Tim kurikulum & Uii, n.d., 2022). The course weighing 3 credits shows that this is a course that has a sufficient level of involvement in the curriculum. The Electric Vehicle Technology course adopts 3 Electrical Engineering Graduate Learning Outcomes (GLO), namely the ability to design and carry out laboratory and field experiments as well as to analyze and interpret data to strengthen engineering judgment, the ability to apply modern methods, skills and tools needed for electrical engineering practice, and the ability to plan, complete, and evaluate tasks within specified constraints.

Students in the course are Generation Z, who grew up in an era of ever-developing technology and information, bringing new challenges to the world of education. They are known as a digitally connected generation, quickly adapting to technological developments, and looking for interactive experiences in learning (Dolot, 2018). According to a study by (Joe Mosca, 2019), Generation Z want to be actively involved in their education and gain from lecturers who give them the freedom to communicate with others in a flexible way while still allowing them to solve problems independently. By embedding these outcomes into the curriculum, the Islamic University of Indonesia aims to produce graduates who are well-equipped to contribute to the growth and development of the EV sector in Indonesia and beyond. Gen Z students are more motivated and satisfied with higher education when using modern teaching method (Alruthaya et al., n.d.); this course will implement the method that supports GLO and will be suitable for generation Z.

The discussion-based learning method is one of the appropriate approaches to be integrated in this course. According to (Dolot, 2018), it is true that Generation Z values communication and wants to hear about the outcomes of what they've done. They tend to be more actively involved in the learning process when they have the opportunity to participate in group discussions. Discussions allow them to share opinions, exchange ideas, and build a shared understanding of the topic being studied. By discussing, students can gain a deeper understanding of concepts in electric vehicle technology and apply them in real contexts. Research by x shows that discussion-based learning is effective in attracting attention and maintaining Generation Z's involvement in the learning process. Discussions allow students to participate actively, share ideas, and build a common understanding of the learning material (Pollock et al., 2011; Zafar & Hafeez, 2021). This is in line with the findings of research conducted by (Scager et al., 2016), which emphasize the importance of social interaction and collaboration in effective learning for the digitally connected generation.

Project-based learning methods are also important to apply in this course. Generation Z tends to be more motivated and actively involved when they are given challenging and relevant assignments or projects (Lei et al., 2012). By using this approach, students can be involved in creating projects that integrate various aspects of electric vehicle technology, such as electrical systems, power electronics, and controls. These projects not only provide practical experience, but also allow students to develop problem-solving and creative thinking skills. Project-Based Learning, also known as PBL, is a type of collaborative learning that encourages students' direct participation in the creation of specific projects relevant to their learning material, with the aim of overcoming their own learning challenges (Gonzalez-Rubio et al., 2016). This learning model consistently requires students to be actively involved and fully participate, with the teacher acting as a facilitator in the learning process (Halim Purnomo, 2019). Research by (Almulla, 2020) found that project-based learning (PBL) methods are well suited to the learning preferences of Generation Z who seek relevant and engaging learning experiences. Challenging and interesting projects can increase students' intrinsic motivation, allowing them to apply knowledge in real contexts, and developing practical skills needed for the future (Swart, 2016).

Laboratory activities are also an important component in the Electric Vehicle Technology course. Through laboratory activities, students can apply theoretical concepts learned in class into real practice. They can conduct experiments, observe phenomena directly, and test the performance of electric vehicle systems in the controlled laboratory environment. This not only deepens their understanding of electric vehicle technology, but also helps them develop practical skills relevant to the rapidly developing automotive industry. Research by (May et al., 2023) highlights the importance of laboratory activities in improving the understanding and skills of Generation Z students in engineering courses. Through practical activities and hands-on experiments, students can experience theoretical concepts in a real context. This helps strengthen their understanding of the learning material and prepares them to face challenges in an ever-growing industry.

Overall, discussion-based learning methods, project-based learning, and laboratory activities are used to meet the needs of Generation Z students in the Electric Vehicle Technology course. By integrating these approaches in the learning process, it is hoped that students will be more involved, enthusiast in the learning process, and ready to face challenges in the developing electric vehicle industry.

RESEARCH METHODS

The UII Electrical Engineering Study Program has 12 Graduate Learning Outcomes (GLO). GLO helps in evaluating the quality of study programs. The formulated learning outcomes are used as a reference in determining course learning outcomes according to the mapping carried out by the curriculum team. The mapping of the learning outcomes into course learning outcomes (CLO) for the Electric Vehicle Technology course can be seen in Table 1 and Table 2.

Table 1. GLO and CLO Mapping

Graduate Learning Outcomes (GLO)	Code
Ability to apply modern methods, skills and tools required for the practice of electrical engineering.	CLO1
Ability to plan, complete, and evaluate tasks within established constraints.	CLO2
Ability to design and conduct laboratory and/or field experiments and analyze and interpret data to strengthen engineering judgment.	CLO3 CLO4

Table 2. CLO Details

Code	Course Learning Outcomes (CLO)
CLO1	Students can identify innovative solutions using modern tools and the latest technology that are relevant to the development of Electric vehicle technology and apply them in projects
CLO2	Students are able to plan assigned group assignments and carry out technical, economic and environmental analyzes for electric vehicles
CLO3	Students carry out designs and experiments on electric vehicle components in the laboratory according to developing technology
CLO4	Students carry out analyzes related to the designs and experiments carried out then write them down.

The learning concept developed can include various elements and methods designed to increase student interaction, participation and understanding.

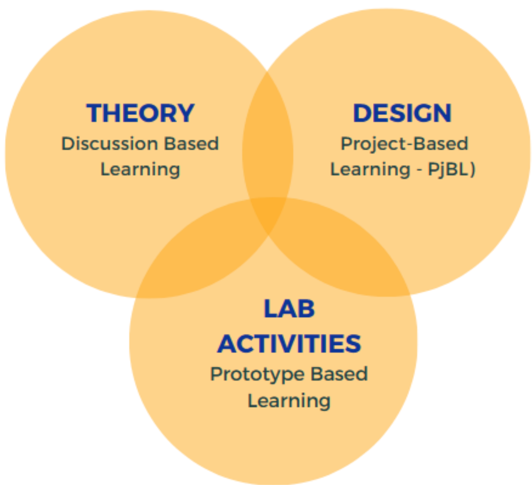


Figure 1. The learning model applied

Figure 1 represents the combination of learning models using Discussion Based Learning, Project based learning and Lab

Activities. The overall approach is designed to provide a comprehensive learning experience, imparting in-depth knowledge and practical skills to students.

1. Discussion-based learning

Discussion-based learning in electric vehicle technology courses follows a structured approach outlined in three stages, as illustrated in Figure 2. The process starts in class when the lecturer gives students explanations and information in an effort to provide a foundational understanding of the subject and discussion environment. This stage helps to reinforce previously presented content, spark student interest, and help prepare for conversations. The instructor then leads the students in group discussions, with groups usually consisting of four to five people. Clear instructions and criteria, including the length of the discussion and the completion of a logbook, are given prior to starting a conversation. Students are encouraged to take the lead in their conversations, supporting autonomy and responsibility in controlling the discourse, with the lecturer acting as a facilitator and providing support as needed.

This method fosters critical thinking and problem-solving skills in addition to improving students' communication and teamwork capabilities. Upon completion, groups may present their findings to the class and receive feedback from peers and lecturers, promoting further learning and reflection.

Figure 2 Discussion Based Learning

2. Project Based Learning

By using Project Based Learning, the inquiry process begins by asking guiding questions and guiding students in collaborative projects that combine various subjects in the curriculum. When these questions are answered, students can immediately see the various main elements and principles in the discipline they are studying. Divide students into project groups to design, develop, and present electric vehicle technology solutions. It encourages collaboration, creativity, and application of concepts in relevant projects. Group Project Based Learning in the field of electrical engineering is also carried out by [1]–[4]. In the context of the Electric Vehicle Technology course, PBL offers students the opportunity to deepen their understanding of electric vehicle technology through in-depth and relevant practical experience.

- **Challenging challenges**: At the beginning of the lecture, students are introduced to the PBL concept by being given instructions and direction from the lecturer regarding the project. The first step in PBL is to determine the type of electric vehicle to be designed. By choosing challenging challenges, students are faced with the opportunity to apply their knowledge in a real context.
- **Continuous exploration**: Next, students engage in developing in-depth understanding and problem solving related to the project. They were introduced to electric vehicle components, from the electrical system to controls, as well as carrying out calculations and determining the required specifications. This process also includes tracking where components are purchased and estimating the costs required for project design.
- **Relevant authenticity**: One important aspect of PBL is the authenticity of the

project. Projects in this course must have relevance, meaning and significance in real life. In this way, students not only learn theory, but also apply it in contexts relevant to the electric vehicle industry.

- **Student voice and choice**: PBL gives students the opportunity to have voice and choice in the learning process. They can choose the type of electric vehicle that will be the topic of their project, and have the freedom to conduct investigations, collaborate with fellow students, and work in teams to achieve common goals.
- **Deep reflection**: As the project progresses, students are encouraged to reflect and reflect on their thoughts and findings. Through class presentations or group discussions, they have the opportunity to share the results of their research and hear the views of their peers. This not only deepens their understanding, but also facilitates the exchange of ideas and valuable feedback.
- **Criticism and revision**: As part of the PBL process, lecturers provide feedback on student projects based on a predetermined assessment rubric. This helps students understand strengths and areas for improvement in their designs, encouraging continuous development and quality improvement.
- **Public product**: Finally, students present their projects in the form of presentations and reports in front of an audience consisting of classmates and lecturers. This presentation is an opportunity for them to communicate their findings, solutions, or results from their project to others.

By combining all these elements, the PBL in Electric Vehicle Technology course not only provides students with a deep and meaningful learning experience, but also prepares them to face real-world challenges in the ever-growing electric vehicle industry. The output of project-based learning can be seen in Figure 3.

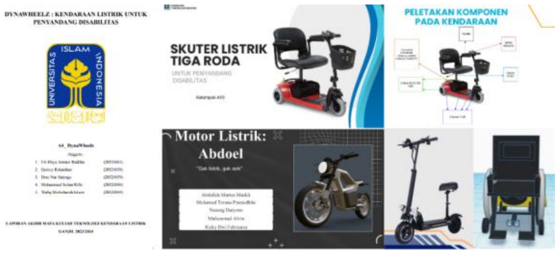


Figure 3. Final project output

3. Lab Activities

In lab activities, students design and experiment on batteries, motors and converters in electric vehicles using the EV Simulator. Students must study the precondition material before entering the lab so that they have a basic understanding of the topic that will be discussed, then continue with the pre-test. The lab assistant explains the purpose, basic concepts, and objectives of the experiment. Students carry out experiments according to the instructions given. They record data, measure results, and observe changes as they occur. Students analyze the data they have collected during the experiment. Students understand the meaning of experimental results, try to explain their findings, and relate them to previously learned concepts. Students discuss with fellow students or with laboratory assistants about experimental results, findings, and their understanding. Students are asked to prepare an experimental report which includes objectives, methods, results, analysis and conclusions. This report must be written scientifically and according to the specified format and then the students formulate conclusions from the experiment and relate them to the initial objectives. The process of lab activities is shown in Figure 4.

Figure 1. Lab activities

Table 3. Assessment and weight of CLO

Code	Assessment	Weight
CLO1	Final project, written exam	60%
CLO2	Final project: Logbook (Timeline, budget planning)	20%
CLO3	Lab activities	10 %
CLO4	Lab activity reports and final project	10%

Primarily, CLO1, emphasizing the application of modern methods and skills in electrical engineering, is predominantly assessed through a final project (12%) and a written middle and final exam (48%), collectively accounting for 60% of the overall assessment weight. CLO2, focusing on task planning and execution within defined constraints, is primarily evaluated through the final project, with specific emphasis on logbook entries detailing timeline and budget planning, contributing 20% to the total assessment weight. Additionally, CLO3, which centers on laboratory experimentation and data analysis, is evaluated through dedicated lab activities, comprising 10% of the assessment weight. Finally, CLO4, which underscores the importance of robust experimental design and analysis, is assessed through lab activity reports (4%) and the final project reports (6%), collectively contributing 10% to the overall assessment weight. Assessment and measurement of each course learning outcomes based on activities and weighting can be seen in Table 3.

The success of the learning process in electric vehicle technology courses, using a combination of learning methods for Generation Z, will be measured by learning measurement model. It will be assessed by the number of students who graduate with a score above 60, a benchmark set by the department in accordance with the accreditation standards used. This evaluation will cover each Course Learning Outcome (CLO), ensuring that students achieve proficiency across all targeted competencies. Then, the level of student enthusiasm for the learning process will be measured through surveys in classroom, providing insights into their engagement and motivation. Together, these indicators will offer a comprehensive measure of the course's effectiveness in fostering both academic success and active participation among students. The learning measurement model and performance indicator can be seen in Table 4.

Table 4. Learning measurement model

Learning measurement model	Performance indicator
The number of students who have (or demonstrate) the ability to identify innovative solutions using modern tools and the latest technology relevant to the development of electric vehicle technology and apply them in projects	CLO 1 achievement level > 60
The number of students who have been able to plan a given group assignment and carry out technical, economic and environmental analysis for electric vehicles	CLO 2 achievement level > 60
The number of students who can design and experiment on electric vehicle components in the laboratory according to developing technology	CLO 3 achievement level > 60
The number of students who can carry out analyzes related to the designs and experiments carried out and then write them down.	CLO 4 achievement level > 60
Measuring the level of student enthusiasm in the learning process carried out	80% enthusiastic

RESULTS AND DISCUSSION

Course Passing Rate

CLO 1: Students can identify innovative solutions using modern tools and the latest technology that are relevant to the development of electric vehicle technology and apply them in projects

Student's passing rate for Course Learning Outcomes (CLO) can be seen in Figure 5. The CLO 1 score is taken from the mid-semester written exam and final written exam scores, each with a weight of 40% and also from major assignments (20%). It can be seen that students' passing rate in class A was 88% and in class B, 84%. Student passing rate for CLO 1 is classified as very good. A survey of the students' understanding of CLO 1 was conducted, and the results can be seen in Figure 6. The survey results showed that 51.5% (52 of 101 respondents) said they really understood the CLO 1 material, while 47.5% (48 of 101 respondents) said they understood the CLO 1.

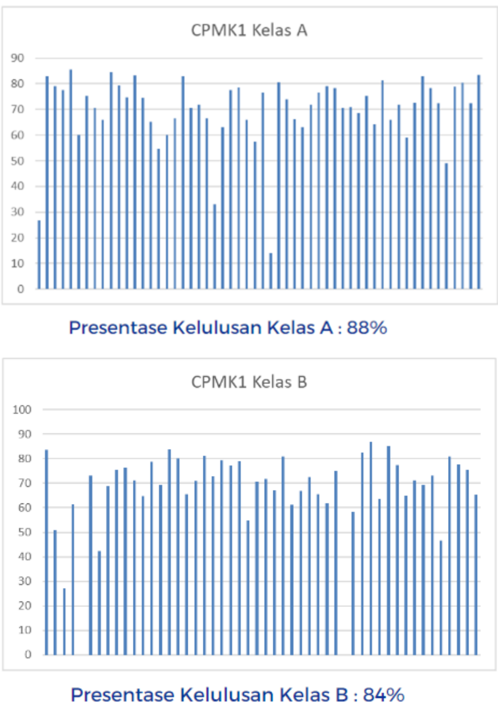


Figure 5. CLO 1 passing rate in Class A and Class B

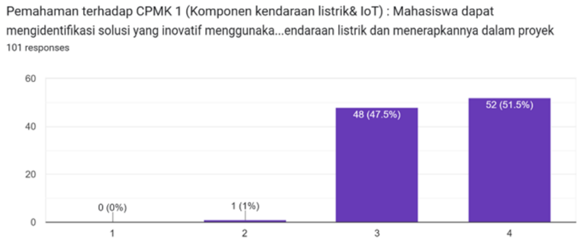


Figure 6. Survey of students' understanding of CLO 1 ((Note: 1: Completely don't understand 4: Completely understand)

CLO 2: Students are able to plan the group assignment given and carry out technical, economic and environmental analysis for electric vehicles

Students' passing rate for CLO 2 can be seen in Figure 7. CLO 2 grades are taken from major assignments only. It can be seen that the passing rate in class A is 98% and 94% in B. Students' passing rate for CLO 2 are classified as very good. A survey of students' understanding of CLO 2 was conducted, and the results can be seen in Figure 8. The survey results showed that 48.5% (49 of 101 respondents) said they really understood the CLO 2 material, while 50.5% (50 of 101 respondents) said they understood the CLO 2.

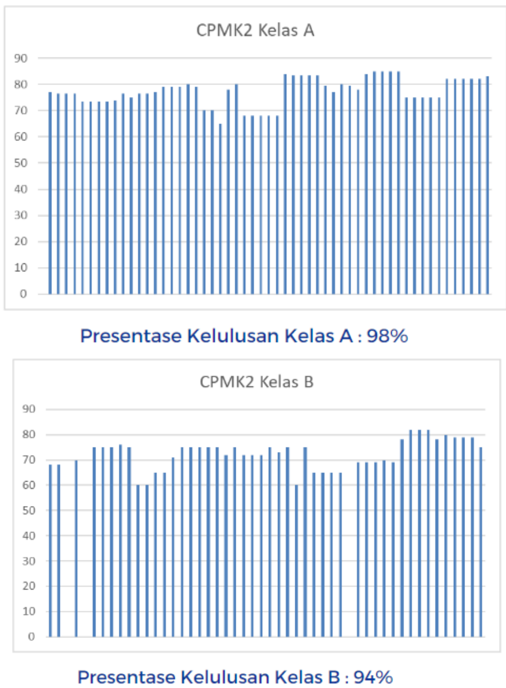


Figure 7. CLO 2 passing rate in Class A and Class B

Figure 8. Survey of students' understanding of CLO2 (Note: 1: Completely don't understand 4: Completely understand)

CLO 3: Students design and experiment on electric vehicle components in the laboratory according to developing technology

The Student Passing rate for CLO 3 can be seen in Figure 9. The CLO 3 score is taken from lab activities, weighing 10% for the pre-test score and 90% for the lab activity score. It can be seen that the students' passing rate for CLO3 in class A is 98% and in class B, 94%. Students' passing rate in CLO 3 is classified as very good. A survey of students' understanding of CLO 3 was conducted, and the results can be seen in Figure 10. The survey results showed that 54.5% (55 of 101 respondents) said they really understood the CLO 3 material, while 44.6% (45 of 101 respondents) said they understood.

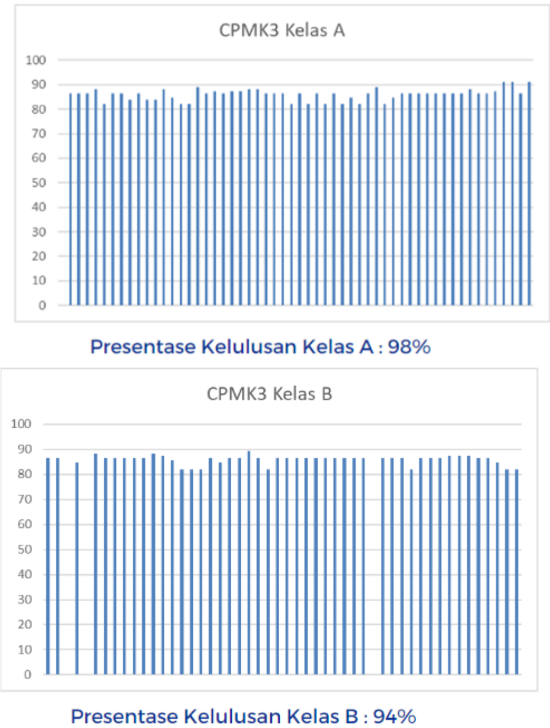


Figure 9. CLO 3 passing rate in Class A and Class B

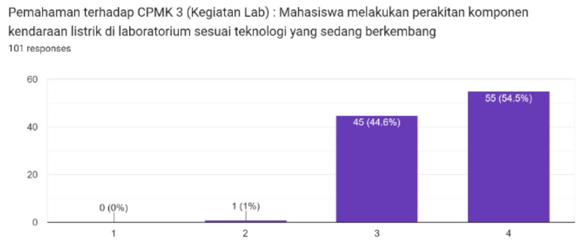


Figure 10. Survey of students' understanding of CLO 3 (Note: 1: Completely don't understand 4: Completely understand)

CLO 4: Students carry out an analysis related to the design and experiments carried out then write it down.

Student passing rate for CLO 4 can be seen in Figure 11. The CLO 4 score is taken from the final project report, weighing 40%, and the lab activity report score, weighing 60%. It can be seen that the student passing rate for CLO 4 in class and B are 98% and 94% respectively.

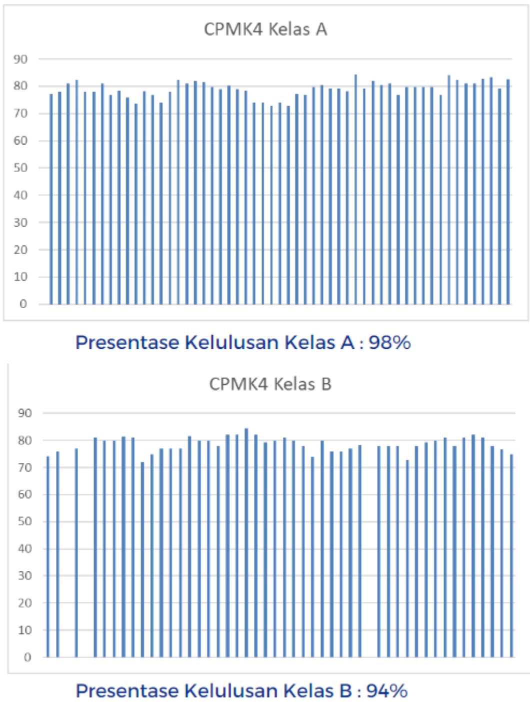


Figure 11. CLO 4 passing rate in Class A and Class B

The passing rate for CLO 4 is classified as very good. A survey of students' understanding of CLO 4 was conducted, and the results can be seen in

Figure 12. The survey results showed that 56.4% (57 of 101 respondents) said they really understood the CLO 4 material, while 43.6% (44 of 101 respondents) said they understood.

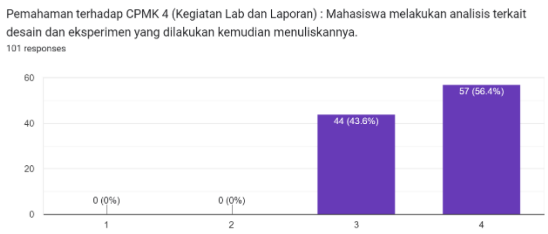


Figure 12. Survey of students' understanding of CLO4 (Note: 1: Completely don't understand 4: Completely understand)

The passing rate for the 2023/2024-odd-semester Electric Vehicle Technology course using the Student-Centered Learning-based learning method can be seen in Table 3. It shows that the passing rate for each CLO is above 80%. The total passing rate for each class is 88% for class A and 84% for class B.

Tabel 3. Course passing rate

Class	Number of students	CLO1	CLO2	CLO3	CLO4	Passing rate
A	56	88%	98%	98%	98%	88%
B	50	84%	94%	94%	94%	84%

Enthusiastic students

A survey was conducted to measure students' enthusiasm in learning in class based on discussions, projects and lab activities. The survey results can be seen in Figure 13. Students' enthusiasm for participating in classroom learning using the discussion method was 61.4% (62 of 101 respondents) were of the opinion that they were very enthusiastic, 35.6% (36 of 101 respondents) were of the opinion that they were enthusiastic and the remaining 3 students said they were not enthusiastic. The majority of students taking the 2023/2024-odd-semester Electric Vehicle Technology course are enthusiastic about participating in classroom learning activities.

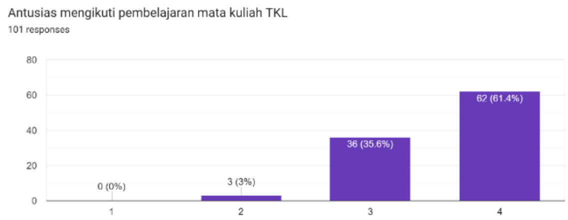


Figure 13. Survey of students' enthusiasm for participating in class learning (Note: 1: Very not enthusiastic 4: Very enthusiastic)

A survey was conducted to measure students' enthusiasm in participating in project-based learning. The survey results can be seen in Figure 14. The enthusiasm of students in carrying out projects in learning were as follows: 61.4% (62 out of 101 respondents) thought they were very enthusiastic, 35.6% (36 out of 101 respondents) thought they were enthusiastic and the remaining 3 students said they were not enthusiastic. The majority of students taking the 2023/2024 odd semester Electric Vehicle Technology course are enthusiastic about working on the projects given.

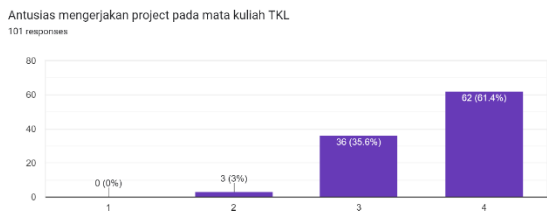
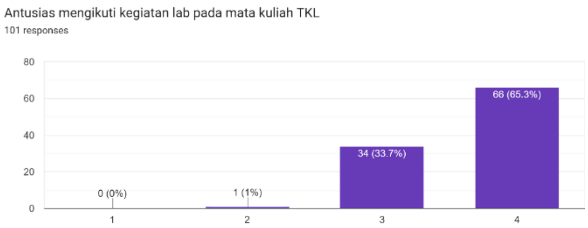


Figure 14 Survey of students' enthusiasm for working on a given project (Note: 1: Very not enthusiastic 4: Very enthusiastic)

Surveys were also conducted to measure students' enthusiasm in carrying out lab activities. The survey results can be seen in Figure 15. The enthusiasm of students in participating in lab activities was as follows: 65.3% (66 of 101 respondents) were of the opinion that they were very enthusiastic,



33.7% (34 of 101 respondents) were of the opinion that they were enthusiastic and the remaining 1 student was of the opinion that he/she was not enthusiastic.

Figure 15. Survey of enthusiasm for participating in lab activities (Note: 1: Very not enthusiastic 4: Very enthusiastic)

In the learning process, several challenges need to be addressed to improve effectiveness and equality among students. The understanding among group members is often uneven due to varying levels of enthusiasm. To tackle this issue, it is important to emphasize balanced work distribution among group members. Unequal task distribution among group members is also a problem that needs to be addressed. The solution is to conduct regular peer assessments, allowing group members to provide feedback and evaluate each other's contributions, ensuring tasks are distributed fairly and evenly.

CONCLUSION

The effectiveness of discussion-based learning methods, project-based learning, and laboratory activities in increasing the involvement and understanding of Generation Z students in the Electric Vehicle Technology course. The integration of these methods creates a stimulating learning environment, generates student enthusiasm, and results in high graduation rates. The suggestions given refer back to the results of this study, recommending the application of similar learning practices in other courses to support the learning needs of Generation Z students. The results demonstrate the effectiveness of this approach, with a graduation rate exceeding 80% for each learning outcome in both classes. Class A achieved an overall passing rate of 88%, while class B attained 84%. These outcomes signify the success of the combination of learning methods in creating a stimulating learning environment that fosters student enthusiasm and achievement. Moving forward, continued adaptation and refinement of teaching strategies to cater to the evolving needs of Generation Z will be essential. This case study underscores the importance of aligning educational practices with the characteristics and preferences of contemporary learners to enhance learning outcomes and prepare students for success in an increasingly technologically-driven world.

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REFERENCES

Padhilah, F. A., Surya, I. R. F., & Aji, P. (2023). Indonesia Electric Vehicle Outlook 2023 Electrifying Transport Sector: Tracking Indonesia EV Industries and Ecosystem Readiness. *Institute for Essential Services Reform (IESR)*.

Adnan Padhilah Ilham Rizqian Fahreza Surya Pintoko Aji, F., Arinaldo Handriyanti Puspitarini Julius C Adiatma, D. D., & Tumiwa Julius

Adiatma, F. C. (2023). *Indonesia Electric Vehicle Outlook 2023 Electrifying Transport Sector: Tracking Indonesia EV Industries and Ecosystem Readiness*.

Almulla, M. A. (2020). The Effectiveness of the Project-Based Learning (PBL) Approach as a Way to Engage Students in Learning. *SAGE Open*, *10*(3). https://doi.org/10.1177/2158244020938702

Alruthaya, A., Nguyen, T.-T., & Lokuge, S. (n.d.). *The Application of Digital Technology and the Learning Characteristics of Generation Z in Higher Education*.

Dolot, A. (2018). The characteristics of Generation Z. *E-Mentor*, *74*, 44–50. https://doi.org/10.15219/em74.1351

Gonzalez-Rubio, R., Khoumsi, A., Dubois, M., & Trovao, J. P. (2016, December 19). Problem- and Project-Based Learning in Engineering: A Focus on Electrical Vehicles. *2016 IEEE Vehicle Power and Propulsion Conference, VPPC 2016 - Proceedings*. https://doi.org/10.1109/VPPC.2016.7791756

Kurikulum, T., & Uii, P. (n.d.). *BUKU PANDUAN AKADEMIK 2022 PROGRAM SARJANA Program Studi Teknik Elektro Universitas Islam Indonesia*.

Lei, C. U., Kwok-Hay So, H., Lam, E. Y., Wong, K. K. Y., Kwok, R. Y. K., & Chan, C. K. Y. (2012). Teaching introductory electrical engineering: Project-based learning experience. *Proceedings of IEEE International Conference on Teaching, Assessment, and Learning for Engineering, TALE 2012*. https://doi.org/10.1109/TALE.2012.6360320

May, D., Jahnke, I., & Moore, S. (2023). Online laboratories and virtual experimentation in higher education from a sociotechnical-pedagogical design perspective. In *Journal of Computing in Higher Education* (Vol. 35, Issue 2, pp. 203–222). Springer. https://doi.org/10.1007/s12528-023-09380-3

New Approaches to Learning for Generation Z. (2019). *Journal of Business Diversity*, *19*(3). https://doi.org/10.33423/jbd.v19i3.2214

Pollock, P. H., Hamann, K., & Wilson, B. M. (2011). Learning through discussions: Comparing the benefits of small-group and large-class settings. *Journal of Political Science Education*, *7*(1), 48–64. https://doi.org/10.1080/15512169.2011.539913

Scager, K., Boonstra, J., Peeters, T., Vulperhorst, J., & Wiegant, F. (2016). Collaborative learning in higher education: Evoking positive interdependence. *CBE Life Sciences Education*, *15*(4). https://doi.org/10.1187/cbe.16-07-0219

Swart, G. (2016). Learning Systems Engineering Lessons from an Electric Vehicle Development. *INCOSE International Symposium*, *26*(1), 2055–2069. https://doi.org/10.1002/j.2334-5837.2016.00280.x

Zafar, N., & Hafeez, M. (2021). A Critical Review on Discussion and Traditional Teaching Methods. In *Psychology And Education* (Vol. 58, Issue 1). www.psychologyandeducation.net