



Effective Teaching-Learning Process through WIT&WIL Methodology to produce Employable Engineers

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ABSTRACT:

The number of higher educational institutions in India has increased by 30 times compare the institutions 30 years ago. The quality of passed out engineers compare to the placement that they are getting, shows massive difference between the existing engineering education system and industry human resource requirements. All India Council for Technical Education and the Government authorities are restricting the Engineering Institutions to limit the seats up to the demand. As in October, 2015, in India 3,470 Technical Institutions with 16.7 lakh capacity, 40% seats were left unfilled. And the other major problem is employability of graduate engineers which is limited to only 18-20% this year. This paper attempts to discuss the challenges and one of the solutions of applicability of WIT & WIL Methodology in teaching-learning process of engineering institutions, which would aim to bridge the gap between institutional academic systems and industry requirements. The objective of study is to produce employable engineering graduates and helps in growth of the institutions of medium and low standards. This paper attempts to introduce the WIT & WILL with a case study along with the results before and after the methodology implementation.

Key words: Engineering Education, Teaching-Learning, Employability.

1. Introduction:

Academic Excellence in Technical institutions is the essential requirement and should be measurable in the form of metrics. In recent days outcome based learning is becoming more important goal to enhance the quality of technical education with excellence parameters. This leads to reduce the gap between industry and academia by providing excellent graduates who plan their career as an employee or entrepreneur to develop society with their knowledge & skills. On the other hand, lack of quality and excellence in academics of engineering education is giving defeat to the society in two ways. First, there is a huge constraint to the Technical Institutions to develop and to compete with Global Academic Standards. Second, it is too difficult to create a good career path to the graduates by providing employability and entrepreneurial skills.



According to recent survey and statistics, in India, the contribution of technical education which should play major role to the societal development is gradually reducing [ix]. The choice is reducing to choose engineering education and it is diverted the students interest to join the other courses. This situation is even worse in South Indian states. The reasons for this situation are lack of qualified faculty appointments, well equipped laboratories, latest teaching and learning methods etc. to overcome the situation, the Government authorities came up with the idea of controlling the institutions by providing ranks according to criteria with the motto of creating competition among the institutions to increase quality standards.

A rigorous and relevant education is a product of effective learning, which takes place when standards, curriculum, instruction, and assessment interrelate and reinforce each other[iii]. When assessment is viewed as the end goal or finish line, the test itself becomes a barrier to high levels of student achievement. However, if curriculum, instruction, and relevant learning become the focus, the tests will take care of themselves.

2. Recent Trends & Challenges in Engineering Education:

The present trends of globalization of learning environment and boundary less markets are waiting for a graduate with well-ordered Career Vision. In recent times, most of the Higher Education Institution and Universities are facing the experience of increasing enrollments with limited resources. The students who are pursuing higher education are facing great pressure due to heavy competition among educational institutions to produce quality students and among industries for business growth. Hence, the responsibility of Educational Institutions is to put the targeted students in a robust path to make them industry ready in the environmental impact of external sources and pressures in the society. The focus on state assessments as the one true measure of academic excellence is slowly but surely limiting our young people's chances of experiencing any semblance of the success in life that we expect for them and that they believe college will provide for them[ix]. State assessments play a role in education, but a score on a test will not help the student when he or she is competing for a job in the global arena.

The following are the major identified issues and challenges regarding engineering graduates with career vision approach:

- In India, privatization took place fifteen years ago in engineering education to enhance the contribution of quality and capable technical human resources to technology sector in Globalization scenario[vii].
- The importance of technical education and demand for the courses also very high in initial stages for the private institutions. To take advantage of this situation, many institutions without clear knowledge, vision and goals have added by influencing Government and Universities authorities. In result, inefficient management of continuous evaluation caused to decrease the quality and increase the fee.



- The Institutions with proper technical knowledge, good vision can make excellent engineers for the society. In the institute level for the failure of producing good engineers the following are the some of the major reasons have identified by survey authorities:
 - Lack of commitment and understanding the current technical development in Management
 - The inefficient administration and lack of coordination among management and staff
 - Running the institutions with self opinions and not comparing with the situations
 - Salaries, incentives & rewards for the faculty and staff are not as per norms
- The graduates coming from the inefficient institutions are not getting any employment from outsources with the required skill set and are accepting a low profile jobs. But according to industry requirements, jobs are unlimited but the candidate profiles are very limited from unlimited upcoming graduates every year.

The expert's opinions on survey are proposed the ranking system for all the technical institutions by evaluating in all quality parameters. The participation in ranking system should not be voluntary. It should be mandatory and the rankings need to provide country wise and state wise. The efforts of the institutions taken for the development of the quality parameters need to identify by respective authorities[v]. The vision, mission and objectives of engineering education need to be modified and prepared with Global view for future ready.

3. Teaching-Learning Process with WIT & WIL Methodology?

In fast changing trends in education, 'learning' comes from multiple open sources with wide choice of content and depends on learner capabilities. Outcome Based Education (OBE) has become one of main criterion for accreditation by the National Board of Accreditation (NBA) in light of the Washington Accord. Whereas the traditional education process emphasizes the inputs in terms of teaching staff, curriculum, labs, library and other resources, OBE shifts from measuring the inputs and processes to include the measurement of outcomes. The mission and vision of the Institution guide the Program Education Objectives. The Program Educational Objectives are evaluated through Program Outcomes. Program outcomes describe what set of skills students are expected to learn and be able to do upon graduation. The Program Outcomes at department level are based on Learning Outcomes at subject level. The definition of "WIT & WIL" method explained as an active methodology of teaching and learning activity with "*Why am I Teaching & What I am Teaching*" from Teacher's perspective. And from student's perspective "*Why am I Learning & What I am Learning*".

4. WIT & WIL Methodology at VNR VJIET, Hyderabad:

"Vignana Jyothi", a non-profit organization founded by a group of Industrialists, Academicians, Professionals and non-resident Indians with an idea of imparting purposeful education to youth,



started VNR Vignana Jyothi Institute of Engineering & Technology. Education is the backbone of a society's growth and development. It was therefore felt that maximum contribution to society can be made in this sphere. It was with this background that the Vignana Jyothi Society was formed with the objective of promoting excellence in education in the state of Andhra Pradesh.

Today, Vignana Jyothi has created an edifice with unshakable foundations which can only grow higher and higher. Conscious of quality and integrity in everything they undertake and achieving EXCELLENCE as a habit, Institutions run by Vignana Jyothi reflect their character, vision and passion for education. VNR Vignana Jyothi Institute of Engineering & Technology was established in the year of 1995. The Institute was accorded Autonomous status by the affiliating University (JNTUH) from the year 2011-12. The Institute is NAAC graded with 'A' providing NBA accredited 9 Engineering Courses and 12 Master Courses with campus capacity of 5000Plus Students. A distinct and fresh perspective worked out by VIGNANA JYOTHI Society will soon make VNRVJIET different and exclusive to join the top ranking Institutions across India.

The Institute attempts to integrate class room learning with related industrial experience into a single educational process. One of the important goals of the Institute is to provide integrated knowledge of theory and practice to the student by creating opportunities to work on projects as well as summer internship in Industries. During the first year, special stress is laid on development of manual skills, work culture, communication skills and courses on general education and introduction to Engineering. The Institute designed a Mentoring-Training-Placement (MTP) system implemented and monitored from the day of admission till the day the student leaves the Institute to make him/her a complete knowledgeable and useful citizen.

The Management of VJ believes that by being research driven, by providing world class infrastructure and by adapting a strategic and practical approach towards teaching that is aided by an experienced faculty, VJ will differentiate itself from other institutions and join the band of EXCLUSIVE AND PREFERRED INSTITUTIONS providing a value-sensitive workforce and leaders of tomorrow. With its "ever-widening thought and action" VJ reaffirms that its "clear stream of reason has not lost its way into the dreary desert sand of dead habit". Dedicated to serving society, VNR VJIET with its all pervasive environment of innovation pledges to reinvent itself from time to time. The initiative of WIT & WIL is introduced in the institute as a part of Reengineering process in 2013.

The implementation process is structured in a framework. The format is prepared in the form of lecture plan and gave it to the concern faculty to fix their contents of the syllabus into the format. This document is purely transparent to the students through wiki page. The feedbacks are collected at the end of each class in the form of slip note, quiz, student presentation, etc.

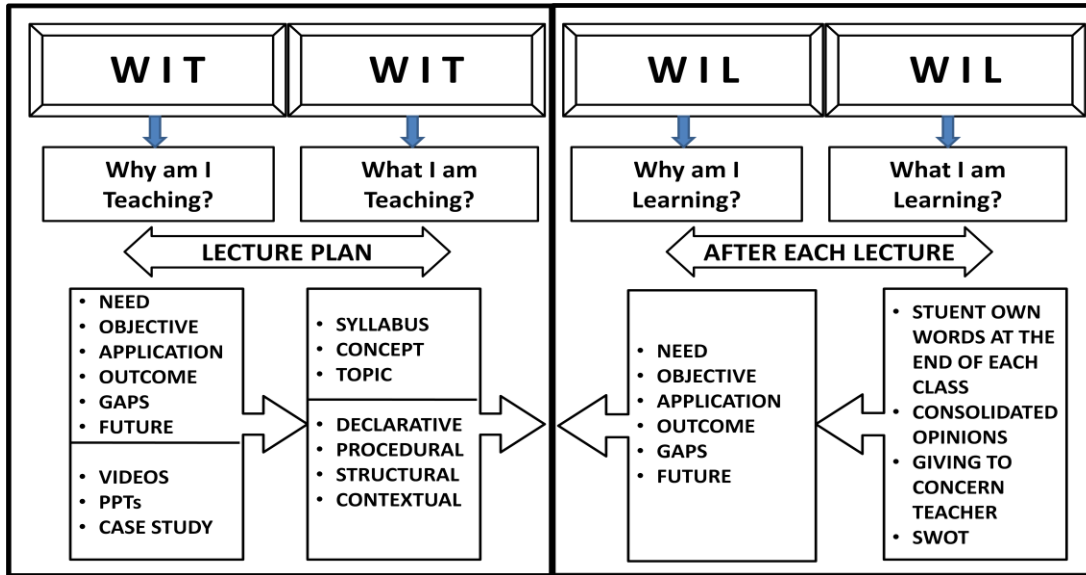


Figure-1: Flow chart of WIT & WIL Methodology

All the teachers have to give their presentations on ‘WIT & WIL teaching plan’ of their own subjects in knowledge sharing sessions before the semester. The expert committee is formed with the Directors, Heads and senior faculty to check the presentations through Micro-teaching sessions. The following is the sample teaching plan for which each topic in the syllabus should be prepared in the prescribed format.

Subject :		Subject Code :		Academic Year :		Number of working days :	
Name of the Faculty Member:		Student Branches deals with:		No. of periods planned:		Number of Hours / week :	
Why am I Teaching – What I am Teaching (WIT)				Why am I Learning – What I am Learning (WIL)			
Course Learning Objectives:				Course outcomes:			
S.No.	Description of Topic	Why am I teaching	What I am teaching	Objective of WIL	No. of Hrs.	Method of Teaching	Video links
Assignment Questions: For revision of the topic 1.							
Tutorial Questions: Involves questions expected in exams and questions from previous exam paper for practice. 1.							
Text Books:				Evaluation Scheme:		Websites to browse for additional information:	
Feedback:				Why am I Learning:		What I am Learning	

Figure-2: Format of Teaching Plan according the Methodology

The management also had taken the initiate of changing all procedures like attendance registers, class timetables, remedial lecture plans for slow learners, exam patterns, questions paper setting, etc. according to WIT & WIL requirements. The attendance registers are updated with the following format to pursue the implementation of methodology.

Sl. No.	Date	Period(s)	Topic covered	Active Teaching Technique used	Outcome of the class	Remarks

Table-1: Attendance Register Contents page format

In the above table, the topic need to cover should be given to the student as prior information sheet in the form of presentation/document. From this, student can understand that why this topic need for them and what they can get after the lecture and also the other sources to learn the topic. For the three academic years, the process implementation is being developed and updated according to the feedback in the form of PDCA Cycle. For the better assessment the other management techniques like Shared Vision & Philosophy to all the faculty by the top management, Rewards and incentives for better performance measured through Balanced Scope Card(BSC) helps for successful implementation and results. The following table consolidates the gradual changes and result of before and after methodology implementation:

Sl. No.	Particulars	Outcome- Before (A.Y.2013-14)	Outcome- After (A.Y.2015-16)
1.	Aggregate Student Attendance per section in month	63%	90%
2.	Access of Academic Plan and Syllabus by the students	40%	90%
3.	Access of Digital Library to search online Video/PPT & Lecture content	30%	80%
4.	Aggregate student contribution in classroom discussions	20%	80%
5.	Pass Percentage in MID, Final Examinations & Lab experiments	65%	85%
6.	Placements	68% (ECE & CSE)	92% (ECE & CSE)
		55% (Other branches)	85% (Other branches)
7.	Student Publications	10%	40%
8.	Student Research Projects & funding	5%	20%



9.	Student Startups through Institute Incubation Centre	20%	60%
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Table-2: Changes and Result of the WIT & WIL Methodology Implementation

5. Conclusions & Expansions:

The engineering programs curricula and syllabus designed and implemented for a period of four years in most cases, although most engineering students take longer to complete their graduation degree requirements. One of the reason for this is the deficiencies in engineering education have been exhaustively enumerated in recent years. Many innovative instructional methods have been developed and emphasize free discussion and expressions of student opinions, with minimal teacher-centered presentation of information. For enhancing the learning ability of students, the institutes should implement the various innovative initiatives in a structured manner. Hence, the responsibility of Educational Institutes is to put the targeted students in a robust path to make them industry ready. The above initiative can provide an industry ready profile of the student through the following objectives.

- To introduce the student to recruiters with a academic achievements such as good aggregate percentage, attendance, etc.
- Lead the students towards passion on their selected subjects or specializations from first years onwards.
- Provide them the additional training with blended learning and effective certificate courses within the campus.
- Make them to work on Real time projects with emerging new technologies on fully equipped laboratories with standard protocols.
- Encourage to execute their innovative ideas on their working projects for create incubation centers to help them in commercializing good ideas.
- Create the environment to have the proactive questioning capabilities, presenting techniques and Extensive exposure to Industry.
- To develop the culture of appreciating all branches & specializations by allowing to work in cross domain fields with more electives.
- Ultimately, the institution is responsible to make the engineering graduates with all round development of cultivate good habits, life management skills, problem solving skills, etc. for all time success.

To encourage the institutions of any standard in autonomous status or affiliated colleges, to adopt the system and implementation for continuous development is essential to give best result in student outcome. This is purely concern on how we structure the processes and create the policies for better implementation up to the ground level. No matter how much expenditure require, this is obviously up to the capacity. But the challenge is to select the appropriate team and giving flexibility provided with target objectives and time settings. However continuous monitoring and reengineering is compulsory on periodic basis. The future work on Process Reengineering of educational institutions may be streamlined and



supported by some business organizations with most modern technology and team expertise to establish the campus automation management system.

6. References:

- i. A.K.Kar and B.S.Yilbas, Saudi Arabia, *Reengineering the Engineering Schools*, 1995, Fourth Saudi Engineering ASEE Conference Proceedings, Vol:1, pp.113-118.
- ii. Herbert F. W. Stahlke and James M. Nyce, Indiana, *Reengineering Higher Education: Reinventing Teaching and Learning*, 1996, Vol.1, CAUSE/EFFECT articles <http://www.cause.org/cause-effect/cause-effect.html>
- iii. Pratt, D.D., Netherlands, *Re-conceptualizing the Evaluation of Teaching in Higher Education*, Kluwer Academic Publishers, Vol. 34, pp.23-44, 1997.
- iv. Fatimah Hashim, Halimah Awang, University of Malaya, *An institution in search of excellence: Lessons learnt*, International Education Journal, Vol:6, Issue:3, pp.291-296, 2005.
- v. Ayse Aytac and Veli Deniz, Turkey, *Quality Function Deployment in Education: A Curriculum Review*, Quality Function Deployment in Education Journal, Vol:39, pp.507-514, 2005.
- vi. Christophe Choquet and Alain Corbière, University of Maine, France, *Reengineering Framework for Systems in Education*, 2006, Educational Technology & Society, Vol:9, Issue:4, pp.228-241.
- vii. Gretar Tryggvason and Diran Apelian, *Re-Engineering Engineering Education for the Challenges of the 21st Century*, Oct.2006, Journal of Management, pp.14-17
- viii. M'hammed Abdous and Wu He, USA, *A Framework for Process Reengineering in Higher Education: A case study of distance learning exam scheduling and distribution*, Oct.2008, E-journal of International Review of Research in Open Distance Learning, Vol.9, Issue.3.
- ix. P. Arunachalam, *Higher education sector in India: issues and Imperatives*, Journal of global economy, Vol:6, pp.267-291, 2010.
- x. Md.Saifuddin KHALID, Mohammad Shahadat HOSSAIN & Nikorn RONGBUTSRI, *Education Process Reengineering and Diffusion of Innovations in Formal Learning Environment*, 2011, 19th International Conference on Computers in Education, Chiang Mai, Thailand. Published by: NECTC, Thailand, Vol:1, pp.758-762.
