IJCRT.ORG ISSN : 2320-2882

INTERNATIONAL JOURNAL OF CREATIVE RESEARCH THOUGHTS (IJCRT)

An International Open Access, Peer-reviewed, Refereed Journal

A STUDY ON IMPLEMENTATION OF THE COLLABORATIVE LEARNING METHOD BY USING LEAN THINKING METHODOLOGY

PRABHU RS

Department of Management studies, ANNA university regional campus Coimbatore, Tamil nadu, India

prabhumech094@gmail.com

ABSTRACT

In the modern world, we are evolving with newer stages using technology to upgrade ourselves with the competitive world. Nowadays in teaching new methods are developed to transform the atmosphere of the learning environments to make them more interactive and participative manner. The methods like collaborative learning flipped classroom, Gamification, cross-over learning, etc. were effective modern teaching tools in recent years. These methods are used to improve thinking skills, teamwork, and life-oriented skills which the basis of Outcome-based education (OBE) for the learners. The objective of the research is to study the impact of the collaborative teaching method to improve teamwork skills by Lean methodology and academic level of Implementation.

Keywords: Lean methodology, Collaborative teaching methods.

1. INTRODUCTION

In modern ages of education is not only involves skills and knowledge also its involves interpersonal skills for the learners such as teamwork, coordination, adaptability towards the environmental changes, life-long learning. These skills can be achieved through the collaborative learning methodology. It is designed by Robert Salvin at Johns Hopkins University USA. In this process, the students are divided into different groups which consist of students having different levels of learning capabilities. Where the task on the different topics is given to the groups through various mediums like Google doc, Google forms, Answer garden, Khaoot, etc. The performance is evaluated according to the metrics for the task. To implement this process we use lean thinking which is known as the Toyota-Production system (TPS). It is used to remove the Non-value activities which does not create any value for the end-user. It is done through the PLAN-DO-CHECK-ACT (PDCA) cycle for this implementation of collaborative learning.

2. RESEARCH METHODOLOGY

In this study, we use the Action Research methodology, which is recommended for the study of social science. It involves the active participation of all stakeholders of the research. It is an interactive Inquiry process. It combines both theoretical, practical solutions to develop the practical knowledge in the pursuit of knowledge is gained through action and for action. Here the professor, the students were involved in the case study. The course “Written and Communication skills” was taken for the case study. Lean thinking is used for deployment as Plan-Do-Check-Act (PDCA). The finding of the research finds through the statistical analysis and team effectiveness evaluation sheet.

3. CASE STUDY

In this process, we change the traditional classroom structure into a collaborative structure into to improve the teamwork within the students and interpersonal skills.

We use the PDCA cycle for the implementation of the process.

3.1. Plan

To identify the non-value activities, comprehensive plan for OBEE and PO, time frame set for the process by brainstorming.

NON-VALUE ACTIVITIES

S.NO	Wastes	Meaning	NVA activites	Measures
1	Defects	Flaws in the work-in-process, final products/ services that do not meet the customer‟s requirements. Correction or rework because of defects, low quality, or errors	The students are not able comprehend the concept and misconstrued the theory	Use Flipped classroom along with classroom teaching for better understanding
2	Overproduction	Products and/ or services which are in surplus to current customer requirements. Producing extra, sooner or faster than required by the next process.	The Outcomes, Teaching-Learning Strategy, and Assessment will not cater to the needs of the students	OBEE must be implemented through student-centric approach (such as STAD) and assessment should be in line with it
3	Waiting	The time duration of the work-inprocess that is not directly related to a customer requirement. People, machine, and information idle time.	Students are waiting for information and data	Complete database needs to be shared with the students along with the activity plan
4	Non-utilization of talents	Having excess workforce for the process or underutilized abilities of the people. Mismatch of skills and tasks.	Students with different capacities and abilities are not used in the team formation	A heterogeneous team needs to be framed
5	Transportation (Material)	Moving raw materials, product, or information unnecessarily	Non-availability of material hinders the momentum of the activity	Ensure that all materials are available in advance and video editing demo for presentation is provided

6	Inventory	Work-in-process that is not directly related to a customer requirement (Information, material or customers in queue or stock)	Different learning ability students block the completion of activity on time	Conduct preliminary test to gauge the level of learning to help slow learners
7	Motion (People)	Unnecessary movement by people (travelling, searching, walking)	Lack of eco-system for the activity prolongs the TAT	Plan the classroom settings, framework, and timeline for the activity and share the same with the students
8	Extraprocessing	Adding value to a process and /or product the customer would not pay for or unnecessary processing	Outcome is defined far beyond expectation without scientific notion	Use performance Indicators and Competency levels to categorically define the outcomes

Table 3.1 NON-value Added Activities

3.2Group Formation Strategy

The group formation strategy is tabulated in table 3.2

Description	Composition	Rationale	Method of selection
Total class strength = 67 Each Team = 5 Members Total Teams = 13	Member 1	Who has experience in leadership	Through questionnaire
	Member 2	Academic topper	
	Member 3	Good communication skills	
	Member 4	Team player	
	Member 5	Introvert	

Table 3.2 Group formation strategy

3.3Time Frame for the Project

Time Frame	
Description	Rationale
A duration of 20 days has been allotted to complete the project. Step 1: A brief discussion on the important aspects of the topic including discussion on the topic, the rationale behind team formation, importance of collaborative learning, Step 2: Giving tasks of planning for project Test 1 – Quiz and Case studies to assess the learning level of Individual through khaoot, answer garden. Students. Step 3: Submitting the findings; Test 2 – Virtual Presentation through video for group assessment.	Step 1 can be completed within 5 days as it can be delineated through Flipped Classroom approach. Step 2 is included to comprehend the learning level of the students to ensure/facilitate. Step 3 is Assessing the group activity through the online classroom presentation and giving to them

Table 3.3 Time frame

3.4 Performance Measurement

The performance measurement is done through assessment and group activity performance against the rubric system and Teamwork performance is measured through the questionnaire which is designed in 5 linear Scale level to find the parameter for teamwork.

This questionnaire examines team effectiveness from the perspective of eight [8] dimensions.

1) Purpose and goals
2) Roles
3) Team processes
4) Team relationships
5) Intergroup relations
6) Problem-solving
7) Passion and commitment
8) Skills and learning.

3.5 DO

The second phase of the methodology is the deployment of the plan with an eye on critical quality characteristics and TAT.

Deployment method		
S.no	Deployment Methods Adopted	Rationale
1	Strategy to keep the discussion ongoing among team members	Delineate the importance of teamwork: Students were informed about the importance of team skills from the employers‟ perspective. Also, it was highlighted how the activity has been mapped with PO9 (Individual and Teamwork) to ensure that the students imbibe this attribute and be adept as engineering professionals.
2	The strategy used to motivate non-participating members in the student group	Asking general questions/opinions: Team members involved in the discussion were directed to ask opinions/questions of at least one member of the team on the topic, which had to be documented in the video.
3	A strategy used to break a deadlock, while activity is ongoing in the class	Ensuring team meeting every week: Every day two team meetings were scheduled with the teacher to address the queries and resolve any issues, thus, paving the way forward.

Table 3.5 Deployment method

3.6 Check

Rubrics to identify the Presentation through videos					
Criteria	Program outcomes	Exemplary(4)	Proficient (3)	Partially Proficient (2)	Needs Improvement (1)
Relevance & usefulness of contents		Content is highly informative, and an update of the topic has been provided.	Content provides essential information.	Content provides partial information.	Content points towards some information.
Follows Good Presentation Principles		Theme, Colour, Aesthetics, and communication of contents are very creative and has several interactive elements	Theme, Colour, Aesthetics, and communication of contents are sufficient and have one interactive element.	Theme, Colour, Aesthetics, and communication of contents are common with no interactive element.	No proper Theme, Colour, Aesthetics, and communication of contents.
Curiosity	P012	No proper Theme, Colour, Aesthetics, and communication of contents.	Explores a topic in-depth, yielding insight and/or information indicating interest in the subject.	Explores a topic with some evidence of depth, providing occasional insight and/or information indicating mild interest in the subject.	Explores a topic at the surface level, providing little insight and/or information beyond the very basic facts indicating low interest in the subject.
Team Work	P09	The team responds to negative conflict promptly and helpfully without instructor assistance. Fortifies team relations and productivity through skilful conflict mediation.	The team responds to negative conflict without instructor assistance and can mediate.	Sometimes responds to conflict and tries to manage it.	Rarely responds and/or addresses conflict.
Conventions: grammar, punctuation, spelling, paragraphing, format		No mistakes	Minor errors	partial error	high

Table No 3.5 Rubrics Formation

3.7 ACT

The final stage involves the standardization of the implemented process, determination of the target achievement, the establishment of the control measures, and sustainability of the improved result. Thus, the rubrics were further strengthened to differentiate between the team performances. Besides, Templates/Questionnaires were prepared to deduce and synchronize between the theory and the practice, which in turn reduced over-processing. Specific types of industries were identified (Food processing, Manufacturing, Service, etc.) to gain better insight and for comparison and to reduce extra-processing.

4. DATA INTERPRETATION AND RESULTS

This stage deals with the analysis of data, comparison of data to prediction, and document the lessons learned and managerial implications. To ensure transparency and to avoid ambiguity in evaluation, rubrics were framed with special reference to the POs mapped.

4.1 STATISTICAL SUMMARY OF TEAMS PERFORMANCE AND TEAM EFFECTIVNESS

The analysis of data, comparison of data from the performance evaluation through the rubric system formulated shown in table 3.5. The team effectiveness is evaluated through questionnaire that collected individually from the students. The analysis of data shown in Fig 4.1 and Fig 4.2 of team performance and team effectiveness respectively. Fig 4.1 show that the data is not normally distributed and it does not have the same mode, median, mean. Median is 51.000(P>0.05).thus the collaborative learning improves the student's performance and performance of the teams are under the statistically under control. In Fig 4.2 the team effectiveness of the teams are not normally distributed, the median is 4.6607 (P>0.05).The team effectiveness of each group is under statistically under control .The students feedback of the system is very positive and the impact of the system is very effective towards the learning methodology.

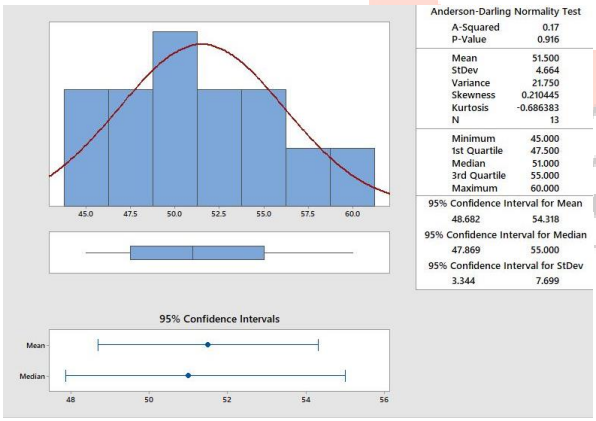

FIG 4.1 PERFORMANCE OF TEAMS

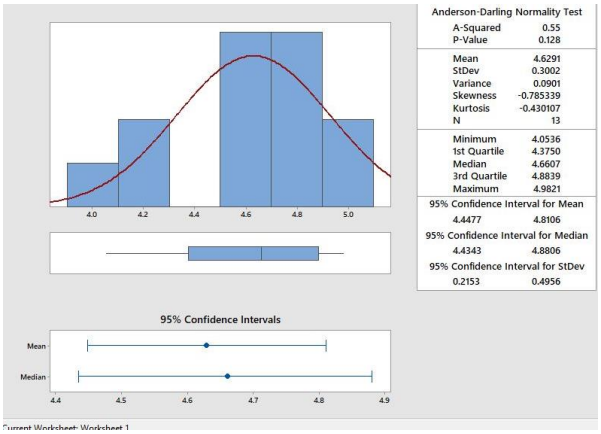

FIG 4.2 TEAM EFFECTIVNESS

5. CONCLUSION

The collaborative learning method is successfully implemented through PDCA cycle which eliminated the NVA of the process.it improves the team work critical thinking of the students.it builds the bonding between the members of the group highly. Hence the knowledge is shared all over the member of the group and motivated the non- participate students to make them actively participate in the tasks. Lean thinking is very useful to implement within the time frame. The main outcome of the research are follows:

Interactive classroom structure: The Classroom very interactive and activity throughout the hour.

Team Work and Co-Ordination: The high skilled students shares their knowledge to others and develop them and others.

Turns learning into a truly active process: To make the students actively involved.

Promotes listening to criticism and advice: Share the idea and motivate each other.

Acknowledgements The authors would like to thank the management of ANNA university regional campus Coimbatore for creating an ecosystem for carrying out research.

References

[1] Shreeranga Bhata et al (2020) “Collaborative Learning for Outcome Based Engineering Education: A Lean Thinking Approach”

[2] Dewiyanti, S et al (2007) “Students’ experiences with collaborative learning in asynchronous computer-supported collaborative learning environments”

[3] Javad Mehrabi (2012) “Application of six-sigma in educational quality management”

[4]Thelma de Jager (2012) “Can First year students critical thinking skills develop in a space of three months?”

[5]Howard P. Greenwald (2018) “Assessing Collaboration: Alternative Measures and Issues for Evaluation”

[6]Carla Evans, Ph.D. (2020) “MEASURING STUDENT SUCCESS SKILLS: A REVIEW OF THE LITERATURE ON COLLABORATION”

[7] M. Niaz Asadullah (2020) “Measuring educational inequality of opportunity: pupil’s effort matters”

[8] Reetu Malhotra (2020) “An Impact of Using Multimedia Presentations on Engineering Education.”

[9]Jacobs, G. M (1998) “Four questions and 53 answers about using cooperative learning. Teaching & Learning”

[10] Ramanan Lakshminarayanan (2014) “Six Sigma Methodology for Addressing Employability Issue of Engineering Graduates.”

[11]Leeann M. Lower (2015) “Validity and Reliability of the Teamwork Scale for Youth”.

[12] Therese Moen van Roosmalen (2014) “QUESTIONNAIRE ON TEAMWORK AND TEAM EFFECTIVENESS”.

[13] Martin Simbauni Wamalwa (2014) “Effects of Lean Manufacturing technology strategy implementation on Factory Time Efficiency, a case study of Mumias Sugar Company Limited in Kakamega County, Kenya”.

[14]Indukuri Manoj Varma (2017) “Feasibility Study on Implementation of Lean Manufacturing in Sugar Industry: A Case Study”.

[15] David Avison, (2001) “Controlling action research projects”.