Implementation Of Hybrid Learning In Teaching And Learning Of DET20033 Electrical Circuits And DET30053 Power Systems

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Abstract
The Covid-19 pandemic has provided a holistic picture of the future of the education world through information technology-based teaching and learning applications. However, information technology applications or e-learning platforms still cannot replace the role of teachers, lecturers, and learning interactions between students and teachers because education is not only about gaining knowledge but also about value, cooperation, and efficiency. Furthermore, this pandemic situation is a challenge to the creativity of individuals in using technology to develop the world of education. Covid-19 transmission has affected the learning method of students by emphasising what minimises physical presence online. In addition, there is a risk of inequality in student achievement, cognitive development and characterisation. Thus, the I 2021/2022 session beginning in September 2021 has applied the hybrid learning method to suit the current state of the Covid-19 pandemic. This study aims to identify the impact or impact of implementing hybrid learning methods in teaching and learning sessions for the DET20033 Electrical Circuits and DET30053 Power System courses. A total of 33 students from the Diploma in Electrical and Electronic Engineering and Diploma in Electronic Engineering (Communications) were involved as respondents to this study. The research in this study used a qualitative and quantitative approach to obtain feedback and findings of research data on the impact of hybrid learning in the teaching and learning process.

Keywords: Hybrid learning, teaching and learning, the Covid-19 pandemic

1.0   Introduction

The Covid-19 epidemic has altered learning patterns, which has motivated educators to maximise their efforts in reaching their objectives and learning outcomes. Despite improving communication and information technologies, educators must prioritise students' intelligent and pleasant conduct patterns (Aminah, Setiawan, Rozal & Sulman, 2021). Modifications to teaching strategies can produce a balanced pattern involving the three learning domains of cognitive, emotional, and psychomotor learning appropriate for the twenty-first century.

Teachers can help students develop their creativity so they are ready for the instructional content and the creative learning process (Roshayanti, Wicaksono, Minarti & Nurkholis). Creativity can be developed using a learning model appropriate for the situation and the time. As a result, online or e-learning sessions have been implemented during the Covid-19 pandemic.

Today, educators and students can access various e-learning platforms, often online teaching and learning platforms. According to Maillis et al., during the time that the Movement Control Order (MCO) is in effect, teachers may employ a variety of e-learning tools, including Google Classroom, Zoom, Microsoft Teams, Google Meet, and other programmes that are appropriate for carrying out the teaching and learning process.

Furthermore, as of October 2021, higher education institutions can perform online and in-person teaching and learning activities. The management of higher education institutions is actively planning to adopt face-to-face and online learning, also referred to as the hybrid learning approach (Berita Harian, Sept. 2021).

Hybrid learning is a blend of in-person and online instruction by Hidayatullah and Anwar (2020). With hybrid learning, students can interact face-to-face with lecturers to ask questions, debate topics, work on assignments, and receive hands-on guidance. Additionally, hybrid learning provides students with 50% online and 50% in-person lectures, allowing them to overcome the challenges of online learning (Febnesia, Nurtanto, Ikhsanudin & Abdilah, 2021).

1.1   Objective

According to Susanti (2021), learning in a hybrid setting can produce efficient teaching and learning dynamics, motivating relationships between students and lecturers, providing up-to-date teaching and learning information, and successful communication. This illustrates how hybrid learning can enhance student involvement to accomplish learning objectives. This study's objective was:

i.   To determine how the use of hybrid learning techniques in teaching and learning sessions for the courses DET20033 Electrical Circuits and DET30053 Power System affected student performance.

2.0   Literature Review

The impact of learning can be increased, and current time constraints can be solved through hybrid learning, which blends (traditional) face-to-face learning and online learning. Ikawati et al. (2021) discovered that hybrid learning improves students' perceptions of and satisfaction with the University of Gajah Mada's Faculty of Pharmacy's implementation of lectures and practises throughout the Covid-19 epidemic. Group discussions, practical and academic meetings are just a few examples of impediments or constraints face-to-face college and e-learning may encounter through the platform.

According to Pangkerego et al. (2021), hybrid learning affects students' learning results. As a result of participating in a teaching and learning session, students modify their behaviour patterns, values, understanding, attitudes, appreciation, and skills. These changes are known as learning outcomes.

According to Dhewy and Randayani (2021), using hybrid learning techniques during post-pandemic Covid-19 improved students' comprehension of statistical courses by 43.4 per cent for the English Education programme at STKIP PGRI Sidoarjo. Face-to-face lectures, in-person workshops, and online workshops are all used to implement this hybrid learning approach. As a result, hybrid learning can raise students' academic performance and level of interest in statistics courses.

In essence, hybrid learning allows both students and educators to use technology to learn more or get more knowledge. According to Hidayat et al. (2022), students have strong critical thinking abilities using hybrid learning approaches. Students can use problem-based learning when completing assignments or helping others when hybrid learning is implemented (Sasmita & Harjono, 2021).

3.0   Methodology

This study's methodology is the mixed mode approach, which combines qualitative and quantitative methodologies. Over 6 to 8 weeks starting in September 2021, the researcher performed structured observations and interviews for the I 2021/2022 session. Attachments or observation sheets, interview sheets, checklist sheets, and field notes were used in this research. The last lecture session was then used to distribute a (1) set of questionnaires to respondents to collect student input on implementing hybrid learning.

Through online observation and in-person instruction, data-collecting approaches are used. The questionnaire was then distributed to respondents using Google Forms, and researchers took field notes, and offline/in-person student interviews, gave documentation checklists, and administered the questionnaire. The observation processes used in this study are shown in Figure 1.
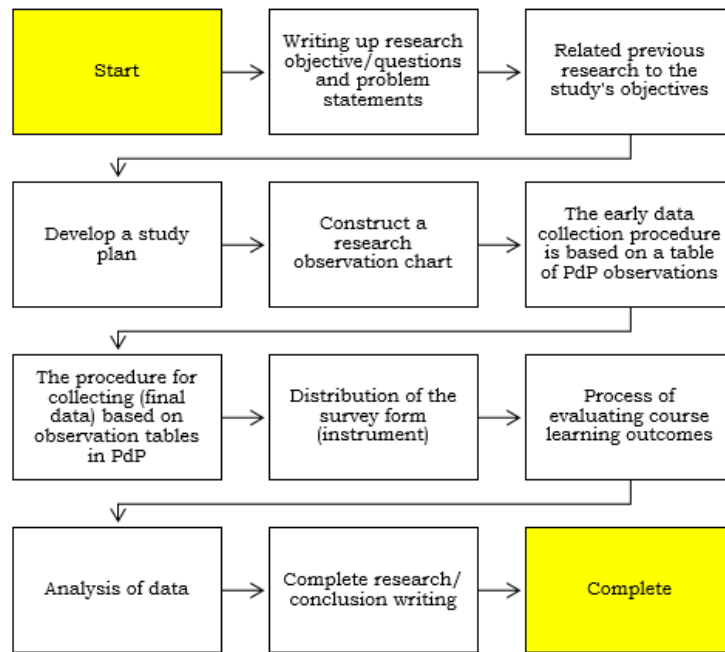
Figure 1: Diagram of the research implementation process

The planning, implementation and assessment phases of the Miles et al. (2014) Analysis Model technique are adapted to this structured observation and interview method. The observation stages and implementation indicators for the use of hybrid learning are displayed in Table 1.

Table 1: Implementation indicators and observation levels for hybrid learning

No.	Level of observation	Indicator of Implementation
1.	Planning	Explanation of the course learning outcomes (CLO)
		Preparation of teaching materials
		Learning and teaching session
2.	Implementation	Give the accurate instructions
		Utilise application or platform
		Methods for learning
3.	Assessment	Practical/Assignment/Test
		Scoring

The structured questions researchers have developed to address students in this interview session are presented in Table 2. The field notes for this research observation session provide the findings of this interview.

Table 2: Research structured questions for interview sessions

No.	Level of observation	Indicator of Implementation	Structured questions
1.	Planning	Explanation of the course learning outcomes (CLO)	Do you understand the course's learning outcomes (CLO)? Who gives you an explanation of course learning outcomes? Do you understand the description that was given?
		Preparation of teaching materials	Do the teaching tools help the student understand the lessons' material better entirely? Do you agree that this course's teaching materials are suitable for both teaching and learning activities? Are the teaching materials for the course relevant to the subject being covered?
		Learning and teaching session	How many hours are required for this course each week? Does the amount of time provided for experimental task sound appropriate? Does the amount of hours allotted for face-to-face or online lectures appropriate?
2.	Implementation	Give the accurate instructions	Do the lecturers give clear and concise instructions? Are there opportunities for students to ask questions during lectures? Are the instructions for the practical (Lab) sheet or assignments clear and simple to understand?
		Utilise application or platform	A user-friendly online application or platform?

No.	Level of observation	Indicator of Implementation	Structured questions
			Does this course's online application require a lot of data usage? Do you encounter difficulties when accessing online applications?
		Methods for learning	Do lecturers actively encourage student participation in the teaching and learning process? Do lecturers communicate with their students in two ways? Do lecturers facilitate classes that involve teaching and learning?
3.	Assessment/ Reflection	Practical/ Assignment/Test	Is the lecturer's method of assessment appropriate to the topic being covered? Do the student know how the distribution of the final and continuing assessments works? Do the practical assignments and tests align with the learning outcomes for the course?
		Scoring	Do lecturers give fair evaluations and grades? The test or test script are they given back to the student? Are the students satisfied with the results?

Researchers distributed Google Forms-formatted questionnaires after this course to get student input on using hybrid learning. Additionally, this questionnaire's items are organised into three sections:

   i.   Section A: Demography
  ii.   Section B: Impact of using e-learning
 iii.   Section C: Impact of face-to-face implementation

This research applied the Likert Scale's interval measurement system, which has four measurement levels: Strongly Agree (SA), Agree (A), Disagree (D) and Strongly disagree (SD).

Students enrolled in the DET20033 Electrical Circuits and DET30053 Power System courses for the Diploma in Electrical and Electronic Engineering (15 participants) and Diploma in Electronic Engineering (Communication) (18 participants) session I 2021/2022 participated as research respondents.

4.0   Results and Discussion

According to Table 3, the interpretation of the mean score is based on Asrul Azmin (2010).

Table 3: Interpretation of the Mean Score

Classification of Mean Scores	Level
1.00 – 1.33	Low
1.34 – 2.66	Moderate
2.67 – 4.00	High

The results of the hybrid learning implementation of the DET20033 Electrical Circuits and DET30053 Power System are extremely successfully implemented, according to Table 4. The overall observation rate for hybrid learning was 91.6 per cent. The results of this study are consistent with the study of Susanti (2021), which found that high school students in Malang, Indonesia, especially during the Covid-19 epidemic crisis, are more motivated as a consequence of the implementation of hybrid learning.

Table 4: Impact of hybrid learning on observation data (n=33)

No.	Level of observation	Indicator of Implementation	(%) Implementation reflection percentage	Level of implementation
1.	Planning	Explanation of the course learning outcomes (CLO)	100.0	Very good
		Preparation of teaching materials	93.9	Very good
		Learning and teaching session	100.0	Very good
2.	Implementation	Give the accurate instructions	100.0	Very good
		Utilise application or platform	75.7	Good
		Methods for learning	87.8	Very good
3.	Assessment/ Reflection	Practical/ Assignment/Test	84.8	Very good
		Scoring	90.9	Very good
% Overall			91.6	

A descriptive data analysis of the impacts of hybrid learning on the teaching and learning sessions for the courses DET20033 Electrical Circuits and DET30053 Power System is also included in Table 5. During the final

lesson of the course, a set of (Google Forms) surveys were issued, and their answers served as feedback.

Table 5: Analysis of the mean scores and standard deviation of the research constructs (n = 33)

Domain	Mean Score	Standard Deviation	Level of Implementation
Impact of using e-learning	2.87	0.783	High
Impact of face-to-face implementation (Amali)	3.35	0.606	High

This data is coherent with Wijaya & Budiman (2021), which discovered that the State Islamic University (UIN) Walisongo, Semarang's hybrid learning implementation is excellent because it is clear and straightforward to carry out. Students are happy with the flexibility of the college implementation.

5.0 Conclusion

Planning, implementation, and evaluation are covered by the hybrid learning strategy used in the DET20033 Electrical Circuits and DET30053 Power System courses. The results of the data analysis demonstrate that hybrid learning-based teaching and learning sessions have a significant positive impact on students' abilities, knowledge, and experiences—conversations and knowledge exchange through online lectures in keeping with the digitalisation era of computers and information technologies.

The high impact of hybrid learning implementation will offer numerous opportunities for the advancement of information and technology. Additionally, with the Covid-19 pandemic condition, more significant and dynamic learning access is possible.

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