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Title **Impact of Active Teaching & Learning Strategies in Higher Educational Institutions**

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Impact of Active Teaching & Learning Strategies in Higher Educational Institutions

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ABSTRACT: Is it possible to improve the attention of the students, especially for the millennial learners. The answer would be yes; this is possible through Active learning and teaching strategies. Knowledge and wisdom could completely be acquired through basic understanding. With the implementation of active learning strategies, all the improvements, which cannot be fulfilled by traditional learning and teaching methods can be attained. With active learning, the students' attention can be grabbed consistently throughout the lecture hour. Since it is one of the major challenges met by every faculty from day one. Active learning helps students to be actively involved themselves in a group activity, makes others and also themselves learn the concepts in an innovative manner. Active learning is not just a one-way learning method as it involves multitasking without losing the attention in the classroom. Active learning builds an individual's thinking ability by various brainstorming activities namely think pair share, group activity, fishbowl, Stump your partner, quiz, flipped classroom etc. Initially the students may feel difficult and show disinterest and unwillingness to participate in such activities. But with proper guidelines, expectations and communicating, how to involve them are keys to breakup the barriers. These activities need to be practiced among the students so that they themselves indulge and completely get benefited. As these strategies are slowly being practiced and dealt by many educational institutions, this is a great advantage and would become successful if it's included in our curriculum for improving the quality of the teaching standards. One should approach education with a modern mindset. This paper presents an impact of active learning strategies and few of the activities reflections.

Keywords: Cognitive learning, active learning, millennial learners, collaborative learning, Learning Management System (LMS).

Abbreviations: LMS, Learning Management System; TAI,

Team-Assisted Individualization; STAD, Student Teams-Achievement Division TGT, Teams-Games-Tournaments, DNR CET: D.N.R. College of Engineering & Technology

I. INTRODUCTION

Most of the engineers today are likely to recall their undergraduate period as a span of mathematical and theoretical study. However the engineering curriculum at most colleges was mostly practical rather than mathematical applications. As the engineering institutes hire the faculty to teach and conduct the research, the number of faculty with industry experience is declining. When institutes decide to give so much value to the research than education, the innovative practices in teaching and learning become unsustainable, not preparing the students with industry ready skills. Learning takes place on the job, in practical situations of challenging projects that required the freshers to step out side their comfort zone [1]. In engineer curriculum normally the capstone project will be done in the final semester of fourth year. So the students develop the employability skills like team skills, project management



skills and communication skills. In the field of engineering, each aspect emphasizes on the design thinking. One of the key parameters is the design which has created impact in every flourishing industry like business corporate fields, textile industry, automation sectors, Aircraft sectors and various small-scale industries. The design feature enhancing for young students is a challenging task, however, there seems to be a large response and expectation among the student's communities as they seek for better job opportunities and like to build their designing skills. Individual Learning was exploited and distinguished clearly in this course. Along with academic excellence, innovative curriculum gives students a taste of the real world; with enriching, innovative entrepreneurial learnings. In the present days, innovation, team workers and uniqueness are expected in industries of every aspect. For meeting the short term and long term goals, each student undergoes a task which is a challenging in the day-to-day life. To fulfil their dreams, students should be proactive and exhibit their innovative skills for acquiring a job. As an engineering professional every student should learn and acquire knowledge to cope up in order to compete and get jobs. These are the foundation blocks for building every individual career in their professional life to dwell and become a successful engineer. Inter-Disciplinary learning ensures that students gain knowledge and perspective over multiple subjects.

II. LITERATURE REVIEW

Revolutionary changes in engineering education has taken place in the last decades with the perspective that students follow multi-disciplinary approach and this will be used worldwide in problem solving and connect students further and their University to the world [1]. In every professional organisations, codes of conduct on social responsibility is very important [2]. An investigative study was conducted into the meaning and capabilities of design, using a literature review and subsequent content analysis method to create a theory-based Design Spectrum, which laid the foundation to demonstrate the wide breath of design parameters [3]. Transformation of the educational system through three key differentiators namely creative engaging faculty, technology enabled infrastructure and collaborative entrepreneurial eco system makes the quality of teaching and learning much better. The second stage was an exploration of the expanding parameters of innovation in the commercial environment [4]. In professional education, teachers should have a basic understanding of the abilities which they are seeking in their students to develop and teachers can get by at the end of their course, as long as their students are competent enough to enter their profession. In unprofessional education, the differences between training and education are less clear-cut compared to general education [5].

III. BROADER CONTEXT – INNOVATION IN TEACHING AND LEARNING

3.1 Core Values

The mission of DNR CET is to create and develop students entrepreneurial mindset, staff, and faculty through educational ecosystem. So, for this mission achieving, the ecosystem of educational institution has been designed to integrate curriculum relevant to the industry needs with extra-curricular opportunities of learning. To make the students globally employable and competitive, to face challenges in the society, and for higher education pursuing purpose, the design of curriculum has been made by JNTUK (R20). The new curriculum is being implemented and in order to teach the student community, new open elective and professional elective courses were offered to students based on their choice which changed the teaching and learning methods by imposing new techniques.

Course objective and outcomes – Objectives chosen that should be observable, measurable and achievable is my first course objective. The culture of our institution paves the way for development of this mindset by various teaching and learning methods as per the curriculum. In this ecosystem, students become leaders of thought provoking in creating new innovative ideas, and innovative solutions realization to seek a job in near future.

Industry Relevant Curriculum – The main objective of DNR CET is to present the JNTUK curriculum as per the latest technologies satisfying industry needs. So, various inputs are taken from industry experts in framing the curriculum, to design the projects and assessed by industry mentors and evaluators. DNR CET students are very much exposed to the latest trends of the industry by continuous interaction with industry experts for bridging the gap between academia and industry.

Online course site - The main objective of DNR CET is to create a specific learning management system (LMS) for the purpose of the students, where the entire course related data are loaded from the syllabus to lesson plan and other teaching material. Learning through these methodologies is so professional and improves every student thought process. Our ecosystem of academics is based upon these ideas, thoughts and by creating common core curriculum which leads to rich experience of learning.

Learning and teaching style – Sensory and intuitive learning – perception: Students visually see the construction working principle was conveyed through power point presentation and adequate concrete content satisfying the teaching style. Given time to reflect about how any process is happening and to ponder about the application in real time with an example.

3.2 Pre-implementation and post implementation reflection

Students do not show any interest during the course delivery and also handling a large classroom is also very challenging, hence creating an interest by relating to reality or industrial applications makes sense. Making students to think and participate in quizzes gave them brushup of what was taught in class for the purpose of reflection.

Attention: Students are asked to identify the devices in the classroom with examples and in day to day life to check the attention, where students come up with great ideas about usage of the topic chosen during the course

Relevance: Discussion about new upgradation relevant to electrical field, Students are asked to come up with relevant examples used in the reality. To face any competitive examinations. Builds confidence while attending interview.

Confidence: Interactive session for the first 5 min at the start of the class. Students able to understand the concept and asked to write down points about the previous class, views or doubts that needs to be clarified.

Satisfaction: Students find it satisfying at the end of the exams. The course learned completely reflects through exams and the marks scored but each and every student.

IV. LEARNING STYLES INVENTORY

4.1 Basic Information

Learners like to implement teaching according to various learning methods as illustrated in this paper.

A student learns by various ways like seeing, hearing, reasoning, memorizing, visualizing, thinking, Multidisciplinary learning [6] and so on. When I was a student, I was also adapting such methodologies. However Felder-Silverman Learning Styles inventory provides modified and classified specific group of students falling under categories namely visual auditory, inductive deductive, sensory intuitive, active reflective, sequential global where each needs to be handled in different modified ways of teaching.

We too liked to interact and was more an active learner when we were a student, we used to gain more knowledge and remembered the subject when was interacting with my group of my friends. We share our knowledge inside and outside the classroom. We were also a person of reflective thinker sometimes. We rethink about it when we were back at home or when we are outside, we try to relate things learned to the practical applications existing inside or the outside the surrounding. We always try to relate our theory to practical applications [10].

We were able to grasp many concepts and ideas, which is helping me even now when we explain it to our students, so as a lecturer we like to provoke the same with my students too. We like to emphasize solving problems in groups and verifying by doing a think pair share activity. Exhibiting tangible information with legible results. As reflection happens only certain time is given to think, it's better to break up the lecture in short spans and making students to relate it to the applications and come back with their thoughts and share the same among themselves with a small group. Providing an open-ended problems and exercises that help analyzing things. Some of this modification in teaching; certainly bring changes among the student community.

4.2 Teaching Philosophy Statement

Contribute towards positive learning and produce quality engineers. Educate and learn enthusiastically, Builds a strong base to inculcate learning throughout the lifetime. Innovative brain-based learning methodologies are being propagated nowadays[7]. Teaching with clarity, enthusiasm, transparency and involvement have improved to greater extent.

4.3 Fundamentals Of Course Design

To design an effective course design and implementation. Develop the course objectives and outcomes using “blooms taxonomy. Design the pre-requisites of the course. Set up the ground rules and expectation appropriately. Faculties able find the student’s involvement and their level of interest. Students support and involvement towards the subject is achieved. The expectations of the students are clearly met[8].

4.4 Creating A Dynamic Classroom

Active learning is one of the best strategies suitable for the millennial learners to create a dynamic classroom. Active learning enables student’s achievements and exposes their abilitiesActive learning stimulates the brain based learning among students. Active learning engages the students with the quality time. Motivated students who were unable to speak out to actively participate and made them realize it would help them in exams, also score for their own team. Students participated very enthusiastically in groups and showed lot of interest taken place in classroom. Now, as a faculty able to bring back the class after the activity, which was a hard task?



Fig. 1. Photo shot during the activity



Fig. 2. Photo shot during the think pair share activity.

The above photo shot was during think pair share activity. As I was unable to implement many activities as discussed in modules. I tried implementing few and even students are aware of such activities now and eagerly participated.

4.5 Collaborative Learning

Collaborative learning enhances the logical and innovative processes working in a group. Collaborative learners are set with a common goal, opens up deadlock. Team work improvises by involving them to take the responsibility to check each other's work Collaborative learning enhancing the skills and abilities of each student in some way or the other Remember all the basic concepts and builds interaction and also builds friendly and fare competition among team members. Through collaborative activity, I was inspired by the TAI (STAD & TGT), which also matches with my course outcomes to proceed with; hence I tried implementing this activity in the classroom. It was time consuming and the entire 50 minutes of class was not enough to complete the activity. But, I was able to manage it to some extent. Students are aware of such activities which would help them build team work especially in the industry[9].



Fig. 3. Photo shot during the activity.

The above photo shot shows the students participation during a small group activity.

4.6 Harnessing Technology

Developing a Flipped class room technique rather than traditional teaching style for the convenience of the students. Execute the flipped classroom for the important topics and class time could be utilized for the field work. Students missed the classes could utilize this technology and also revise during the exams. Flipped classroom technique was an excellent choice for the students. After viewing the video, students showed much interest in answering the questions asked in the video session. Students came up with thoughtful answers and excellent involvement in the class session.

4.7 Effective Assessment

Rubrics guide the student's outcomes in an implicit manner to extract the proper outcomes from the students. Rubrics help students develop more confidence while appearing for the exams. An extremely detailed oriented and helps in student self reflection. We are able to produce a proper justification, during the evaluation process. This methodology exhibits transparency among the students, as to what is being expected from them. It helps both the faculty and students during examinations, projects and various places where it involves evaluation.

Table 1. Rubrics set for a project report

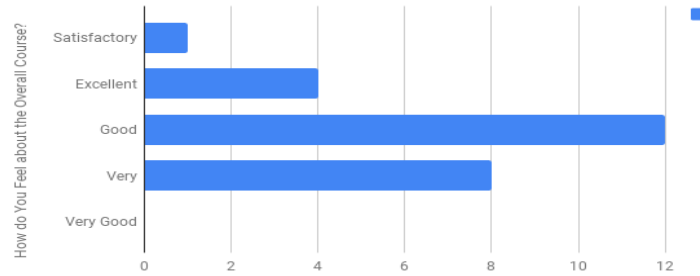
RUBRIC FOR DESIGN PROJECT----New rubric					
	Criteria	Rating (Fully met expectation)	Rating (Approached expectation)	Rating (Not met expectation)	Total points
Review 0 (Selection of suitable project)	Segregation of literature survey	Information gathered was relevant to the topic chosen for the project...(5pts)	Information gathered was not sufficient for the topic chosen ..(3pts)	Information chooses was less relevant to the topic chosen(1pt)	5
	Base paper selection (Topic selection)	Selected base paper is appropriately chosen from IEEE transaction and latest...(10)	Selected base paper is not latest upgraded in the IEEE transaction...(5pts)	Selected base is completely not an upgraded IEEE transaction...(3)	10
	Innovativeness or real time applicability.	Completely involves real time application (10pts)	Involves in real time application to some extent(5pts)	Does not apply to any real time application nor innovative...(3 pts)	10
Review 2(Identifying the need and conceptualization)	Progress of the project and tools used	Efficient usage of software displayed and utilized to seek the progress...(10 pts)	Usage of software not fully utilized to seek the progress...(5pts)	Insufficient usage of the software utility...(3pts)	10
	Simulation and execution	A part of the circuit design, simulated	Execution an simulated output is less close to the	Execution is not up to the expectation...(3pts)	10

The above table displays the rubric created for a project report.

V. IMPACT OF LATEST TEACHING METHODOLOGY AMONG STUDENTS

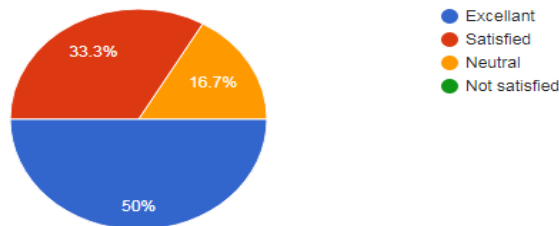
As Collaborative Learning Techniques have been adopted, students were able to observe the concepts and able to implement, which in turn reflected in the exams. Student's interest and attitude towards the course have improvised. Students are exposed to new technology and have reflected with feedbacks in various aspects.

Count of How do You Feel about the Overall Course?



Did the group activity helped in exams

6 responses



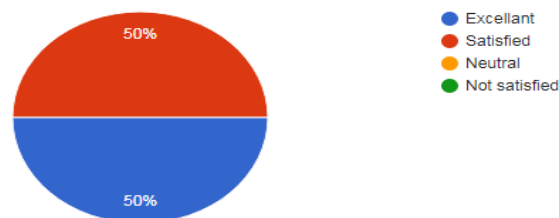
Do you feel that new learning methodology is useful than traditional methods.

5 responses



How do you feel about the new learning methodology

6 responses



VI. CONCLUSION

This paper impresses the importance and widens the scope of the teaching and learning methodology in the engineering Education. As millennial learners seek for the new ideas and innovations through cognitive learning, these methods would promote the proactiveness among the students now and in the future generation. Indeed students learn and imply in reality which enable employability throughout the nation. These approaches are most adapted by the students than traditional learning methods and also it is most suited for the millennial learners.

VII. FUTURE SCOPE: This work can be extended to various latest teaching methodologies as per the technological advancements that can be implemented in the classrooms and online teaching methodologies as well.

REFERENCES

- [1]. Ryan Legg, Mark Recipe, Krishna S. Athena, Mani Mina Iowa State University, Ames, Iowa, "Solving multidimensional problems through a new perspective: The integration of design for sustainability and engineering Education", "Proceedings of the 2005 American Society for Engineering Education Annual Conference & Exposition Copyright © 2005, American Society for Engineering Education"
- [2]. Bennett, A. G., Cassin, F., & van der Merwe, M. (2017). How design education can use generative play to innovate for social change: A case study on the design of South African children's health education toolkits. *International Journal of Design*, 11(2), 57-72.
- [3]. Na, J., Choi, Y., & Harrison, D. (2017). The design innovation spectrum: An overview of design influences on innovation for manufacturing companies. *International Journal of Design*, 11(2), 13-24.
- [4]. Kleinsmann, M., Valkenburg, R., & Sluijs, J. (2017). Capturing the value of design thinking in different innovation practices. *International Journal of Design*, 11(2), 25-40.
- [5]. kees dorst and isabellereymen, "levels of expertise in design education", International engineering and product design education conference 2-3 september 2004 delft the netherlands.
- [6]. Kumar, K. S. Alok, G. Reddy, M. S. and Reddy, N. B.S An integrated Multidisciplinary skill development strategy for effective execution from virtuality to reality in Engineering Education, IEEE 6th International Conference on MOOCs, Innovation and Technology in Education (MITE) pp. 79-83, IEEE.
- [7]. Alok, G. Pothupogu, S. Reddy, M. S. and SaiPriya, P. (Nov-2018) Trenchant Pathway to bring Innovation through Foundations to Product Design in Engineering Education, IEEE 6th International Conference on MOOCs, Innovation, and Technology in Education (MITE), pp. 43-47. IEEE.
- [8]. Alok, G., Anushalini, T., & Condoor, S. (2018). Effective Approach towards development of idea through Foundations to Product Design doi: 10.16920/jeet/2018/v3i3/120756
- [9]. Srinivas, S. Soumya, P. (2015) A Traditional Novel Approach for Skill Enhancement of Teaching-Learning Process in Engineering Education, doi: 10.16920/jeet/2015/v28i4/70407.
- [10]. Anuradha, P., 2019. The teaching learning process. *International Journal of Advanced Science and Technology* Vol.28, PP 709-714.