Department of Electrical and Electronics Engineering

Academic Year 2023 - 2024 (Even Semester)

Degree, Semester & Branch: VIII Semester B.E. EEE

Course Code & Title: EE8019 Smart Grid

Name of the Faculty member (s): Mr. E. Thangam

Innovative Practice Description

- **Unit / Topic:** Unit II / Plugin Hybrid Electric Vehicles (PHEV)
- **Course Outcome:** CO 2
- **Topic Learning Outcome:** TLO - 9
- **Activity Chosen:** Visible Quiz
- **Justification:**

The PHEV topic is very generic, but the students usually confuse the operation of PHEV. If they understand the difference between PHEV and Electric Vehicle (EV), they will be able to remember all the concepts in PHEV. Otherwise, they will confuse the PHEV operations. Hence, I decided to conduct an activity visible quiz. In this activity, the students in a group discuss themselves to choose relevant vehicle for the given situation and vice versa. This visible quiz activity helps them to distinguish the PHEV.

- **Time Allotted for the Activity:** 10 minutes
- **Details of the Implementation:**

I have prepared eight sets of Multiple Choice Questions (MCQ) for the PHEV PPT slides. A set of large unique cards printed with A, B, C, and D was prepared. During my lecture hour, I have classified students into 6 teams of 10 students each, and then I gave a set of unique printed cards to each student's team. I have shown the MCQ on the classroom projector, and then I asked all the student teams to discuss and choose the relevant vehicle for the given situation shown in the MCQ. Based on the discussion and their answers to all the MCQ, the student team representative has shown the relevant cards for their selection. If time permits, I will call on groups to explain the rationale for their selection. I also gave them a mini-lecture on inappropriate responses. This immediate feedback helps me identify the learning level of the students.

Total Strength is 12,

Photographer: one student - Mr. Arjuna Raja (interested in photography)

Reporter: Myself

- **CO – PO / PSO mapping:**

CO	PO 1	PO 2	PO 5	PO 10	PO12	PSO 1
CO1	3	2	1	2	2	2

(1 – Low 2 – Moderate 3 – High)

- **PO / PSO mapped:**

Innovative practice	**PO10**
	2
Justification for correlation	During the activity, the students were allowed to communicate with teammates; hence it is moderately correlated as 2.

Reflective Critique:

(i) Feedback by the students:

The students enjoyed the quiz. They told they have been given the chance of remembering the concepts in the same class itself.

(ii) Benefit of the practice:

The students are getting the feel of being involved in the learning process inside the class. Since the quiz is not included in the calculation of the internal marks, the students answered the quiz without any test fear. Hence, they participated freely. I can get the student attention after the activity.

(iii) Challenges faced in implementation:

Few students have not much interest in attending the quiz sincerely, since the quiz is ungraded. Managing those students and making them do the quiz is a difficult task for me in this activity.

(iv) Success rate of the activity:

By using this 1-10 scale, I evaluated the success of this activity. Out of the 6 teams, team number 4 was able to answer 6 questions correctly, team number 3 answered 2 questions correctly, the team number 1 answered 1 question correctly. From this, I

thought to conduct one more online quiz test for all the students to assess their individual performance.

Team Number	No. of Quizzes answered
Team -1	1 Question answered correctly
Team -2	-
Team -3	2 Questions answered correctly
Team-4	6 Questions answered correctly
Team-5	1 Question answered correctly
Team-6	-

(v) Implementation Photograph:

References:

- A. Shunmugalatha, B. Ashok Kumar, S. Senthilrani, T. Chandrasekar, J. Rajeswari, “Smart Grid”, March 2021
- Joeri Van Mierlo, “Plug-in Hybrid Electric Vehicle (PHEV)”, Mdpi AG, 2019

Signature of Faculty Member **HOD**

Department of Electrical and Electronics Engineering

Academic Year 2023 - 2024 (Even Semester)

Degree, Semester & Branch: VIII Semester B.E. EEE

Course Code & Title: EE8019 Smart Grid

Name of the Faculty member (s): Mr. E. Thangam

Innovative Practice Description

- **Unit / Topic:** Unit III / Phasor Measurement Unit (PMU).
- **Course Outcome:** CO 3
- **Topic Learning Outcome:** TLO – 12
- **Activity Chosen:** Think-Pair-Share
- **Justification:**

As electrical engineering students, they must be able to role of PMU in smart grid. This think-pair-share can help them to recall and analyze the process involved in the PMU. The knowledge about this topic is required them to understand further topics in the field of electrical engineering, so because of this activity, peer learning occurs; hence, the students will never forget this important concept forever.

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- **Time Allotted for the Activity:** 7 Minutes (Think – 2 Min, Pair – 3 Min, Share – 2 Min)
- **Details of the Implementation:**

After teaching the topic of Smart Meter, I have posed a question to all the students: "What is the role of measurement unit in smart grid?" Before starting the activity, I have discussed the different case study, so this increases the curiosity among the students to learn more about this topic. Then I gave them a minimum of 2 minutes for thinking. I encouraged them to write the responses in a paper. Afterward, I have allowed the students to form a pair and share their responses for 3 minutes. During the time of sharing responses, I keep a round at the class to watch the students' pair discussion. Next, I asked one or two individual students to share the consolidated responses with the entire class for 2 minutes. Finally, I gave a brief summary of the topic using PPT slides.

Total Strength is 12,

Photographer: one student - Mr. Rajesh V (interested in photography)

Reporter: Myself

- **CO – PO / PSO mapping:**

CO	PO 1	PO 2	PO 5	PO 10	PO12	PSO 1
CO1	3	2	1	2	2	2

(1 – Low 2 – Moderate 3 – High)

- **PO / PSO mapped:**

Innovative practice	**PO 12**
	2
Justification for correlation	During the activity, the students understood the importance of PMU in smart grid environment. It motivates them to explore more in the future, hence it is moderately correlated as 2.

Reflective Critique:

(i) Feedback by the students:

Most of the pair of students utilized this activity well, and a few students replied that 7 minutes is not enough for this activity. They requested to give more than 5 minutes for think, and 10 minutes for pair and share. But the majority of the team has satisfied with this activity.

(ii) Benefit of the practice:

The team of students has understood the concepts clearly and it has been evident from the points they have written on the paper during the discussion.

The one team of students presented the points to the class; it cleared any ambiguity in understanding the important points in the chosen topic.

(iii) Challenges faced in implementation:

Some of the team has one low-performing student and one high-performing student, which creates the least discussion in that team, so managing the non-participating team of students in the class is the challenging one. Mostly the slow learners have not participated in the activity. They have not discussed or written any points on the paper.

(iv) Success rate of the activity:

I have taken one two-mark question from the chosen topic in Internal Assessment Test -1, more than 78% of the students answered the question correctly.

(v) Implementation Photograph:

References:

- A. Shunmugalatha, B. Ashok Kumar, S. Senthilrani, T. Chandrasekar, J. Rajeswari, “Smart Grid”, March 2021
- Joeri Van Mierlo, “Plug-in Hybrid Electric Vehicle (PHEV)”, Mdpi AG, 2019

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Department of Electrical and Electronics Engineering
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Course Code & Title: EE8019 Smart Grid

Name of the Faculty member (s): Mr.E. Thangam

Innovative Practice Description

- **Unit / Topic:** Unit III / Smart Metering System
- **Course Outcome:** CO 3
- **Topic Learning Outcome:** TLO - 10
- **Activity Chosen:** Demonstration
- **Justification:**

A smart meter tracks the utility energy consumption that occurs on the system or outlet it is attached to. For example, a smart meter connected to a natural gas line tracks the number of therms consumed. The "smart" feature of the meter lets it control the flow of the resource being used, such as natural gas, water or electricity. The meter can also be controlled remotely. After teaching the concept, I thought of conducting this activity for making the students to give the difference between the normal meter and smart meter and as a teacher I can judge the understanding level of the students.

- **Time Allotted for the Activity:** 15 minutes
- **Details of the Implementation:**

After teaching the concept, give students one or two minutes to think about the topic without writing anything.

Total Strength is 12,

Photographer: one student – Mr. Rajesh V (interested in photography)

Reporter: Myself

At the end the Class (Last 15 minutes)

- ✓ I asked the students to think about evolution of energy meters.
- ✓ Then I told them to Pair with their neighbours and discuss about the operation of smart meter for another 1 minute.
- ✓ Finally, I shown the various energy meters to each students.

- **CO – PO / PSO mapping:**

CO	PO 1	PO 2	PO 5	PO 10	PO12	PSO 1
CO3	3	2	1	2	2	2

(1 – Low 2 – Moderate 3 – High)

- **PO / PSO mapped:**

Innovative practice	**PO 7**
	1
Justification for correlation	During this activity, the students understood concept of smart meter and the impact on environment and sustainability. So it is correlated slightly.

- **Images / Screenshot of the practice:**

Reflective Critique:

- ***Feedback of practice from students and other stakeholders:***
  Students told that it is good see all the parts of the meters individually and demonstration helps the students to understand the concepts easily.

- ***Benefit of the practice:***

1. Students can able to understand the impact of engineering solution on society
2. Most of the students attended the question asked Internal Assessment Test – I retest.
3. The success of the activity was evaluated by asking the same question during transformer core construction (Unit – II) **– Around 80% of students answered.**
4. Students can able to explain the concepts in examination without any confusion.

- ***Challenges faced in implementation: Nil***

References:

- A. Shunmugalatha, B. Ashok Kumar, S. Senthilrani, T. Chandrasekar, J. Rajeswari, “Smart Grid”, March 2021
- Joeri Van Mierlo, “Plug-in Hybrid Electric Vehicle (PHEV)”, Mdpi AG, 2019

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