Enhancing Engagement and Critical Thinking in Transport Management: Exploring the Power of Observe-Think-Pair-Share (OTPS) Active Learning Techniques

Prof. Dr. Sanjay R. Kumbhar[1], Prof. Sanjay T. Satpute[2]

[1]Department of Mechanical Engineering, Kasegaon Education Society's Rajarambapu Institute of Technology, affiliated to Shivaji University, Sakharale, MS – 415 414, India, sanjay.kumbhar@ritindia.edu
[2]Department of Automobile Engineering, Kasegaon Education Society's Rajarambapu Institute of Technology, affiliated to Shivaji University, Sakharale, MS – 415 414, India, sanjay.satpute@ritindia.edu

ABSTRACT

Engaging `students effectively in teaching theoretical courses like "Transport Management" can present unique challenges. By addressing challenges like abstract concepts, lack of practical experience etc. and implementing innovative teaching strategies, instructors can create a more engaging and enriching learning experience for students in theoretical subjects like "Transport Management." This paper highlight the effectiveness of the Observe-Think-Pair-Share (OTPS) active learning technique in driving student engagement, encouraging critical thinking, and facilitating collaborative learning in "Transport Management" course. OTPS proves to be a powerful pedagogical tool that enhances the learning experience and contributes to better learning outcomes in theoretical courses like "Transport Management".

***Keywords*—Critical thinking; active learning; OTPS.**

I. INTRODUCTION

This paper delves into the realm of pedagogical innovation by investigating the efficacy of the Observe-Think-Pair-Share (OTPS) active learning technique in the context of teaching "Transport Management", a course at Final Year B. Tech. (Automobile Engg.). The paper examines how OTPS, a structured and collaborative approach, enhances student engagement and cultivates critical thinking skills in this theoretical course. Drawing upon a comprehensive literature review and a real-world case study, the paper sheds light on the transformative potential of OTPS in "Transport Management" course. The findings underscore the significance of active learning methodologies in fostering a deeper understanding of complex concepts and promoting dynamic interactions among students. As educators seek strategies to bridge the gap between theoretical concepts and practical application, the exploration of OTPS as a pedagogical tool provides valuable insights into cultivating an enriched and participatory learning environment within the field of "Transport Management".

II. CHALLENGES DURING TEACHING THEORETICAL COURSES

There are variety of challenges during teaching theoretical courses like "Transport Management". Some of the challenges are–

- *Abstract Concepts*: Transport Management involves complex and abstract concepts, which can be challenging for students to grasp. Use real-world examples and case studies to make the content more relatable and tangible. Visual aids like diagrams, flowcharts, and graphs can also aid understanding.
- *Lack of Practical Experience*: As Transport Management is theoretical, students may

struggle to connect concepts to real-world applications. Organize field trips, guest lectures from industry experts, or internships to provide hands-on experience and relate theoretical knowledge to practical scenarios.

- *Large Class Size*: In large classes, it can be challenging to engage every student actively. Break the class into smaller discussion groups for certain activities, or use technology like classroom response systems to encourage participation and gather feedback.
- *Diverse Learning Styles*: Students have diverse learning preferences. Use a variety of teaching methods, such as lectures, discussions, group activities, and multimedia presentations, to cater to different learning styles and keep the class dynamic.
- *Monotonous Delivery*: Lengthy lectures without interactions can lead to disinterest. Incorporate interactive elements like quizzes, debates, and group discussions to break the monotony and stimulate engagement.
- *Pre-requisite Knowledge*: Students with varying levels of prior knowledge may find some topics either too easy or too challenging. Provide pre-readings or supplementary resources to bridge the knowledge gaps and ensure that the class progresses at an appropriate pace.
- *Digital Distractions*: In the age of technology, students may be tempted to use electronic devices for non-academic purposes during class. Set clear expectations regarding device usage and consider integrating technology into the learning process to make it more engaging.
- *Time Constraints*: Theoretical subjects often require in-depth coverage, which may lead to time constraints. Prioritize essential topics and consider offering optional readings or resources for students who wish to delve deeper into specific areas.
- *Assessment Methods*: Traditional exams may not effectively assess students' understanding of theoretical subjects. Include a mix of assessments, such as written assignments, presentations, group projects, and open-book exams, to evaluate different skills and knowledge levels (Freeman et al., 2014).
- *Motivation and Relevance*: Students may question the relevance of theoretical subjects to their future careers. Highlight the practical implications and career prospects in Transport Management, demonstrating how the knowledge gained can be applied in various industries.
- *Teacher-Student Interaction*: Limited interaction between students and teachers can hinder engagement. Encourage students to ask questions and participate in class discussions actively. Provide timely feedback and support to foster a positive learning environment.

Active learning has gained attention due to its effectiveness in promoting deeper engagement and enhanced critical thinking skills among students" (Freeman et al., 2014, Prince 2004).

III. Observe-Think-Pair-Share" (OTPS) active learning tool

The "Observe-Think-Pair-Share" (OTPS) active learning tool is an excellent approach for engaging students in the classroom and promoting collaborative learning. Here are the systematic steps to follow for this activity, along with its objectives and outcomes:

- *Objective*: The objective of using the OTPS technique is to enhance students' understanding and retention of the Transport Management course material through active engagement and peer learning.
- *Preparation*: Before the class, select a relevant video related to a specific topic in Transport Management. The video should be informative, concise, and capable of stimulating critical thinking and discussion.
  Step 1: *Observe (Individual Activity):* Start the class by showing the video to all students.

During this phase, students watch the video attentively and take notes on the key points, concepts, and questions that arise in their minds.

Step 2: *Think (Individual Activity):* After watching the video, give students some time to reflect on what they have observed. Encourage them to connect the new information with their prior knowledge and experiences, and consider how it relates to the course content (Adams, 2015).

Step 3: *Pair (Small Group Activity):* Divide the class into small groups (pairs or trios). In these groups, students share their observations and thoughts from the video. They can discuss and clarify doubts, exchange ideas, and collaboratively build a deeper understanding of the material.

Step 4: *Share (Classroom Discussion):* After the pair activity, bring the class back together for a group discussion. Each group shares the key insights and conclusions they derived from the video and their group discussions. Encourage open dialogue, active participation, and constructive feedback.

"Observe-Think-Pair-Share", an active learning tool was used in classroom while teaching "Transport Management" course. In this technique, first student observes the video, then think on the content, then pair the knowledge gained through video to other colleagues and then share the information to all class.

IV. Benefits of Observe-Think-Pair-Share (OTPS)

Some of the benefits of OTPS techniques can be summarized as follows (Richards et al.,2016) -

- *Active Engagement*: OTPS encourages students to actively participate in the learning process. It moves away from passive listening and encourages students to interact with the material actively.
- *Critical Thinking*: The structured approach of OTPS prompts students to think critically about the content they observe and engage in thoughtful analysis and reflection.
- *Collaborative Learning*: OTPS fosters collaborative learning as students work in pairs or groups, sharing ideas, discussing concepts, and collectively constructing knowledge.
- *Inclusivity*: All students have the opportunity to participate and share their ideas, ensuring that even shy or introverted students are included in the learning process.
- *Retention*: By engaging with the material multiple times (observe, think, pair, and share), students reinforce their understanding and are more likely to retain the information.
- *Development of Communication Skills*: Students practice articulating their thoughts and ideas during the share stage, enhancing their communication skills.
- *Encouragement of Questions*: The think stage often prompts students to generate questions, leading to further exploration of the topic.

V. case study of R.I.T., Rajaramnagar

The B. Tech. (Automobile Engineering) program is being offered at Final Year at R.I.T., Rajaramnagar, one of Empowered Autonomous Institute of Western Maharashtra. “Transport Management” course is included as a “Program Elective” and looking to the employment opportunities in various sectors like Maharashtra State Road Transport Corporation (MSRTC), Insurance Industries, Motor Vehicle Department (for Post like Assistant Motor Vehicle Inspector (AMVI), Regional Transport Officer (RTO) etc.; every year many students opts this elective for their study.

This course comprises various units like Motor Vehicle Act, Motor Vehicle Insurance, Motor Vehicle Taxation, Passenger Transport Operations, Goods Transport Operations and Advanced Techniques in Traffic Management.

To teach this course, variety of real life examples are required to be discussed with students. But as this is theoretical course, there are certain limitations of delivering the course in effective way. Students also get bored during the lectures. To make effective learning of the students, an attempt has been made to use this OTPS technique during the delivery of this course. Various other techniques like Think-Pair-Share, One-minute test, muddiest point method, case study etc. are also being used.

VI. IMPLEMENTATION OF CASE STUDY OF R.I.T., RAJARAMNAGAR

For implementation of OTPS techniques during delivery of "Transport Management" course, topic selected was – Advanced Traffic Management.

For giving real life examples of advanced traffic management techniques, following steps were followed.

Step 1: Observe (Individual Activity): Class was started by explaining various traffic control techniques being used with their system description. Then, students were shown the video of "Hubballi Dharwad BRTS (CHIGARI)_Bus Rapid Transit System" of 4.36 min. duration. (This is one example; other videos like BRTS System – Advanced Traffic Management System, 7.6 min), Students were asked to watch the video attentively and take notes on the key points, concepts, and questions that arise in their minds. (Fig. 1)

Fig. 1. Students are watching the video

Step 2: Think (Individual Activity): After watching the video, students were given some time to reflect on what they have observed. They were encouraged to connect the new information with their prior knowledge and experiences, and consider how it relates to the course content. (Fig. 2)

Fig. 2. Students are connecting information with prior knowledge

Step 3: Pair (Small Group Activity): The class was divided into small groups. In these groups, students shared their observations and thoughts from the video. They discussed and clarified doubts, exchanged ideas, and collaboratively built a deeper understanding of the material.
Step 4: Share (Classroom Discussion): After the pair activity, the class was brought back together for a group discussion. Each group shared the key insights and conclusions they derived from the video and their group discussions. During this, students were encouraged for open dialogues, active participation, and constructive feedback.

VII. OUTPUTS OF IMPLEMENTATION OF OTPS

Before Implementation:
The content of Unit Test No. 1 (UT-1) of this course was taught by conventional lecturing methods. It was observed that, students were listening during the lectures, but not much active and couldn't correlate the theoretical learning with practical applications of real life. This was reflected during their examination of UT-1, wherein, their score is very less. They couldn't write answers giving practical interpretation.

TABLE I
CO ATTAINMENT OF COURSE "TRANSPORT MANAGEMENT"

CO No.	Course Outcomes	Overall Percentage Attainment
CO1	Describe the motor vehicle act & central motor vehicle rules	73.33
CO2	Illustrate motor vehicle insurance & taxation	86.67
CO3	Analyze the passenger & goods transport operations	86.67
CO4	Identify advanced techniques in traffic management	86.67

After Implementation:

Active learning technique, i.e. OTPS techniques was implemented for delivery of content of Unit Test No. 2 (UT-2). During the delivery, students took active participation and tried to think critically for correlating the theory with practicals. They also tried to communicate with their colleagues, discuss and present their views on the topics, and present their ideas in front of the whole class.

The marks obtained by students in UT-1 and UT-2 were compared and found that the marks obtained in UT-2 were increased considerably. The students could answer the question in UT-2 very much elaborately.

The output of the implementation is correlated with attainment of course outcomes (COs). While calculations of CO attainments, marks obtained by students in various assessments like Unit Test 1 (UT-1), Unit Test 2 (UT-2), In-Semester Evaluation (ISE), and End Semester Examination (ESE) were considered.

From the CO attainment (As shown in Table I), it has been clearly indicating that the content taught by conventional teaching methods (the portion related to CO-1) has got less CO attainment, whereas, the majority of content taught by using OTPS has got more CO attainment.

Apart from CO attainment, student's feedback in informal ways were taken regarding the effectiveness of OTPS technique. The students were given positive feedback and were satisfied on OTPS technique. Majority of students have given feedback that OTPS technique, apart from other techniques used, has clarified various concept easily and they can correlate the theory with practical.

VIII. Conclusion

This paper explores the application of the Observe-Think-Pair-Share (OTPS) active learning technique in the context of teaching theoretical courses, specifically focusing on its implementation in "Transport Management". The study investigates how OTPS enhances student engagement, critical thinking, and collaborative learning. Through a review of relevant literature and a case study, this paper highlights the positive impact of OTPS on students' learning experience in Transport Management classrooms.

The findings of this paper highlight the effectiveness of the Observe-Think-Pair-Share (OTPS) active learning technique in driving student engagement, encouraging critical thinking, and facilitating collaborative learning in "Transport Management" education. OTPS proves to be a powerful pedagogical tool that enhances the learning experience and contributes to better learning outcomes in theoretical subjects like Transport Management. Educators are encouraged to incorporate OTPS into their teaching practices to foster a more engaging and effective learning environment. Further research can explore its implementation across various educational levels and disciplines to uncover its broader impact on student learning.

References

- Adams, N. E. (2015). Bloom's taxonomy of cognitive learning objectives. Journal of the Medical Library Association, 100(1), 25-27.
- Chickering, A. W., & Gamson, Z. F. (1987). Seven principles for good practice in undergraduate education. AAHE Bulletin, 39(7), 3-7.
- Freeman, S., Eddy, S. L., McDonough, M., Smith, M. K., Okoroafor, N., Jordt, H., & Wenderoth, M. P. (2014). Active learning increases student performance in science, engineering, and mathematics. Proceedings of the National Academy of Sciences, 111(23), 8410-8415.
- Prince, M. (2004). Does active learning work? A review of the research. Journal of Engineering Education, 93(3), 223-231.
- Richards-Babb, M., & Jackson, A. (2016). Using the "Observe–Think–Pair–Share" active learning technique to enhance student participation in large undergraduate lectures. Journal of College Science Teaching, 45(2), 32-38.