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Effectiveness of Flipped Classroom Model for Teaching Management Subject to The Under-Graduate Students.

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ABSTRACT:

The COVID-19 pandemic and the recent technological advancements have given rise to the use of active, interactive, and innovative learning strategies in Higher Education in India that help in promoting collaborative learning. The aim of introducing flipped classroom strategy using some active learning strategies is to evaluate its effectiveness in use and academic performance, develop managerial, problem solving, creativity, and innovative skills in students, the need of the hour in the present situation where 80% of the engineering graduates are unemployable (aspiring minds report, 2019) and to arouse interest in the management courses which are given little emphasis by engineering students in their undergraduate program and which is affecting their placement because of the backlogs in Management courses. This strategy is used for the Management Science course, which is a common paper for all the engineering branches of III/IV B.Tech students. The results showed that the students were highly engaged in learning; interest was aroused in the subject, and there was drastic progress in academic performance, as well as improved problem-solving, creativity, managerial, and innovative skills.

Keywords: Flipped Classroom, Management Science, Undergraduate students

1. Introduction

The technological revolution in the present 21st century and the impact of the COVID-19 pandemic had a major impact on business organizations in terms of competition, innovation, and creativity. Due to this change in conditions, organizations want to hire employees with high levels of creativity, innovativeness, and managerial abilities. This requirement of organizations has led to a change in the educational system from a teacher-centric approach to a student-centric approach. In a student-centric approach instructors/ faculty use active learning and other pedagogies by involving the students to develop their analytical and problem-solving skills and greater interaction with the subject content (Graeff TR, 2010; Wright, 2011; Kober L., 2015; Collado- Valero et al. 2021). From the previous studies conducted it is proved that through active learning the student's understanding capacity and performance are improved (McLaughlin JE et al., 2014; Taylor AT. et al., 2017; Bergmann J, 2012; Dsouza et.al., 2025). The various approaches used in this process are concept maps, mind maps, case studies, group discussions, Think-pair-share, Flipped Classroom, and so on.



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2. Literature Review

According to Chen et al., the Flipped Classroom is a hybrid approach that combines in-person interaction in the classroom with online learning (Chen K-S et al., 2018). The Flipped Classroom is a blended learning model in which traditional ideas about classroom activities and homework are 'flipped," or reversed (schoology.com) (Giler et al., 2023). It consists of two categories: 1) Out-of-class activities and 2) In-class activities. In out-of-class activities, students are provided with study materials like short lecture videos, PowerPoint presentations, quizzes, match-the-following exercises, reference notes, etc., to study the topic before coming to class. In the classroom, it involves discussions about the topic and application-based learning (Huang et.al., 2023) through activities like case studies, debates, and group assignments, all based on the study material provided before class (e-learning). Over the past few years, it has become increasingly evident that there is greater academic improvement with the use of the Flipped Classroom approach compared to the traditional approach (Chen K-S et al., 2018, Yildiz et al., 2022, Pan Qi et.al., 2024).

Though the modern versions of Flipped Classroom appeared over a decade ago, it is more popular in the fields of Medical (Chen F, 2017), Pharmacy (Pierce R, 2012; Bossaer JB, 2016), Nursing (Njie-Carr VPS et al., 2018, Betihavas V et al., 2016), Chemistry (Baepler P et al., 2014), Veterinary (Moffett J et al., 2014) and Physics and Engineering (Sein-Echaluce ML et al., 2018; Weinstein RD, 2015; Sahin A et al., 2015). This appoarch recently gained popularity in higher education (Divjak rt.al., 2022) The research carried out in the field of Social Sciences (Albert M et al., 2018; Roach T, 2014), especially in Commerce and Management is more scarce. Few studies that were conducted taking M.B.A students as sample revealed that Flipped Classroom approach is more effective when compared to traditional lecture-based teaching, measured positive students' perception towards it (Maheshwari P et al., 2019), change in pass percentage, and improved grades of students (D.M. Arvind Mallik, 2018; Hoda Baytiyeh et al., 2017; Bergfjord Ole Jakob, 2016) and determined the relationship between student perceptions and student grades (Beatty B.J, 2016). The research gaps identified are that there are no studies conducted for Commerce and Management papers at the undergraduate level, especially in Engineering where students give less priority to these subjects and don't see the importance of the subject in their personal and professional life.

3. Objectives

The objective of introducing a flipped classroom strategy using some active learning strategies is:

- 1. To evaluate its effectiveness in use and academic performance.
- 2. To develop and assess managerial, problem-solving, creativity, and innovative skills in students and
- 3. To arouse interest towards the management courses which are given little emphasis by engineering students in their undergraduate program.

4. Methodology

Sample

210 students of IV ECE were taken as a sample for the study.

Business Economics and Financial Analysis and Management Science are the two papers offered to undergraduate engineering students, and the Management Science paper was selected for the study. The flipped classroom is designed for 'Performance Appraisal' one of the topics in the syllabus. Firstly, for out of class activity, a PowerPoint presentation on Performance Appraisal, a Screencast video developed by faculty, YouTube videos on methods of Performance Appraisal and on how appraisals must not be



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done were provided to the students through MOODLE and to assess their learning design of Quiz, Crossword and Match the following Secondly, for in the class activity case study using Think-Pair -Share an assignment to develop an own case study were given. Feedback was collected from the students using a questionnaire.

The following is the procedure used for designing a Flipped Classroom activity for the topic 'Performance Appraisal/ Merit Rating' in the course Management Science [B. Prathyusha et al., 2019].

Learning Objectives for the topic:

By the end of this activity students will be able to:

- ✓ Define the concept of Performance Appraisal.
- \checkmark State the need and objectives of Performance Appraisal.
- ✓ Describe the process of Performance Appraisal.
- ✓ Explain the methods of Performance Appraisal.
- ✓ Choose the best method of Performance Appraisal.

Types of Design Decisions taken:

To accomplish the study's and topic's learning objectives and effectively implement the Flipped Classroom strategy, three types of design decisions are considered: Content, Pedagogic, and Technology decisions [B.Prathyusha, 2019].

Content Decisions:

It consists of:

a. Performance Appraisal: Definition, Need, Process involved, Objectives, and Methods.

Pedagogic Decisions:

In this flipped classroom strategy, both the segments – Out of class and In-class activities follow the Bloom's Taxonomy levels.

a. Cognitive Level of Questions are asked along with the resources– Remember to Analyse level questions for out of class activity.

b. Assessment Strategies are used along the resources – Quiz, Match the following, Crossword/ puzzle, and developing an own case study as an assignment activity –Evaluate and Create Level questions for an in-class activity.

Technology Decisions:

The following are the technology decisions that were considered while developing the Flipped classroom activity

- a. MOODLE
- b. Screencast-O-Matic and
- c. You Tube

The MOODLE account was created.



Lesson Settings:

	 ü List out the methods of job evaluation. 	 ·
MS	ü Evaluate different methods of performance appraisal.	
Participants		
Badges		
Competencies	Performance Appraisal methods of Performance Activity	
Grades	state the following activity	
General	how appraisals must not be done	
Topic 1	Think-Pair-Share activity	
Topic 2	Quiz on Performance Appraisal https://prathyushabandla.gnomio.com/pluginilie.phtp/32/mod_quiz/intro/quiz.docx	
Home	Conserved activity	
Dashboard	Form a group of four students and develop a case study on any of the topics you learnt in HRM unit	
Calendar	Feedback	
Private files		
Site administration	Topic 2	
= 👩 🐵 🕅	U	 11:15 AM 10/18/2017

Fig 1: Screenshot of the general page in MOODLE

A. FLIPPED CLASSROOM: OUT OF CLASS ACTIVITY

1. USE OF PPT (PowerPoint Presentation)

The use of PPT was to provide the content on the topic of Performance Appraisal. The student has to click on the link HRM PPT on the MOODLE site to go through the content on the topic Performance Appraisal



Fig 2: Screenshot of the PPT opened through MOODLE

2. USE OF SCREENCAST-O-MATIC

While going through the PPT for better clarity and understanding of the topic faculty recorded lectures using Screencast-O-Matic was provided. The Screencast-O-Matic is used to provide an introduction and purpose /need for performance appraisal



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Fig 3: Screenshot of Screencast-O-Matic of the purpose of Performance Appraisal

After listening to the screencast on the purpose of Performance Appraisal the following questions are to be answered in their own words: 1. What is Performance Appraisal?

- 2. Explain the importance of Performance Appraisal.
- 3. Mention the other name for Performance Appraisal
- 4. State the purpose of Performance Appraisal.

The purpose of asking the students to submit this assignment of four questions was to analyse their understanding of the topic. The first three learning objectives were achieved as it was found that out of 210 students, 198 students were able to write all four questions in their own words and 12 students were able to answer three questions in their own words.

3. USE OF YOUTUBE LINK

a. Methods of Performance Appraisal

For a better understanding of the concept methods of Performance Appraisal, the below-mentioned link is provided in the MOODLE <u>https://youtu.be/H-OKGoxdrYA</u>

After watching the above video, attempt the assessment activities (Quiz, Crossword, and Match the following)



Fig4: Screenshot of Quiz in MOODLE



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Participants	HRM PPT Opening CROSS-WORD FUZZLE.ppt
Badges	Vou have chosen to open:
Competencies	Quiz on Pe which is: Microsoft Office PowerPoint 97-2003 Presentation (180 KB) from: http://oathwichahandla.goomic.com
Grades	https://prat
General	Clossified Construction
Topic 1	how appra Do this automatically for files like this from now on.
Topic 2	Think-Pair
	Cancel
Home	Form a group or room and develop a case aroug on any or me ropica you learnt in HRM unit
Dashboard	Eeedback
Calendar	Topic 2
Private files	
Site administration	
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F1g 5:	Screensnot of opening the Crossword in Moodle
	CROSS-WORD FUZZLE-1 [Compatibility Mode] - Microsoft PowerPoint - 🗖 💌
A Cut Exposit	Since Show Keveev Vew III III III Direction · □ · · · · · · · · · · · · · · · · ·
Paste Pormat Painter New Side - SI Delete B	Z II de & M Ar A - = = = = III - Converto Smatht - 4 \ C \ C \ C \ C \ C \ C \ Arrange Quick - Shape Outine - 4 Replace - 4 \ C \ C \ C \ C \ C \ C \ C \ C \ C \
Slides Outline *	zona iz praving iz sumg
Balan memory	
	PERFORMANCE APPRAISAL
	1. Employee is clustered around a high point
	2. Performance is rated with another employee
	3. Determine the points from Criteria 4. Evaluate & arrange the worker based on ment
	5 Evaluate from Monitory return 6. Report in the form of annual confidentiality
	7. Employee performance description in detail
	8. Appraisal done by outside stake holders
Click to add	d notes
Stude 1 of 1 "Office Theme"	
F	ig 6: Screenshot of Crossword in MOODLE
MS	M HRM PPT
Participants	Performance Appraisal Opening MATCH THE FOLLOWING.ppt
Badgos	To leave noisen to open:
Competencies	Club on Performance Appraisal which is Microsoft Office PowerPeriod 77 2002 Presentation (BE.3 KB) https://presentation.approvide/appraisal.appraisal.appraisal.approvide/appraisal.appraisal.app
Grades	crossword activity What should Firld v do with this fiel?
General	match the following activity image with [Merosoft Office PowerPoint (default)]
Topic 1	Think-Pair-Share activity Do this putematically for files like this from now on.
Topic 2	acase study OK Cancel
Home	Form a group of four students a
Dashboard	E Courthack
Concerned M	
Calendar	Topic 2
Calendar Private files	Topic 2
Calendar Private files https://prathy.ushabandla.gnomio.com/mod/reso	
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Fig 8: Match the Following activity

The third and fourth learning objectives were achieved when the students were able to successfully complete Quiz, Crossword, and Match the following.



b. How Performance Appraisals are not to be conducted in organizations

This video helps for a better understanding of "how a supervisor/ manager is not supposed to do the Appraisal"

Youtube Link:

https://www.youtube.com/watch?v=_p8cxmZLgsA



Fig 9: Screenshot of the video link in MOODLE

B. FLIPPED CLASSROOM: IN-CLASS ACTIVITY

1. THINK-PAIR-SHARE (TPS)- Case Study

The IV ECE consists of 210 students divided into 3 sections. In each section, all the students were divided into 14 groups consisting of 5 members in each group. Each group presented and justified their presentations.

s	Case study on Performance Appraisal: MrX is a talented and well experienced human resources manager of ABC company. He undertakes his role of HB manager by being an administrative expert
articipants	and a change agent. He has always been an inspiration for his subordinates and the employees whose performance is measured and appraised by him. It is because of Mr. X's 15 years of experience of working in HR departments helped him to get acquainted with various Performance Appraisal methods for
adges	evaluating the performance of his employees in a better way every time.
ompetencies	He had always been implementing only those methods which he found result-oriented in terms of enabling the employees to know about their performance in
rades	job performance to determine transfer, retention and termination of employees. He has been working in ABC since last 5 years and has gained good amount of
General	respect and faith from his employees due to his appropriate and fair performance appraisal techniques that facilitated the uses of performance appraisal. The mostly used techniques by him are Checklist method, 360'Feedback and Assessment centers.
Topic 1	Because of Mr. X's good rapport and close relations in the recent months with his subordinates Suresh and Venu, he has developed a new tendency to appraise
Topic 2	the performance of those employees known to Suresh and Venu with leniency and because he finds them similar to him (personality and knowledge wise). As a result of this unfair and inappropriate appraisal of Mr. X, he also evaluates the performance of the employees taking into account their recent performances
ome	only. Hence, most of the employees' productivity has reduced and is inefficient, even some of the good employees have become irresponsible towards their tasks along with different behavior showing no interest to put in their best efforts to realize the goals and mission of the company. Some employees are planning to resign as no proper feedbacks are provided when required and no better prospects for Promotions are expected to see the light of the day.
ashboard	Thisk (at 0 minutes)
alendar	Think (~10 minutes)
rivate files	Instruction:
	Based on the above case study list out the problems which Mr. X and ABC company will face and
ite administration	suggest a performance appraisal method which the company must follow to come out of the

Fig 10: Screenshot of Case Study Performance Appraisal using TPS in MOODLE

2. ASSIGNMENT IN CLASS (Development of own Case Study) on Performance Appraisal for grading the students.

To grade, the students' assignment on the development of Case study on Performance Appraisal was given



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MS	Assignment- cas	e study	o -
Participants	Form a group of four students a	nd develop a case study on Performance Appraisal	
Badges	Grading summary		
Competencies	ordaning odininary		
Grades	Participants	1	
General	Submitted	0	
Topic 1	Needs grading	0	
Topic 2	Due date	Thursday, 26 October 2017, 12:00 AM	
	Time remaining	7 days 10 hours	
Dashboard		View all submissions Grade	
Calendar			
Private files			
Site administration			
- 💿 📀 📖 赵			

Fig 11: Screenshot of Grading summary in MOODLE

5. Findings and Discussions

Effectiveness of use of flipped classroom and its impact on academic performance

To find out the effectiveness of the use of the Flipped Classroom strategy, the faculty conducted assessment activities like quizzes, crossword, and Match the following in MOODLE. Immediately after listening to the video on methods of Performance Appraisal, the student has to answer a quiz, crossword, and match the following for 15 minutes (5 minutes for each activity) and 15 marks (5 marks for each activity).

In the assessment results, nearly 98% of the students were able to score 5 marks and the remaining 3% of the students were able to score between 2 to 4 marks as shown in Fig 13.





To evaluate the effectiveness of the Flipped Classroom strategy in academic performance, the scores of mid and final examinations of the topic Performance Appraisal with other topics are compared.







When the mid and the final examinations (Fig 14, Fig 15) were conducted the scores scored by the 210 students on the topic of Performance Appraisal were 30-40% higher than the scores scored by them on other topics where the traditional teaching methods like chalk & talk were used.



Fig 14: Performance of students during the Final examination Assessment of managerial, problem-solving, creativity, and innovative skills

To assess and develop higher-order skills like managerial, problem-solving, creativity, and innovative skills in the students, in class the faculty have given a case study to solve and develop their case study from the concepts they have learned. It was a surprise to the faculty when students requested to give case study presentations individually instead of in groups of 5. Due to time constraints, the faculty opted for group presentations for solving the case study and for assignment (development of own case) individual submission.

The grading of the students was on a scale of 1-5. For the presentation of the case study, the student grades were given group wise and the skills assessed were Managerial and Problem solving (Fig 16). For the development of own case the grades were given individually and the skills assessed were Creativity and Innovativeness (Fig 17).



Fig 15: Graph showing the marks obtained for Managerial and Problem solving skills by the students (group-wise)



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Feedback from Students

Sl.No	Questions	Percentage				
OUT OF CLASS ACTIVITY						
1	What percentage of Videos, PPT, and Screencast-O- Matic have you watched?	Below 50%	51%-80%	Above 80%		
		0	2%	98%		
2	Was the material provided clear and useful?	Yes	No	Don't Know		
		95%	5%	0		
3	What percentage of Quiz, Crossword, and Match the	Below 50%	51%-80%	Above 80%		
	following did you complete?	0	8%	92%		
IN CLASS ACTIVITY						
4	Did you find In class Activity (Case Study- analysis	Yes	No	Don't Know		
	and development) helpful?	94%	6%	0		
5	Did In class Activity complement your learning	Yes	No	Don't Know		
	from Out of Class Activity?	99%	1%	0		
6	Were you able to develop a Case study of your own?	Yes	No	Don't Know		
		98%	2%	0		
GENERAL						
7	Do you feel that this topic and course is useful and important for you in the future?	Yes	No	Don't Know		
		100%	0	0		
8	Do you want Flipped Classroom Activity to be	Yes	No	Don't Know		
	implemented for other topics in the syllabus?	100%	0	0		



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9	What percentage of the syllabus do you want	Below 50%	51%- 80%	Above 80%
	Flipped Classroom Activity to be implemented?	0	88%	12%
10	Do you feel that the Flipped classroom activity aroused interest in you towards the Management Science Course	Yes 100%	No 0	Don't Know 0

Table 1: Feedback from Students on the Flipped Class Room Activity

Arousement of Interest in Management Science

The feedback from the students was very positive insisting on implementing this strategy for at least 50% of the syllabus. 100% of students agreed that the topic and the course are important in the future and this activity aroused interest in the course.

Best Practices to be followed for successful implementation of Flipped Classroom

From my personal experience, the following are some of the best practices for the use of Flipped Classroom Activity:

- 1. To provide the content at least 10 days before.
- 2. To create interest and motivate the students, award marks immediately after the completion of the activity.
- 3. To send notifications regarding the deadlines for completion of activities and the date of In-Class activity.
- 4. To provide a feedback sheet to know the interests of students.

6. Research Limitations

The limitations associated with this study are:

- 1. Flipped Classroom strategy was implemented only for one topic and for only one branch of undergraduate students.
- 2. The research is purely based on the opinions of students which can vary based on time, situation, and attitude.
- 3. Only faculty-recorded videos were provided for out-of-class activity. The other video styles may have an impact on student learning.
- 4. All the students have experienced this strategy for the first time, thus the results may partly vary.

7. Future Scope

Future studies can concentrate on the above limitations and a larger sample will be desirable.

8. Conclusions

In summary, the research has demonstrated that the blended learning approach of the flipped classroom helps both the faculty and the students. With in-class activities like solving and designing case studies managerial, innovative problem-solving, and creative skills can be improved in students. It can be used for the management and economics courses in engineering where students feel that these courses are not necessary for them as interest in the course had aroused to the students after implementation of this activity.



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