Cummins College Digest of Engineering Education

Issue No. 3, 2022

MAHARSHI KARVE STREE SHIKASHNA SAMSTHA's
Cummins College of Engineering for Women
(An Autonomous Institute Affiliated to Savitribai Phule Pune University)
Karvenagar, Pune.
www.cumminscollege.org

Accredited by National Board of Accreditation (NBA) and
National Assessment and Accreditation Council (NAAC) with "A" Grade

<u>Digest Overview</u>

❖ *The **Cummins College Digest of Engineering Education (CCDEE)** serves* to cultivate, disseminate, and archive scholarly research in engineering education.

The Purposes of *CCDEE*

❖ To provide a platform for publishing original research in engineering education.

❖ To provide a forum for sharing innovative practices for imparting engineering education.

❖ To provide a forum for sharing innovative strategies issues which are unique to engineering education in India and abroad.

❖ To foster international collaboration and discourse for the betterment of different aspects of engineering education.

Aims and Scope of *CCDEE*

❖ The *Cummins College Digest of Engineering Education (CCDEE)* is an independent journal. It aims to serve as a platform for sharing scholarly research related to engineering education. The Journal publishes single-issue per year. This issue can be adding up with special issues on specific engineering education topics as well.

❖ Only manuscripts that have a focus on engineering education will be considered for publication.

The Features of *CCDEE*

❖ CCDEE will be published once in a year.

❖ Articles for publication are encouraged from emerging issues in Engineering Education that calls for action from engineering education community.

❖ Research articles in engineering education theory and practice.

❖ Articles on best practices to enhance the quality of engineering education, supported by assessment.

❖ Short communications related original thoughts on certain issues in Engineering Education; significant work in progress aimed at stimulating discussion are accepted.

❖ Brief Digest items about upcoming events and conferences, achievements by faculty, students or institutions; book reviews, case studies, interviews of eminent personalities.

Editorial Board

Statement of Publication Ethics

The Chief Editor/Editor of the *Cummins College Digest of Engineering Education (CCDEE)* is responsible for the final decision regarding which of the research papers/articles submitted to the Digest (CCDEE) should be published. The decision will be based on the recommendation of the Digest (CCDEE)'s reviewers. The policies of the Digest (CCDEE)'s editorial board and legal requirements such as copyright infringement and plagiarism will be considered by the Chief Editor/Editor.

- ➢ **Equality standards:** Manuscripts shall be evaluated by the reviewers solely on the basis of their intellectual content without regard to race, gender, sexual orientation, religious belief, ethnic origin, citizenship, or political philosophy of the authors.
- ➢ **Confidentiality:** The information about a submitted manuscript will be kept fully confidential by the Chief Editor/Editor, Reviewers and any Editorial Staff to anyone other than the corresponding author, reviewers, other editorial advisers, and the publisher, as appropriate.
- ➢ **Disclosure and conflicts of interest:** Any information published or unpublished, disclosed in a submitted manuscript, must not be used in without the express of written consent of the author.
- ➢ **Contribution to Editorial Decisions:** Research papers/articles will be published in the Journal after peer reviewing, under the "Blind Review" process. The reviewers will advise the Chief Editor/Editor in making the editorial decision. The reviewers should not ask for the author's identity and Reviewers' comments to the editors are confidential and before passing on to the author will be made anonymous. The names of the reviewers remain strictly confidential; with their identities known only to the Chief Editor/Editor.
- ➢ **Promptness:** The journal is committed to provide timely review to the authors. Any selected reviewer who feels unqualified to review the research reported in a manuscript or feels that its prompt review will be impossible should notify the Chief Editor/Editor and excuse him/her from the review process.
- ➢ **Confidentiality:** Any manuscripts received for review must be treated as confidential documents. They must not be shown to or discussed with others except as authorized by the editor.
- ➢ **Standards of Objectivity:** The editors and reviewers are required to evaluate papers based on the content. Reviews should be conducted objectively. Personal criticism of the author should be totally avoided. Reviewers should express their views clearly with supporting arguments.
- ➢ **Acknowledgement of Sources:** Reviewers should identify relevant published work that has not been cited by the authors. Any statement that an observation, derivation, or argument had been previously reported should be accompanied by the relevant citation. If not done, then same should be notified to the chief editor/editor immediately.
- ➢ **Disclosure and Conflict of Interest:** Reviewers should not consider manuscripts in which they have conflicts of interest resulting from competitive, collaborative, or other relationships or connections with any of the authors, companies, or institutions connected to the papers.
- ➢ **Responsibilities of authors about reporting standards:** Authors should present an accurate account of the work performed as well as an objective discussion of its significance. The work submitted by the author should be original. The paper should contain sufficient detail and references to permit others to the work. Fraudulent or knowingly inaccurate statements constitute unethical behaviour and are unacceptable.
- ➢ **Responsibilities of authors about Data Access and Retention:** Authors are asked to provide the raw data in connection with a paper for editorial review, and should be prepared to provide public access to such data, if practicable, and should in any event be prepared to retain such data for a reasonable time after publication.
- ➢ **Responsibilities of authors about Originality and Plagiarism:** Authors should ensure that submitted work is original and has not been published elsewhere in any language, and if the authors have used the work and/or words of others that this has been appropriately cited or quoted. In all its forms plagiarism constitutes unethical publishing behavior and is unacceptable.
- ➢ **Responsibilities of authors about Multiple Publications:** An author should not in general publish manuscripts describing essentially the same research in more than one journal or primary publication. Submitting the same manuscript to more than one journal concurrently constitutes unethical publishing behaviour and is unacceptable.
- ➢ **Responsibilities of authors about Acknowledgement of Sources:** Proper acknowledgment of the work of others must always be given. Authors should cite publications that have been influential in determining the nature of the reported work. Information obtained privately, as in conversation, correspondence, or discussion with third parties, must not be used or reported without explicit, written, permission from the source.
- ➢ **Responsibilities of authors about Disclosure and Conflicts of Interest:** All authors should disclose in their manuscript any financial or other substantive conflict of interest that might be construed to influence the results or interpretation of their manuscript. All sources of financial support for the project should be disclosed.

The College

❖ Cummins College of Engineering for Women (CCEW) comes under the umbrella of its parent institution, Maharshi Karve Stree Shikshan Samstha (MKSSS's) Cummins College is the first all women engineering college in India established in the year 1991 with support from Cummins Diesel (India) Foundation. It is located in Pune, Maharashtra State and is well known as 'Oxford ofthe East' with strong Computer, IT, Mechanical, Automobile and Electronics industry hub. The first undergraduate batch of CCEW passed out in July 1995, coinciding with the centenary of its parent institution.

❖ CCEW is recognized for its rigor in academics and dedicated faculty, successful alumnae being its outcome. CCEW has a strong association with the industry and is recognized for providing quality recruits for the industry.

Association of CCEW with Cummins India Foundation

❖ Not limiting itself to financial assistance alone, Cummins has contributed to the development of the college in many ways.

Cummins Signature Project

❖ **Cummins Signature Project:** The aim of the Signature Project is to enhance Academic Facilities in Cummins College. In less than two decades, this association has bloomedmagnificently. Cummins India Foundation has declared the Cummins College as its 'Signature Project' and is working hard at ensuring that the college acquires a listing amongst the top colleges in India. Under Signature Project, Cummins foundation has taken many initiatives for infrastructure, faculty and student development.

❖ **Cummins Fellowship Program:** At Purdue University Cummins Inc. and Purdue University (USA) [since 2004] offer Scholarship to the selected students for Masters Programme. [Till date, 42 students are benefited].

Affiliations and Approvals

❖ MKSSS's Cummins College of Engineering for Women is approved by All India Council for Technical Education, New Delhi and Directorate of Technical Education, Mumbai. CumminsCollege is offering five undergraduate programmes and three post graduate programmes. All undergraduates and post graduates programmes are affiliated to Savitribai Phule Pune University.

❖ MKSSS's Cummins College of Engineering for Women is **an Autonomous College from Academic Year: 2016-2017.**

Accreditation

❖ The programs of Cummins College of Engineering for Women are **accredited by National Board of Accreditation** in 1998, 2002, 2006, 2012 and 2016.

❖ Cummins College is also accredited by **NAAC at "A" grade** in 2012 and 2017 for next five years.

Vision: To be globally renowned institute for imparting quality education and to develop women leaders in engineering and technology.

Mission: To develop women professionals who are academically & technically competent with strong professional ethics.

Contents

Value Engineering as an Innovative Tool in an Engineering Educational System – A Case Study

N. Vivekanandan, K. Rajeswari

Computer Engineering, Pimpri Chinchwad College of Engineering, Pune

Abstract— **Innovations in delivering value are booming in the world. Value Engineering (VE) is an internationally recognised technique that assists an organisation in lowering overall costs, increasing value to the user, improving quality, increasing resource efficiency, simplifying procedures, minimising paper work, lowering staffing costs, increasing procurement efficiency, optimising construction expenditure, and so on. It also aids in the development of a value and creative attitude among employees. The industrial organizations have been compelled to go in for VE in account of globalisation, liberalisation and privatisation.VE has been implemented in industrial sector but has not been widely practiced in education and research. It is now the turn of technical education to follow in the footstep of industry. This paper focuses on the experience of the authors about how integrated VE has been practiced in their institution, Pimpri Chinchwad College of Engineering through different tools, techniques and methodologies for providing value added service in the field of education and research.**

Keywords— **Value Engineering, innovation, Pimpri Chinchwad College of Engineering, education, research.**

I. INTRODUCTION

VALUE creation is defined as:*"The creative invention of new products and services to delight consumers by discovering new market spaces and thus increasing the utility that they draw from them"* Miller, R. and Floricel (2004)

Malmi, T. (1999) stated that in the field of education the primary customers are students of an institution. To please customers, it is critical to generate or develop services in a unique way. Customers perceive value to be something worth paying for, according to Jancsurak, J. (1998). The new services should suit the users' individual requirements. Every team member is responsible for generating value for the educational institution.

In the process of creating value, their collaborative participation is critical. Institutional effectiveness can be improved by adopting or implementing value creation on the organization's services. In a similar line, Miller, R., and Floricel (2004) performed research and found that organisations that achieve high profitability and growth levels do so because they have embraced capabilities and processes to value creations rather than because they have followed best practises.

Organizations use methodologies like Value Analysis (VA), Value Engineering (VE), and Value Management (VM) to improve the value of their products, processes, and projects. Aliza Ramli (2007) stated that these strategies are commonly used in product development. The fundamental activities in the value creation process, according to Lindgreen and Wynstra (2005), are invention and product development.

A. Value Engineering (VE)

According to A. Omigbodun (2001), VE is a product of engineers' vision, ingenuity, and synthesis of a variety of sources. Miles was the driving force behind the creation of VE, and the technique has subsequently gained widespread acceptance in a variety of industries. As Davies points out, there is widespread agreement that Miles is the 'father' of VE (2004). The Society of Japanese Value Engineering [7] defines VE as:

 "A systematic approach to analysing functional requirements of products or services for the purposes of achieving the essential functions at the lowest total cost."

This shows that VE is used to improve products and services by examining each of the functions involved. VE is also used in service companies like hospitals and government institutions, as well as in education.

The term value, as employed by VE or VA, refers to the customer's assessment of the product. It's also seen as a way to handle problems involving the value of a product or service from the customer's perspective. Nonetheless, the core of VE application is to analyse product or service functions in a methodical manner while attaining those functions at the lowest total cost (Omigbodun, A., 2001; Witschey, W. & Wulff, R. 2002; Fong, P. S. W., 1998; Yoshikawa, T et al., 1995). According to Sperling, R. B. (2001), function can be defined as the project, product, or process's purpose or the work it does.

On the other side, if the focus is on cutting costs, one could dispute about the quality of projects, products, and services created or given. In the VE process, quality is not sacrificed, and the approach is not referred to as VE if it is solely a cost-cutting exercise. VE is a technique that only cuts out the costs that aren't necessary (Fong, P. S. W., 1998). According to Miles, unnecessary costs do not contribute to the quality, life, use, look, or customer aspects of Miles products, as noted by L. D. (1963). Poor design, wrong material choices, poor build abilities, and habits are all reasons for the unnecessary expense. When unnecessary cost of a product or system that is extraneous to the specified functions is removed, cost is decreased and performance is enhanced or maintained, according to Fong, P. S. W. (1998).

VE is also a way for achieving the required cost that takes into account both qualitative and quantitative considerations (Rwelamila, P. D. & Savile, P. W., 1994). The qualitative option refers to those aspects of the decision analysis that are difficult to explain numerically, whereas the quantitative option can be adequately expressed in numbers (Hilton, R. W., 2002). Hierarchical pressure can be used to reduce costs and raise production control in the short term (Drury, C., 2000). However, such a situation may have a negative impact on the performance of managers. Low motivation, greater labour turnover, and lower product quality are just a few of the qualitative issues that could develop.

B. Development of VE

VE has its roots in World War II. The "Asbestos Affair" was the catalyst for VE's development. This happened in the United States in 1947 at the General Electric Company. Asbestos, a major warehouse flooring material, was in low supply after World War II ended. A lower-cost replacement material was discovered by General Electric Company through the help of several specialised suppliers.

Other countries, including as Japan, Italy, Australia, and Canada, adopted VE practises and applications in 1970. (Cheah, C. Y. J. & Ting, S. K., 2005).

India, South Africa, England, France, Sweden, and Germany all had construction-oriented value engineers (Dell'Isola, A. J., 1988). In following years, a number of academics and practitioners coined the word "VM" to describe the VE technique. Its use has extended to Australia, New Zealand, and the United Kingdom since then. However, the name VE is still used in North America, Japan, and many European countries (Mazlan, C. M. M., 2002).

VE has grown into a technique that focuses on maximising the value of an entire system's product, processes, or services. Increased value is approached from the perspective of the client or consumer, and the required function is delivered at the lowest cost possible without compromising the quality and reliability of the product, process, or service.

C. Applications of VE

The VE approach can be used in a variety of industries. The VE approach was first used in the manufacturing industry. Construction, service, government, agriculture, education, and healthcare are just a few of the industries that have adopted this technique (McDowell, T., 1996). Construction projects (Omigbodun, A., 2001; Davies, K. E. L., 2004; Witschey, W. & Wulff, R., 2002; Jergeas, G. F., Cooke et al. ; Fong, P. S. W. 1999 ; Male, S., & Kelly, J., 1990) and manufacturing projects (Omigbodun, A., 2001; Davies, K. E. L., 2004 (Yoshikawa, T. et al.,1995). E is currently not a widely used technique in education, according to Ramli and Sulaiman (Ramli, A. & Sulaiman, S., 2006).This paper emphasises the importance of VE in technical education to delight the students who are the major beneficiary of educational institution. They undergo the process of education and training and get value added to them in terms of added knowledge, acquired skills, developed attitudes relevant to their occupation/ profession.

D. Diffusion of Innovation

Because innovations are believed to assist firms in successfully adapting to and continuing to exist in turbulent business settings, innovation is seen as an important research field (Emsley, D., 2005; Rogers, E. M., 2003). Innovation is defined by Rogers as

"…a*n idea practiced or objects that is perceived as new by an individual or other unit of adoption.*" (Rogers, E. M., 2003)

The term innovation can be applied to any concept, activity, or thing that is viewed as new by a person, group of individuals, or organisation, regardless of the length of time from its initial application or discovery. This suggests that innovation may have existed in the past in a different form or in a different location. In addition, newness can be linked to knowledge, persuasion, or a desire to adopt (Rogers, E. M., 2003; Bjornenak, T., 1997 It qualifies as an innovation if it is seen as novel in a certain location or social group. The act of choosing an idea and then refining it into a concept is referred to as invention. In turn, the concept will become an invention. According to Anthony (Bjornenak, T., 1997), innovation refers to new technology, modernization, or betterment. Gaynor, G. H., 2002, contended that Improvements to current products, processes, services, and systems, he defined incremental innovation as. Innovation can also be thought of as a collection of interconnected sub-processes (Zaltman, G., et al., 1973). It encompasses all processes in an integrated manner, from the invention of new ideas through the establishment of a new market.

Based on past research, VE aligns well with the characteristics of innovation and hence can be considered an innovative technology. It was also stated that VE brings a new perspective and enhancement to an activity. Because it produces alternatives through the examination of creative ideas, VE is thought to be innovative (Davies, K. E. L., 2004; Sperling, R. B., 2001)

Diffusion theory would be a good conceptual framework for VE because it is an innovation. Diffusion studies have looked at ABC, Balanced Scorecard, Business Computing, City Structure, Replacement Cost Disclosure, Web-based Distance Education, and Word Processors as examples of innovation (Christian, A. & Bjornenak, T. 2005.; Frederickson, H. G., et al. 2004; Li, Y., 2004 ; Mitsufuji, T. 2003; Kelly-Newton, L., 1980). Financial and management accounting, management, administrative, technology, and education have all been the subject of diffusion studies on innovation.

The majority of organizational changes are a direct result of the spread of innovations (Malmi, T., 1999). The diffusion process spreads or disseminates the innovation (Bjornenak, T., 1997) According to Frederickson et al. (2004), some people think of dissemination as change, while others think of it as reform or innovation. Rogers (2002) defined diffusion as:
"The process by which an innovation is communicated through certain channels over time among members of a social system"

II.   APPLICATION OF VE TO TECHNICAL   INSTITUTION

The history of technical education dates back a century and there has been a tremendous growth in the number of technical institute and its intake. There is a pressing need to emphasise technical education quality at a time when the country is liberalising its economy and entering the global market. Today, India's Technical and Vocational Education and Training (TVET) system is one of the world's largest, with over 5000 institutions offering programmes at various levels. Technical education is a critical component of economic development. Globally, technology development is thought to be responsible for 50% of economic progress. Despite the ongoing rise of technical education, the quality and standards of technical education are constantly declining.

Realising the importance and successful implementation of VE practices in manufacturing and other industrial organizations, it is considered of extending these VE principles and practices to technical education system.

While analyzing industrial activities, more importance is given to productive activities. Non- productive activities are eliminated from the system. The educational system can be considered in the same way with the perception for improvement by removing the non value added activities.

A. Present activities in the college

An educational institution comprises of two major components namely, students and faculties. The activities in academia can be classified into
- Student Oriented activities

- Faculty Oriented Activities

Major activities of the academics are indicated in the table 2.1 along with the objectives.

III.   BUILDING A NEW DIMENSION BY ADDING VALUE TO THE EXISTING SYSTEM

A.   Priority based selection of activities

The activities stated in table 2.1 are conducted unanimously in almost all the educational institutions. In this paper we discuss the most essential activities through which the value of education system can be increased tremendously. Based on ABC analysis the following activities were selected for value addition.

1)   Teaching Learning process:
"For the things we have to learn before we can do them, we learn by doing them" –Aristotle.

Creativity is an important component of problem solving in social, academic and industry success in addition to other higher cognitive abilities. Learning by interacting and integrated actions for innovation and competence building is the core elements of the approach. In education, the challenge is the variety of student cadre in a single classroom. Monk et al., 2022 have discussed on deep engagement along course concepts, commitment to collaborative learning, and the role of affect and in transformative learning

Bejamin Bloom identified three domains of educational activities:
(i) Cognitive (Knowledge): Mental skills
(ii) Affective (Attitude): Growth in feelings or emotional areas
(iii) Psychomotor (Skills): Neuro-Muscular Activities

Howard Gardener viewed intelligence as "*the capacity to solve problems or to fashion products that are valued in one or more cultural setting".*
The nine key areas of intelligence as categorized by Gardener are:
   (i)   Linguistic intelligence (word smart)
   (ii) Logical-mathematical intelligence (number smart)
   (iii) Spatial intelligence (picture smart)
   (iv) Bodily-Kinesthetic intelligence (body smart)
   (v)   Musical intelligence (music smart)
   (vi) Interpersonal intelligence (people smart)
   (vii) Intrapersonal intelligence (self smart)
   (viii) Naturalist intelligence (nature smart)
   (ix) Existential intelligence

Under teaching learning even if the students are taught about a subject by a profound teacher, the output during examination is rarely 100%. The reason is around 70% of students are said to be average, 10% of students are very intelligent and 20% of students are of below average cadre [Slow learners]. The grasping skill of some students may be quick or some may need more time. The key points in intelligence are
- There is no hierarchy among intelligences.
- Each one of us has all the nine intelligences in varying degrees.
- Each intelligence can be honed with time, training and practice.

To increase the output during examination, or to increase the value in educating a slow learner, the following things are done.
   (i) Learner centric approach
- Involving learners in teaching understanding process. This can be accomplished by conducting activities like
  o   Quiz
  o   Group Discussions
  o   Debates
  o   Innovative Beginning of a session
  o   Seminars
  o   Model making
  o   Animations
  o   Changing voice modulation

Sr.No	Activity	Objective
TABLE. I ACTIVITIES PERFORMED IN OUR COLLEGE ALONG WITH THEIR OBJECTIVES		
CLASS ROOM BASED ACTIVITIES		
01	**Classroom Teaching- Learning**	• To educate the students • To prepare for university examination • To help students to build their career
02	**Conducting practical in laboratory**	• To educate the students • To prepare for university examination • To help students to build their career
03	**Unit tests (Twice a semester)**	• To test the knowledge of students periodically
04	**Guest lectures**	• To gain exposure to recent technologies in Engineering
05	**End term submissions**	• To prepare students for the University practical and orals
ANALYSIS BASED ACTIVITIES		
01	**Students feedback**	• To help identify areas of improvement in teaching learning
02	**Students attendance report**	• To identify the defaulters and take necessary action
03	**Result analysis**	• To analyse the performance of the students and effectiveness of teaching learning.
04	**Academic monitoring**	• To identify the active involvement of faculty in Teaching Learning process by verifying the necessary documents.
05	**Teacher guardian portfolio**	• To give personal counseling to students
06	**Parents meet**	• Involving parents to identify the performance of their children
07	**Alumni interactions**	• To guide the students on the latest industrial scenario
BEYOND CLASS ROOM ACTIVITIES		
01	**Students Associations**	• To involve students for conducting various competitions • To motivate students for active participation.
02	**R&D , Innovation**	• To facilitate the students and faculties for doing research and creating innovative ideas.
03	**Communication and Personality Development**	• To help students in developing the skills of communication • To develop the inter personal and intra personal skills
04	**ISTE,CSI ,SAE chapters etc.**	• To gain exposure to recent technologies in Engineering
05	**Industrial visits**	• To expose students to industrial environment and know practical aspects of Engineering
06	**Training and Placement activities**	• To train the students to make them employable • To promote entrepreneurship
07	**Extra curricular activities**	• To identify the students interest in other activities like sports, car racing, cultural etc. • To create a platform to showcase their potential.
OTHER ACTIVITIES		
01	**Maintenance of campus and facilities**	• To create a healthy environment • To bring in the practice of preventive maintenance

- Real world applications on the topic has to be given for long lasting learning
- Morals and Values in the form of stories or daily happenings may be imbibed in the teaching learning process
  - Spending 2 to 3 minutes for inculculating morals and values is the real responsibility of faculty which will help our nation in long run.

(ii) Notes taking habit
Students are encouraged to take short notes during lecture. This will help them to
- Refresh the temporary memory about lectures back at home
- Understand the concepts and ask for doubts in the next lecture
- Make quick review during examination
- Speedup the process of listening and writing together

(iii) Follow up
Before University exam, the students are regularly monitored for their performance improvement through
- Orals
- Slip tests
- Unit tests
- Remedial lectures and retest

2) Academic Monitoring

Academic Monitoring is an innovative method which is a key element in strategic planning. In our college, for reviewing the academic activities performed by each faculty in the department Academic Monitoring is done twice a semester. This method consists of scientifically analysed twenty two points where attendance, unit test performance, number of lectures engaged, portions covered, lesson plan, teaching plan, remedial lectures and tests, tutorials, time tables, result analysis of the past 3 years etc. are analysed and scope for improvement of the faculty is identified. As every key point is evaluated and monitored it adds tremendous integrated value to the system.

3) Student's feedback

A feedback loop is required in all quality systems. Mechanisms must be in place to allow outcomes to be compared to the plan. In our college we have Student's Feedback system where performance of a faculty in classroom is assessed by the students. During an academic year, twice students feedback is taken. Every department has a committee to prepare a time schedule for feedback which is sent to the respective department to confirm the availability of faculty. According to the convenience of the faculty, the schedule is altered. The faculty appointed receives feedback forms (equal to the student's strength of that class) from the Head of department. The faculty explains to the student every point in the feedback forms and facilitates the student for filling of the form. The forms are collected and submitted to the Head of the department. Later the lab assistants are used to make entry in software for preparing the analysis report manually. Each faculty is given a report page about their performance in the class by the head of department through Dean Academics.
In a semester, after a month Feedback is taken about the faculty handling the students. More time and cost is wasted in preparatory work like forming feedback committee, schedule preparation, confirming faculty, time table alteration, taking photocopies of feedback forms etc.
Proposed System:
The student feedback system is a method used for continuous improvement of the teaching learning process. This system will help the faculty to identify the problematic area and do necessary corrections. Also students feel satisfaction in the system as the system is Learner centric. To add value to the existing feedback system, we propose a computer based system, by which cost and time will be significantly saved. The system is as follows
(i) In Academic Calendar & Time table of the Semester, an hour for every class has to be mentioned for Student Feed Back System.
(ii) In that hour 100% attendance should be made compulsory
(iii) The class teacher may take the students to the computer center where every system will have a screen where the students will make entry of their points and click save button.
(iv) Help should be available in the software about various points.
(v) The saved database is analysed by the software itself and it is viewable only by the Dean Academics.
(iv) The analysis chart with improvement to be done is automatically sent through mail to the respective faculty.
This enhances the effectiveness of the existing system in terms of quality, time and cost.

4) Research, Development and Innovation

To inculcate value in our student's projects, we started setting up Research & Innovation Development cell in the year 2008-2009. The committee was formed comprising interested faculty members [2 from each department]. Under an incharge total of 10 faculty members started their work. An innovation cell was set up. Necessary fundamental tools were made readily available. The students of different department were motivated to come together and work in the innovation centre where they were able to develop multi-disciplinary projects and models.

To introduce and further nurture the concept of innovation among the students innovation software named Goldmine is procured and used. About 10 faculties from different departments were given training on the usage of software and on the concept of innovation by a resource person from well reputed Research and Development organization. The trained faculties are motivated to guide the students working in the innovation centre and develop innovative products. Interest of students in innovation is kindled by organizing project competitions and by providing financial support to good projects. Best projects are selected and they are sent to the university level and state level competitions such as Avishkar. As a result students have been motivated to participate and compete in the competition.

Some of the innovative projects done by our students include

- Design and development of tilting type Aluminium furnace
- Cabin cooling of truck using engine exhaust.
- Mixer grinder with cleaner.
- Window wiper for multi-story building
- Design of automatic robotic arm for sorting of objects using B&R PLC.
- Helmet cooling system.
- PC based automated drip irrigation

Some of the innovative research proposals approved by Board of College and University Development (BCUD) of Pune University for the year 2010- 2011 include

- Experimental investigation of two phase natural circulation loop with end heat exchanger.
- EEG based brain computer interface for communication and control.
- Wi-Fi converter from windows to linux.
- Evolutionary algorithms for document clustering and effective information retrieval.
- Multisensor Image Fusion.

As an impact, currently (2022) we have more proposals sanctioned under organizations like DST (Department of Science & Technology), collaborative projects with DRDO (Defense Research & Development Organisation) which has tremendously helped in our Accreditation process of NBA(National Board of Accreditation), consecutively four cycles since 2012.

5) Other areas of improvement

We are making value addition as our practice and wherever feasible we are trying to add value to our continuous improvement process after in-depth analysis. Some of the activities where we are trying to do value addition are as follows:

(i). Getting feedback from the external examiners who come to our college from other college to conduct practical and oral examinations. A short questionnaire is prepared on the basis of quality of work displayed (journal submitted), theoretical and practical knowledge of students, facilities in the lab, interaction with the internal examiner, hospitality and comments for improvement.

(ii). We understand that industries train the selected fresher's for about at least six months adding value to their performance. Such activity is not usually done in academics. We tried to implement the phenomenon of training the new faculty for about one week by our experienced faculties.

(iii). Students of third and final year are given training on group discussion, personal interview and aptitude for increasing their chance of employability by campus recruitment itself.

(iii). We perform the safety audit once in a year to identify the risks and hazards associated with the laboratories and various activities that is carried out within the campus.

(iv). We use innovative methods to incorporate Value Engineering in Education according to the industrial requirements where the four years of Engineering will be effectively utilized to train the students to solve open ended problems required by the industry. This can be achieved by the following methodologies:

- Bringing both Academic Institutions and Industries together to bridge the gap in learning process.
- Building an efficient Value Engineering team consisting of people from industries and institution.
- Introducing the Concept of "Train the Teachers by Industries".
- Involving Alumni for regular interaction with students to guide them for facing real life Industrial scenario.
- Interdisciplinary teaching and learning.
- Restructuring Curriculum to solve open ended problems.

IV. CONCLUSION

Technical education is a fast growing service sector. There is a vital need to improve the quality of technical education. We are in the urge to add value to the existing process to make the system more effective. Some scientific methods have been utilized to add value to the existing system and the results were fruitful. Thus, we have tried to identify three of our major activities in current academic system, to make it effective. Almost all academic institutions have a system which involves such type of activities, and therefore they can think on increasing value to the existing system without disturbing it. If worked as a group better results can be achieved both in terms of time and cost without compromising the quality.

REFERENCES

Aliza Ramli, Suzana Sulaiman, Falconer Mitchell, (2007), *Case Study : A case study of value engineering as an innovative tool in a Malaysian automotive component manufacturing company*

Anthony, K. R., (2003), *A rapid response organization's diffusion of innovations. Unpublished Ph.D., Capella University*

Bjornenak, T., (1997), *Diffusion and accounting: the case of ABC in Norway. Management Accounting Research, 8(3): 3-17.*

Cheah, C. Y. J. & Ting, S. K., (2005), Appraisal of value engineering in construction in Southeast Asia, *International Journal of Project Management, 23: 151-158.*

Christian, A. & Bjornenak, T., (2005), Bundling and diffusion of management accounting innovations: The case of the balanced scorecard in *Sweeden, Management Accounting Research, 16(1): 1-20.*

Davies, K. E. L., (2004),. Finding value in value engineering. *Cost Engineering, 46(12): 24-27.*

Dell'Isola, A. J.,(1988), *Value engineering in the construction industry.* Washington D. C.: Smith Hinchman & Grylls.

Drury, C., (2000), *Management & Cost Accounting (Fifth ed.). London*: Business Press Thomson Learning.

Emsley, D., (2005), *Restructuring the management accounting function: A note on the effect of role involvement on innovativeness*, Management Accounting Research: 1-21.

Fong, P. S. W., (1998) Value engineering in Hong Kong - A powerful tool for a changing society. *Computers Industrial Engineers*, 35(3/4): 627-630.

Fong, P. S. W., (1999), Function-oriented creative group problem solving, *Creativity and Innovation Management*, 8(3): 210-222.

Frederickson, H. G., Johnson, G. A., & Wood, C.. (2004), *The changing structure of American cities: A study of the diffusion of innovation. Public Administration Review.*

Gaynor, G. H., (2002), *Innovation by design. New York: AMACOM*

Guidebook for VE activities - A basic manual: 1-32: Society of Japanese Value Engineering.

Hilton, R. W., (2002), *Managerial Accounting. Creating value in a dynamic business environment* (Fifth ed.). New York: McGraw Hill.

Jancsurak, J., (1998), Wanted: Value creation, *Appliance Manufacturer*, 46: 57-59.

Jergeas, G. F., Cooke, V. G., & Hartman, F. T. 1999. Value engineering incentive clauses. Cost Engineering Morgantown, 41(3): 25-35.

Kelly-Newton, L., (1980), A sociological investigation of the USA mandate for replacement cost disclosures. *Accounting, Organizations and Society*, 5(3): 311-321.

Li, Y., (2004), *Faculty perceptions about attributes and barriers impacting diffusion of web-based distance education (WBDE) at the China Agricultural University. Texas A & M University.*

Lindgreen, A. & Wynstra, F., (2005), *Value in business markets: What do we know? Where are we going? Industrial Marketing Management*

Male, S. & Kelly, J. (1990), The economic management of construction projects: *An evolving methodology. Habitat International*, 14(2/3): 73-81.

Malmi, T., (1999), Activity-based costing diffusion across organization: An exploratory empirical analysis of Finnish firms. Accounting, *Organizations and Society*, 24: 649-672.

Mazlan, C. M. M., (2002), Value Management Principles and Applications. Petalng Jaya: Prentice Hall.

McDowell, T., (1996), Value management: Surviiving in the millennium via diligence rewarded, *Management Accounting* 74(7): 48-50.

Miles, L. D., (1963), *Definitions: Lawrence D. Miles value Engineering Reference Center: Wendt Library.*

Miller, R. & Floricel, S., (2004), Value Creation and games of innovation, *Research Technology Management:* 25-37.

Mitsufuji, T., (2003), How an innovation is formed: A case study of Japan word processors. *Technological Forecasting & Social Change*, 70: 671-685.

Monk S, Riley T, Van Issum H.(2022), Using Arts-Based Inquiry and Affective Learning to Teach Indigenous Studies in a First-Year Preservice Teacher Education Course. Journal of Transformative Education.

Omigbodun, A., (2001), Value engineering and optimal building projects, *Journal of Architectural Engineering,* 7(2): 40-43.

Ramli, A. & Sulaiman, S., (2006), The structural and functional changes of management accountants in Malaysia, *Asian Academic Accounting Association 7th Annual Conference, Sydney.*

Rogers, E. M., (2003) *Diffusion of Innovations* (Fifth ed.). New York: The Free Press.

Rwelamila, P. D. & Savile, P. W., (1994) Hybrid value engineering: The challenge of construction project management in the 1990's, *International Journal of Project Management*, 12(3): 157-164.

Sperling, R. B., (2001), Understanding value engineering. *IIE Solutions*, 33(8): 45-51.

Witschey, W. & Wulff, R., (2002), How to ensure quality and cut costs with cultural institution value mathodology. A case study of value engineering on an history renovation project at the Science Museum of Virginia, *Museum Management and Curatorship*, 17(1): 65-83.

Yoshikawa, T., Innes, J., & Mitchell, F., (1995), A Japanese case study of functional cost analysis, *Management Accounting Research*, 6: 415-432

Zaltman, G., Duncan, R., & Holbeck, J. (1973), *Innovations and organizations: A Wiley-Interscience publication.*

Framework for Staff Development Program for PBL

Jweshvari V. Tupe[a], Vikas Shinde[b], and Bhaveshkumar N. Pasi[c]

[a,b,c]Department of Mechanical Engineering, Vishwaniketan's iMEET, Khalapur (Affiliated to University of Mumbai)

Abstract—The concept of project-based learning is new in the engineering stream, especially in India. As a result of a lack of knowledge and clarity regarding PBL, implementing PBL in the field of engineering poses many challenges. Teachers' perspective and understanding of PBL are the biggest challenges to implementing PBL. A four-year literature review was conducted to find out the latest trends in project-based learning. A literature review revealed that very little attention is given to faculty development for project-based learning. A key component of PBL implementation and execution is faculty involvement. The faculty training is highly recommended prior to implementing project-based learning in any educational system. It is important to understand a few factors such as the teacher's perspective of project-based learning and the teacher's readiness to understand the concept of PBL in order to develop a staff development program. Teachers' perspectives will change when they get acquainted with the PBL concept through a well structured staff development program. This research suggests the framework for the staff development program.

Keywords— PBL, Faculty Development, Challenges, Teachers' Perspective.

I. INTRODUCTION

Project Based Learning is not a new concept. Different varieties of it are practiced in schools and other educational settings. In spite of this, there are some key differences between "doing a project" and undertaking rigorous project-based learning.

PBL has been adopted in many educational institutions. However, the effectiveness and efficiency of PBL have not been satisfactory. The reason is that teachers do not perceive PBL appropriately. There is a lack of teacher and student training as one of the major reasons. PBL must be viewed appropriately by educators. In order for PBL to be implemented effectively, teachers need to receive adequate training.

Various research gaps were identified in published research articles and presented in this research article. Such as, researchers have rarely gathered information about teachers' perspectives on PBL. In relatively few research articles, the framework for training programs for teachers has been discussed. Outcomes of many research articles are based on the development of a framework for project-based learning assessment. But the validity of such a framework is still not investigated thoroughly.

The remainder of the article is organized as follows. Section 2 is devoted to the literature review.. Section 3 is dedicated to research objectives. Section 4 is dedicated to the methodology.

II. LITERATURE REVIEW

A four-year literature review was conducted to find out the latest trends in project-based learning. Numerous researchers have implemented project-based learning in areas such as the arts, literature, and schools.

In this work, researchers explored and compared how different online instructional practices can support the acquisition of design skills through the eyes of students in PBL (project-based learning), as well as the impact of such practices on the student performance. This study analyzes the implications for teaching different engineering design disciplines and settings within the context of educational practices and transferability. They found that the combined deployment of such online practices ensures a student performance (71.7%) which is virtually the same as for the previous cohort (72.0%), when design was fully delivered on-campus.[1]

This project presents design features that bring together the assets of the Framework with project based learning, and then tests these features to derive design principles that serve as commitments for designing for teacher change and student learning. This research showed that these design principles provide guidance for developing materials that support the depth necessary for promoting changes to teachers' practice at scale: Adaptive, Responsive, and both Enjoyable and Intellectually Satisfying.[2]

This study aimed to provide practical insight on how to deal with collaboration challenges in project-based learning. 67 reflections were analyzed by qualitative means by students who were enrolled in a project-based learning course. Students' priority conflicts and project assignment uncertainty were found to be contributing factors to collaboration challenges. Moreover, these results suggest that structured project-management approaches to planning, communication, and follow-up are conducive to successfully addressing these challenges. According to the findings, this structured approach should also be accompanied by an adaptable and flexible mindset as the project develops.[3]

A scalable and sustainable teaching/learning methodology for web programming is presented in this article using project-based learning that is able to adapt to the continuous advances in web technology. Over 9 years, 15 groups, and 3 universities have developed and improved the methodology. Research findings demonstrate that the methodology is adaptable with new technologies and that it offers students the advantages of avoiding plagiarism and personalizing their learning process.[4]

The objective of this study was to characterize college students' social and cognitive presences within online PjBL communities and to examine how presence influenced academic performance. A total of 24 groups of students collaborated in discussion groups via WeChat over the course of three weeks to create a final product. The results of the study showed that the component of effectiveness and the level of exploration accounted for most of the students' social and cognitive presences. The results of step-wise regression analyses revealed that some components and sub-components of students' social presence, as well as levels and sublevels of their cognitive presence were positively related to their academic performance.[5]

They mention in this paper that they have deployed a faculty training model to train faculty on mentoring interdisciplinary projects. Based on the heuristic experience of four iterations, the proposed faculty development model has organically evolved. Engineering Exploration was the context in which the model was implemented. PBL pedagogy is used in the course, where each faculty member mentors a set of students on an interdisciplinary project. In the course, students will be asked to apply knowledge and skills from a variety of domains in the projects. Mentoring such interdisciplinary projects requires formal training. The authors of the literature found, however, that very little is known about standard frameworks and models to be used to train faculty in interdisciplinary thinking and mentoring. The paper describes a model for faculty training consisting of four phases, where the initial phases emphasize the enhancement of faculty members' technical skills, while the latter phases emphasize the enhancement of mentorship skills.[6]

The purpose of this study is to investigate tutor motivation, challenges, and support requirements, the relationship between tutors, and whether a common training and support program is believed to be effective. Analysis of tutor data (n =50) was done according to age, gender, background, experience, employment status, and campus location. An interesting finding of the study is that a tutor's motivation is disrupted by a challenge and, as a result, a relevant support mechanism is needed to re-establish or maintain this motivation. Specifically, motivators such as "interaction with students" correlated with challenges such as "managing group dynamics", "student adherence to PBL rules", and "student behavior" while motivators such as "educational value of PBL" correlated with "student adherence to PBL rules", "student behavior", and "student information and expectations of PBL". In addition, tutors benefited from peer reviews and provided feedback while their needs differed in terms of content- and assessment-related support, motivation, and group dynamics management. It is therefore necessary to implement a framework for restructuring tutor support systems, so that individualized support can be offered to each student.[7]

The purpose of this study was to identify the role of project-based learning in helping students at Imam Abdul Rahman bin Faisal University gain some academic skills and to develop students' and faculty members' attitudes towards it. The current study used two questionnaires and a graded scale to measure faculty and student satisfaction with project-based learning and teaching, and to evaluate the training materials in the teacher's guide and student's book that support project-based learning. This pedagogical strategy was implemented by 87 students and 15 faculty members. As a result of the study, both students and faculty members expressed satisfaction with the project-based learning strategy. The post-application scores in the graduated scale of the standards of project-based learning practice were statistically significantly higher than the pre-application scores in the pre-evaluation. Study results found that project-based learning helped students develop academic skills such as cooperation with their group members, critical thinking, creativity, decision-making, and project management.[8]

The purpose of this paper is to discuss collaboration between teachers in project-based learning environments in engineering. Teachers and students alike find PBL to be a challenging approach to active learning. PBL project themes necessitate teachers to search for new knowledge and they find it challenging to align their disciplinary areas with interdisciplinary areas in a project. Among the many compromises of PBL from a teacher's perspective is the teamwork of the teaching team. From the teacher's viewpoint, PBL compromises the typical assumptions of teaching, such as having considerable control over the classroom, relying on their expert knowledge, predictable educational programmes, the course assessment, the individual work, and so forth. Oftentimes, teachers are uncomfortable sharing their knowledge and being exposed to and/or assessed by their students and peers. Meanwhile, PBL demands that teachers place student achievement first, instead of following mono-disciplinary course based approaches. Here, the authors will present literature reviews and their experience in PBL contexts to demonstrate that such collaboration is important, if not crucial, to PBL success. It will also argue that teachers' collaborations are important as examples for students to follow.[9]

Students gain new knowledge through project-based learning, which connects students' real-life experiences to their education. From both male and female Science teachers' perspectives, the study evaluated the effects of a project-based teaching strategy on improving critical thinking among students in the upper basic Stage. Through a questionnaire, the researcher applied the descriptive-analytical method to (111) male and female Science teachers in Al-Kourah District, Irbid, Jordan. Statistically, the project-based learning strategy exhibits a significant difference (a= 0.05) from the conventional learning strategy. Therefore, the difference favored the project-based learning strategy. Additionally, the textbooks and activities should be organized in accordance with the project-based learning strategy. By using a project-

based learning strategy, this action involves retraining teachers to prepare learning situations. Further studies on the methodology of teaching thinking skills, such as creative thinking, reflective thinking, communication, and cooperation skills, are needed.[10]

III. RESEARCH OBJECTIVES

Following are the objectives of this research work which are orientated to the Indian Education System:

1. To understand engineering teachers experiences of learning about PBL and how to implement PBL

2. To explore what constitute engineering teachers' readiness for change

3. To explore what support engineering teachers' professional learning

IV. METHODOLOGY

There is a need for stepwise staff training programs in the Indian Education System in order to successfully implement PBL. This study proposes a four step framework to assist teachers in best implementing PBL.

Floating Questionnaire through Google Form and collecting responses

↓

Analyzing teacher's perspective and readiness for PBL

↓

A general training on PBL should be provided to institute representatives from different parts of India

↓

According to the need and the location of the institute, a trainer should arrange staff development program

↓

Training Should Include:
- How to identify a real life problem
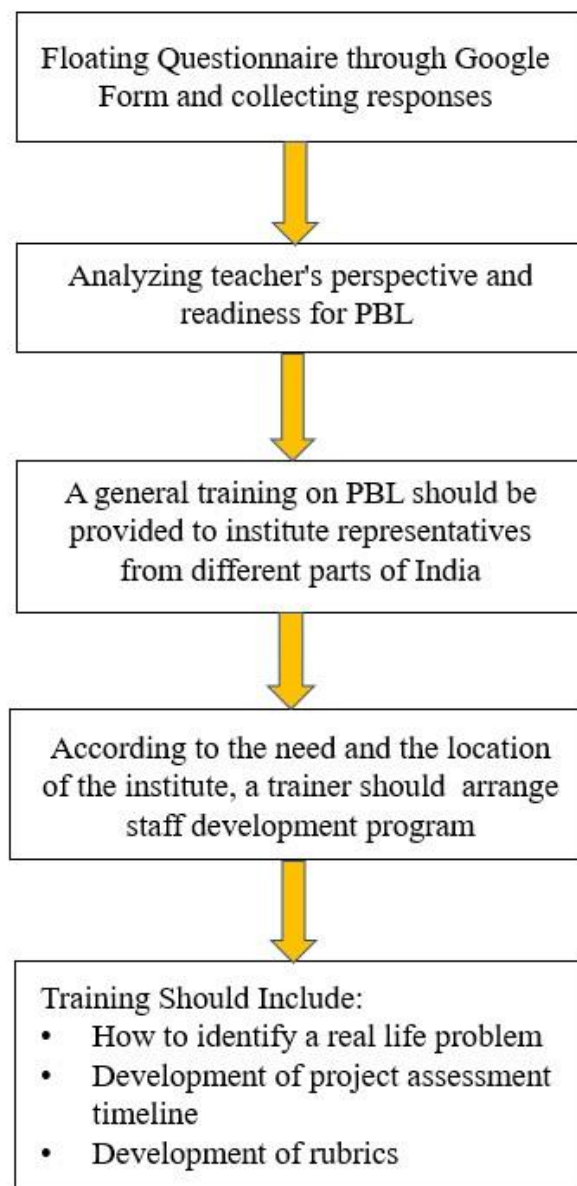- Development of project assessment timeline
- Development of rubrics

Fig 4.1. Flowchart for the conduction of Staff Development Program

11

There will be following steps:
We will conduct a staff survey in task 1. A questionnaire will be distributed to faculty from various engineering institutes. The questionnaire will include questions aimed at analyzing a teacher's viewpoint on PBL. Based on the responses received, an analysis will be conducted. Activities for staff development will then be planned. Following that, institutes will schedule their staff development programs according to their needs.

REFERENCES

1. D. Beneroso, J. Robinson, "Online project-based learning acquisition of design skills training in engineering design: Supporting the", *Elsevire 2022, Education for chemical engineers, volume 38, January 2022, pgs. 38-47*
2. Emily C. Miller, Samuel Severance & Joseph Krajcik, " Motivating Teaching, Sustaining Change in Practice: Design Principles for Teacher Learning in Project-Based Learning Contexts", *Journal of Science Teacher Education, September 2021, pgs. 757-779*
3. Bassam Hussein, " Addressing Collaboration Challenges in Project-Based Learning: The Student's Perspective", *Journal of Education Sciences, 2021, Volume 11, Issue 8*
4. Juan Carlos López-Pimentel, Alejandro Medina-Santiago, Miguel Alcaraz-Rivera and Carolina Del-Valle-Soto, " *Sustainable Project-Based Learning Methodology Adaptable to Technological Advances for Web Programming", Journals of Sustainability, 2021, Volume 13, Issue 15*
5. Pengyue Guo, Nadira Saab, Lin Wu, Wilfried Admiraal, " The Community of Inquiry perspective on students' social presence, cognitive presence, and academic performance in online project-based learning", *Journal of Computer Assisted Learning, Volume 37, Issue 5, Pgs. 1479-1493*
6. Unnati Koppikar, Kaushik Mallibat, Rohit Kanadakatla, Gopalkrishna Joshi, Vijayalakshmi M, " Faculty Development Model for Mentoring Interdisciplinary Engineering Projects", *2021 IEEE Frontiers in Education Conference*
7. Stella A. Nicolaou, Alexandros Heraclides, Costas S. Constantinou, Stella Loizou, David J. Gillott, " One size doesn't fit all: PBL tutor training and development", *IUScholarWorks Journals, Dec. 2021, Volume 15*
8. Ali Alwardany Ali Omar, Montasser M. A. Mahmoud, Samah Ramzy Abdulghani, Ali Amani Mohammed Alqurni, Walaa Saleh Megahed Saleh, Rami Naim Atiyeh, " The Role of Project-Based Learning in Helping University Students Gain Some Academic Skills and Developing Students' and Faculty Member's Attitudes Towards It", *Review of International Geographical Education, Spring 2021*
9. Alves, Anabela C. van Hattum-Janssen, Natascha Fernandes, Sandra, " Teacher collaboration in PBL: setting the example for the students", *INPP - Publicações em Livros de Atas Internacionais, Papers in International Proceedings, July 2021.*
10. *Issa, Heba Bani; Khataibeh, Abdullah, "The Effect of Using Project Based Learning on Improving the Critical Thinking among Upper Basic Students from Teachers' Perspectives", Pegem Journal of Education and Instruction, 2021, Volume 11, pgs. 52-*

Innovation continuum in Education Structure: The Stakeholders' imperative in NEP

Ruby S Chanda , Vanishree Pabalkar

Symbiosis Institute of Management Studies (Symbiosis International University, Pune)

Abstract— **This paper discusses a methodology for creating an Educational structure that aligns with New education Policy2020 using a case study example of Symbiosis International University, Pune. The researchers have described the process adopted by the University for setting up the education structure and the curriculum. The stakeholders from Industry, Society, and the Community are crucial part of the system. The Flow of the process and the challenges which are faced are documented. The whole process follows the objective of Innovation, employability, and inclusion, which is developed with stakeholders' input. This provides insights to the decision-makers to present an explicit offer to the students and the participants across the key dimensions and the consequences of the curriculum at the broader level. The final section of the paper discusses the challenges and the benefits of the adoption of this inclusive structure and its prospects in the near future for everyone.**

Keywords— **Education structure, Stakeholders, NEP 2020, Innovation, Inclusion**

I. INTRODUCTION

"The National Education Policy 2020 envisions an India-centric education system that contributes directly towards suitably transforming our nation into a sustainable, equitable and vibrant knowledge society, thereby providing high-quality education to all." MHRD

India will have the maximum population of young people in the ecosphere over the next decade, and our capability to provide high-quality educational prospects will regulate our country's future. The expectation of the contemporary knowledge society governs the policies of the institution of higher education, whose responsibilities include: conception, diffusion of knowledge, preparation of trained graduates and teachers, and restitution of knowledge (UNESCO world report, 2005). The vision of the National Education policy for achieving Long Term

Sustainable and Employable Growth seeks to "ensure inclusive and equitable quality education and promote lifelong learning opportunities for all" by 2030, encompassing blended learning or flipped learning as a crucial process. But the challenge is -Are we prepared? What's our degree of preparedness and adaptability to the 'new normal?

The global education development program echoed in the Sustainable Development Goal 4 (SDG4) of the 2030 agenda, espoused by India in 2015 - pursues to "ensure inclusive and equitable quality education and promote lifelong learning opportunities for all" by 2030. Such a supercilious goal will entail the whole education system to be reconfigured to sustenance and adaptive learning so that all of the critical objectives and goals (SDGs) of the 2030 Agenda for Sustainable Development can be attained. The world is experiencing swift changes in the knowledge landscape. With the rise of Big data, AI, AR and VR, and machine learning, the workforce engaged in unskilled jobs is threatened by machines. On the other hand, the skilled workforce with computer science, data science and mathematical perspectives possessing varied multidisciplinary abilities is potentially enjoying ever-increasing demand.

India witnessed a new education only once every few decades. India came up with the first National Education Policy (NEP) in 1968 during the administration of Indira Gandhi, which the Rajiv Gandhi administration replaced after a gap of 18 years in 1986. The NEP was little modified under the administration of Prime Minister P V Narsimha Rao in 1992. The education system needed a major revamp; thus, the latest NEP was introduced under the leadership of current Prime Minister Narendra Modi in 2020. The NEP 2019 was approved on 29th July 2020 with a vision of uplifting and restructuring the present education system at all levels and putting down a blue print for a progressive, educated society. Ex ISRO chief K Kasturirangan spearheaded the committee responsible for policy document formation.

II. NEW EDUCATION POLICY

The NEP 2019 is instrumental in educational reforms in India as it aligns with the technological advancement and the growing multi-layered industry requirements in a developing country like ours. The focus is on upgrading the present structure and combating the need of the hour with contemporary resources.

The government's objective is not only to create a progressive all-rounder but also to form a more holistic, logical, and innovative education with the flexibility to opt for different fields of subjects from arts, language, literature, sports, and humanities.

The new policy recommends a swing from an evaluation based on a program's outcome to a year-round assessment structure. This demand decreases curricular content and routine learning and complements it with conceptual

understanding, experimentation, and critical thinking. The goal is for this age of Indian students to obtain a holistic model of knowledge, well equipped with cutting-edge skills required to excel in the 21st century.

A. Vision of NEP

An education system contributes to an equitable and vibrant knowledge society by providing high-quality education to all.

We provide intrinsic skills, values, and disposition supporting human rights, sustainable development, living, and global wellbeing.

B. Key Principles of NEP 2019- In line with the vision and aptly applicable to HEI

Fig 1 Key Principles of NEP 2019

C. Major Key Outcomes for HEI

The major outcomes expected are

- Universalization of Access
- Ensure Equity and Inclusion
- Attain quality and achievement of learning outcomes
- Focus on 21st Century Skills in Teaching, learning, and assessment
- Resource sharing
- Effective Governance
- Overcoming language barrier

III. THE CASE OF SYMBIOSIS UNIVERSITY, PARADIGM SHIFT

The Symbiosis University is an International University with the objective of providing universal and equitable education to everyone with the motto of "Vasudhaiva Kutumbakkam," meaning the world is one family. The idea is to ensure the equity and inclusion of all the students from India and across the globe. This is the first step when we think of aligning the vision of NEP 2019 as a global citizen and global wellbeing. It is multidisciplinary academia offering the students and faculty a vibrant culture of learning environment premeditated around its diverse and advanced philosophy.

A. Key Criteria

Now if we consider the components of NEP 2019, we find that this is already being followed in the curriculum across different courses. The model which is developed and executed can be explained accordingly.

Student Centric Model: There is a choice of courses offered to the students to complete his/ger credits for the semester and the specialization desired by the student. Specifically, the choice of assessments and attempting SWYAM MOOC and from ODL can appear for competency-based evaluation at his own pace.

Competency-based continuous evaluation: The conventional choice-based credit system is being replaced by a competency-based credit system. The new system has an edge in appraising skill sets of a student along with knowledge and experience. Competency makes the foundation for the development of confidence which leads to the achievement of the objective of the higher education system regardless of subjects. The new system identifies challenges and prepares the students to convert them into opportunities to solve societal problems. They have the

opportunity to select and develop the skills besides the regular courses and apply those in Industry through live projects, internships, on-the-job training, and many more.

Research & Innovation: Focused The goal of higher education is to generate new knowledge or a new understanding of existing knowledge through systematic analysis. The students are motivated to explore and innovate. The pedagogy is inclusive, where student participation and involvement is in mandatory. They are initiated to research and present their ideas in front of the class, where they get more ideas to improve and update their knowledge. Generally, almost all the students across the domain areas are pursuing research in their assignments and general sessions, and it becomes imbibed in their system as a process. This also enables them to critically analyze the topic and search for recent research articles to support their perspectives.

Autonomy at all Levels: The University has provided autonomy to all the faculties, all the institutes, and all the courses to do innovations in deciding the courses, curriculum, pedagogy, examination and evaluation to improve the quality of education offered by them. The University's academic body invites the faculty members of course and domain to meet and deliberate regularly to monitor and update the curriculum and the evaluation components. This process also invites industry representatives and the alumni who are working in Industry to their contributions.

Boost to Online training: The University believes in using Education technology, Internet technology, Artificial intelligence, and Virtual reality in effectively implementing education at all levels. Modern technologies support the planning, design, and implementation of effective online teaching to comprehend the characteristics of the ideal education system and enhance overall performance—skill development through different online platforms, E-resources, Bloomberg terminals, and Software applications in regular interactions.

B. The shift

The University is proactive in its approach as they have diverse students with multifaceted research and learning objectives. The University aims to cater to every student segment with a wide variety of course choices and practical exposure. Not only the international students are welcome to enroll, University also provides the opportunity for a semester exchange to the students with a selection of their partner foreign universities. This collaboration and exposure are of immense value to the students as they can compare their global understanding, knowledge, and skills. The students can also take up live projects and research assignments in these partner universities funded by Industry. So, if we take a closer view at how the students become so competitive and have such a comprehensive knowledge base, the process of setting and updating the syllabus with the collective feedback of academia and Industry at a regular basis is the answer
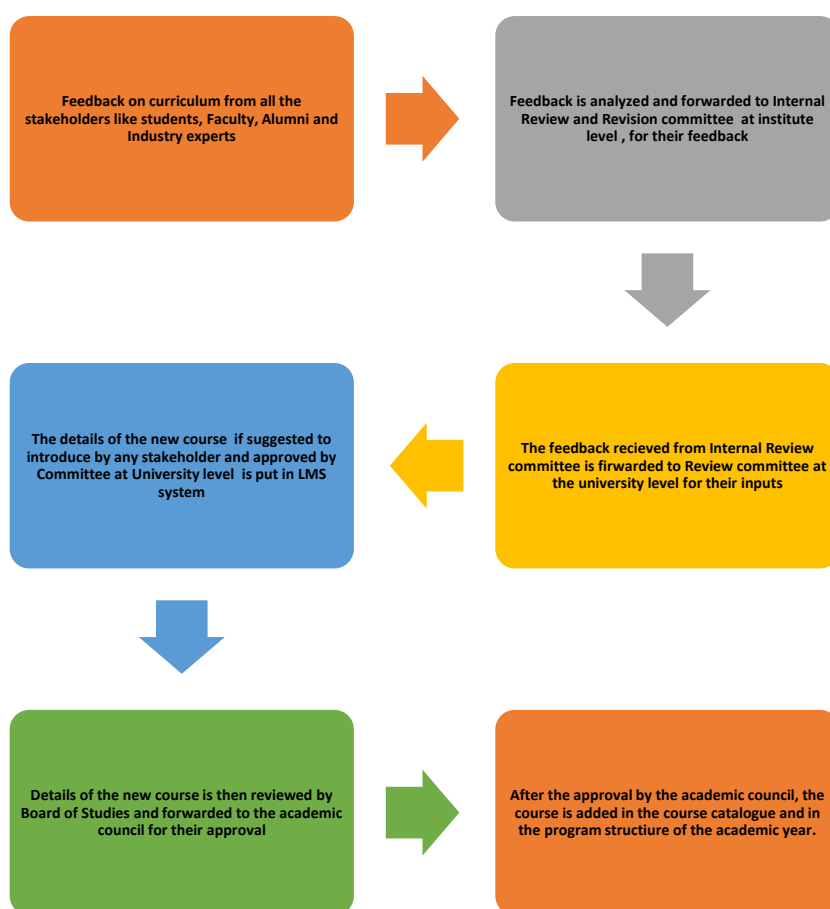

Fig 2: Academic Process for Inclusion of new courses

Existing research has specified that the efficacy of professional development for educators is restricted; however, the process in amalgamation with a pedagogy-based, collaborative professional development approach for bearings in the quality of teaching. The qualitative and quantitative data specified the progression of professional development as interference to accomplish success, thereby supporting teacher erudition for assessable impacts on education

excellence and teacher morale (Gore, Lloyd, Smith, et al. 2017). The study emphasized regular professional progress and the aptitude to acclimate and accept innovative practices as a teacher evolves.

IV. EXPECTED OUTCOME

Education is expected to change as per the requirement of the Industry and the other stakeholders; hence the autonomy is expected to provide the quality education achieving the vision and the mission of the HEIs. The freedom provides the power and the flexibility to make the decisions by the HEIs, leveraging the full potential of external and internal stakeholders for its effective implementation.

Autonomy can be termed as the authority to make decisions in some crucial regions like academia, finance, administration, governance, and the institute's management. Also, autonomy calls for accountability which is the other side. HEIs and Technical institutes are facing the challenge of quality education as they must manage finance accordingly. Most HEIs in India face bureaucracy and hence the restriction of decision-making following the rules and the process, limiting them to gratifying the stakeholders' expectations.

In the research article by Michavila et al. (2018), there is a portrayal of university excellence vs. autonomy, accountability and finance. It was mentioned that universities need to upgrade their organizational structure and processes to respond effectively to stakeholders' expectations and demands to provide quality education. Hence it calls for increased autonomy and better financials at their disposal, a part of current University policy. This was further supported by Kenan Dikilitas et al. (2018), stating the autonomy in teaching. The research focused on the personal and informal process of teacher autonomy. Essentially, autonomy involves opinions and feedback, which helps appreciate the whole process. This motivates and makes the stakeholders aware of the whole process.

In the existing research regarding Innovation in education by Peter Serdyukov (2017), the analytical review of the literature pointed toward the crucial aspect of cost and time efficiency of the learning. The New Education Policy also stresses the same, which is duly followed at Symbiosis International (Deemed) University for a long time. Along with cost and efficiency, we also need to consider the factors influencing the sustainability of HEIs (Talkowska et al.,2015) as this will ensure the quality and the relevance of the education as per the United Nations guidelines as well. The use of the internet/technology to provide flexibility and the autonomy for teachers and the learners is critical as per the article. The future of higher education calls for the active inclusion of Industry, Community, and other stakeholders to maintain the sustainability of Higher Education.

IV CONCLUSION

The COVID outbreak has reconfirmed the adoption and updating of NEP for embracing the flexibility and focus on employability aspect of curriculum structure. Also, the global objective and alignment of NEP is something the corporate is also looking forward to. The policy effectiveness will hugely depend on the implementation which will be controlled by numerous bodies including MHRD, CABE, Union and State Governments, education related Ministries, State Departments of Education, Boards, NTA, the regulatory bodies of school and higher education, NCERT, SCERTs, schools, and HEIs. The role of HEIs is going to be more crucial and decisive as they are last link in the process. Symbiosis International (Deemed) University has already initiated the and modified the curriculum and the implementation proactively. Likewise, the globalization and internationalization is also increased immensely along with the employability of the students across the streams.

REFERENCES

New Education Policy (NEP) (2020). "Ministry of human resource development, government of India",Retrieved 30 August 2020, from, available at: www.mhrd.gov.in/relevant-documents

Gore, J., Lloyd, A., Smith, M., Bowe, J., Ellis, H. and Lubans, D., 2017. Effects of professional development on the quality of teaching: Results from a randomised controlled trial of Quality Teaching Rounds. Teaching and teacher education, 68, pp.99-113.

Michavila, F. and Martinez, J.M., 2018. Excellence of universities versus autonomy, funding and accountability. European Review, 26(S1), pp.S48-S56.

Dikilitaş, K. and Yaylı, D., 2018. Teachers' professional identity development through action research. ELT Journal, 72(4), pp.415-424.

Serdyukov, P., 2017. Innovation in education: what works, what doesn't, and what to do about it?. Journal of Research in Innovative Teaching & Learning.

Talkowska-Wojciechowska, A., 2015. The use of the internet in developing learner's autonomy. World Scientific News, 8, pp.54-81.

Viability of Smart Classrooms Corresponding to Academic Achievement of Students with Reading Difficulties

Ankur Pan Saikia, Sunandan Baruah
Computer Science & Engineering, Assam down town University

ABSTRACT

Numerous understudies enter school today without the physiological and neurological status abilities important to perform expected school assignments. Frequently these understudies keep on experiencing issues learning become progressively baffled and battle in school. Schools should do more to assist these understudies with fostering the availability abilities important for achievement in school. The current means to see the impact of savvy study halls on the scholastic accomplishment and perusing abilities of understudies with understanding challenges. An example of 100 school-going auxiliary school understudies was chosen purposively from metropolitan areas of Kamrup (M) District, Assam, India. Among 100 understudies 50 understudies were chosen from the test bunch and the rest 50 understudies were chosen for the Control trial bunch and estimated the adequacy of the savvy homeroom framework affects the scholastic accomplishment as well as perusing abilities of the understudies.

Keywords: Smart Class Room, Physiological Status, Neurological Status, Students with reading difficulties, Special Attention

I. INTRODUCTION

Education is considered as an agent of social reforms and hence of reconstruction and the renaissance. Schools are expected to provide education to younger generations. But, in present modern times, they are increasingly criticized for distributing so-called inert knowledge. The traditional classrooms are nothing more than one-man shows with a captive but often uninvolved audience. Classes that are teacher-dominated rely heavily on textbooks. There is little room for interaction with students. We are living in the "Technological Age" where new trends in education have entered and new challenges have been thrown up to reckon with this technology-based teaching is a new way of thinking in educational theory. Today we use the most sophisticated devices to produce, store, maintain and distribute printed text. One such effort in this direction is education through smart classrooms. A smart classroom is a classroom that has an instructor station equipped with a computer and Audio-Visual equipment, allowing the instructor to teach using a wide variety of media. These include a smart interactive whiteboard, DVDs. PowerPoint presentations and more are all displayed through a data projector.

Language is the basis of all communication that has made possible all the advancements in all fields of life. And as far as language is concerned, it is the English language that has been playing an important role in our educational systems as well as in our national life. It has greatly contributed to the growth of knowledge in India. English like any other language consists of four important skills speaking, listening, reading, and writing. While listening and speaking skills can be learned automatically from the environment we live in, it is the skill of reading that requires effort. From the academic point of view, it is reading skill that plays a key role. Our examination system is written-oriented and for this good reading skills are essentially required.

Language abilities should be polished in lower classes which give the premise to solid future learning. It is ordinarily capable that in the event that kids don't figure out how to peruse by 3rd grade, they can't peruse to learn. In customary homerooms, it isn't feasible for the instructors to give individual consideration to the students. Prior investigates in the field of semantics uncover that almost 8% of kids in each school experience the ill effects of understanding troubles, which remain underachievers in view of the absence of time and consideration regarding be given by the instructor. Shrewd homerooms are great to conquer this issue of perusing abilities among the understudies.

II. LITERATURE REVIEW

Through appropriate Audio-Visual introductions, the understudies get most extreme tactile encounters and they learn quicker. An autonomous review directed by the Eugene Research Institute uncovers that fifth-graders who took part in savvy homerooms are 60% bound to arrive at state perusing benchmarks than are comparable understudies who didn't take part. As per Lincoln (1992), without the pictures to make importance in the words, youngsters won't peruse. Glasser (2001), states that kids see just 10% of what is perused however 80% of what is capable. To build understanding perception, understudies genuinely should have chances to work with and disguise, or experience, the understanding entry. This can be accomplished through multimodal guidance in shrewd study halls.

In addition, with understanding abilities, scholarly accomplishment is firmly related. Brilliant homerooms through different intelligent modes present various themes from various subjects to the understudies. These are handily perceived by the students and subsequently scholastic accomplishment is impacted. Trifonas (2004), contends that a text is a bunch of 'lexical or visual signs" that act blame to direct a per user's psychological interpreting and significance making tasks. Sevindik (2007), decided the adequacy of shrewd homerooms on the scholastic accomplishment of nursing understudies.

There is a shortage of writing accessible around here of exploration as this is as yet a creating field. This provoked the agent to embrace the current review. Accordingly, the current review is an endeavor by the agent to go through the viability of the shrewd homerooms in optional schools of metropolitan areas of Kamrup District.

"Viability of Smart Classrooms according to Academic Achievement and Reading Skills of Higher Secondary School Students with Reading Difficulties"

The accompanying targets are planned in the current examination.

1.   To distinguish the understudies with understanding challenges.
2.   To plan savvy study halls in view of mediation programs for creating understanding abilities and scholarly accomplishment of understudies with understanding troubles.
3.   To execute brilliant homerooms-based mediation program for creating understanding abilities and scholarly accomplishment among understudies with understanding troubles.
4.   To assess the viability of brilliant homerooms in light of intercession program for creating understanding abilities and scholastic accomplishment among understudies with perusing challenges:
a)   Studying the critical distinction in the perusing abilities of the understudies with perusing challenges contemplated with and without shrewd homerooms (Both parts of the understanding expertise - word perusing and 'perusing cognizance were concentrated independently)
b)   Studying the huge contrast in the scholarly accomplishment of the understudies with perusing challenges examined with and without shrewd homerooms.

III. RESEARCH METHODOLOGY

Hypotheses
1)   There exists no huge distinction in the understanding abilities ('word perusing' and 'understanding appreciation') of the understudies with perusing hardships examined with and without brilliant study halls.
2)   There exists no huge distinction in the scholarly accomplishment of the   understudies with perusing challenges considered with and without shrewd study halls.

IV. METHODS

The current exploration work depends on the test techniques in non-research center settings. It is two gatherings randomized, pre-test, and post-test exploratory plan. Due care has been given to Control the superfluous factors, similar to, every one of the four chose schools were C.B.S.E. subsidiary and situated in a metropolitan region and the mechanism of guidance there was in English. There was no age segregation and every one of the understudies taken for the review in both the gatherings were in the age gatherings of 15-16 years considering in 8th and 9th Standards. The two gatherings were something similar in the degree of scholarly accomplishment understudies scoring beneath 45% in the class midterm assessments (meeting 2020) were chosen. No understudy was presented to a brilliant class framework during that period. The substance educated to the test and Control bunch was something similar.

The plan has been trailed by three functional stages, viz. pre-test, trial program (treatment), and post-test.

An example of 100 understudies with perusing hardships in English dialects was chosen purposively from four schools in Kamrup Metropolitan area of Assam. Out of 100 understudies 50 understudies were chosen for exploratory gathering and the rest 50 understudies were chosen for Control bunch.

V. RESEARCH TOOLS

Two tools have been used for the data collection. These are:

1. **Reading Test by Dr. Raj K.Gupta (2008):** The test was created by Dr. Raj K.Gupta (2008) to quantify the perusing abilities of school understudies of class eighth and ninth. It comprises of two segments:

a) **Word Reading Test:** It involves 50 words to be perused by the understudies. The words have been taken from the expressions made during a word familiarity test by standard eighth and ninth understudies. An understudy acquiring fewer than 20 imprints was considered for the review.

b) **Reading Comprehension Test:** In this test, the understudies need to address 4 inquiries in light of the cognizance section given as exchanges. Understudies scoring beneath worth of mean less standard deviation were considered for the review.

2. **Previous Academic Records**

The midterm test characteristics of the meeting 2020 were considered for the scholarly accomplishment of the chose understudies. The understudies scoring beneath 45% imprints midterm assessment in the meeting were chosen for the review.

Treatment Tools: The specialist, with the consent of the Head experts and Principals of the schools, organized a 27-day brilliant homeroom instruction framework for the understudies of the trial bunch. Those themes were chosen from their schedule that aides in upgrading perusing abilities as well as they are significant from scholastic thought.

The savvy study hall was exceptional with a white intuitive board. Projector and self-created power point introductions and the downloaded cutting of the themes to instruct.

The details of the programme are given in brief below:

Duration   :   27 days
Weeks   :   6
Weekly day: 5 (Working)
Time   :   30 minutes in each class (Exptl. Group)

(Similar subjects were covered on similar dates in the benchmark group likewise to limit the substance inconstancy in surveying scholarly accomplishment).

Statistical Analysis: Mean, S.D. and 't' test were used to assess the significant differences in academic achievement and reading skills of the students who studied with and without smart class rooms.

Result and Discussion: After the recognizable proof of secondary school understudies with understanding troubles, the information acquired on the chose factors under review was examined in two segments.

In section-I a correlation between the mean pre-test scores of the test and Control bunches has been made to see that there exists no critical distinction between the two gatherings of understudies in their scholarly accomplishment and understanding abilities.

Section-II uncovers the impact of brilliant homerooms on scholarly accomplishment and perusing abilities by making the correlation between the mean post-test scores of the exploratory and Control bunches on both the reliant factors.

Section-I

Pre Testing of Experimental and Control Group

Table-1

Significance of difference between the mean pre –test score of Experimental and Control group w.r.t., academic achievement of the students.

Test	Groups	N	Mean	S.D.	SE_d	t-ratio	Level of Significance
Pre-test	Experimental	50	101.5	5.49	2.15	1.14	Not
Pre-test	Control	50	103.95	7.9			Significant

Table value of df 118 at 0.05 level = 1.98 and at 0.01 level =2.62

It very well may be seen from Table-1 that the determined t-proportion for the pre-test scores of Experimental and Control bunch is 1.14, which isn't huge at any recommended Level of Significance, for example at 0.05 and 0.01 levels. Thus, it very well may be deciphered that there exists no huge contrast between the pre-test scores of Experimental and Control bunch w.r.t scholarly accomplishment.

Table -2

Significance of difference between the mean pre –test score of Experimental and Control group w.r.t. 'word reading' component of the reading skills of the students.

Test	Groups	N	Mean	S.D.	SE_d	t-ratio	Level of Significance
Pre-test	Experimental	50	3.67	4.69	0.79	1.57	Not
	Control	50	2.43	3.92			Significant

Table value of df 118 at 0.05 level = 1.98 and at 0.01 level =2.62

It very well may be seen from Table - 2 that the determined t-proportion for the pre-test scores of Experimental and Control bunch is 1.57, which isn't huge at any endorsed Level of Significance, for example at 0.05 and 0.01 levels. In this way, it very well may be deciphered that there exists no huge contrast between the pre-test scores of Experimental and Control bunch w.r.t. word perusing part of the understanding ability.

Table -3

Significance of difference between the mean pre –test score of Experimental and Control group w.r.t reading' comprehension' components of the reading skills of the students.

Test	Groups	N	Mean	S.D.	SE_d	t-ratio	Level of Significance
Pre-test	Experimental	50	2.55	2.93	0.99	1.49	
	Control	50	4.03	7.09			Not Significant

Table value of df 118 at 0.05 level =1.98 and at 0.01 level =2.62

It very well may be seen from Table - 3 that the determined t-proportion for the pre - test scores of Experimental and Control bunch is 1.49, which isn't huge at any endorsed Level of Significance, for example at 0.05 and 0.01 levels. In this way, it tends to be deciphered that there exists no critical distinction between the pre-test scores of Experimental and Control bunch w.r.t. perusing understanding expertise of the understanding system.

It can hence be said that before treatment the Experimental gathering and Control bunch taken for the review are equivalent. It further affirms the matching of two gatherings on both the reliant factors prior to giving treatment to the Experimental gathering.

Section-2

Post- testing of Experimental and Control Group

Table -4

Significance of difference between the mean post-test score of Experimental and Control group w.r.t academic achievement of the students.

Test	Groups	N	Mean	S.D.	SE$_d$	t-ratio	Level of Significance
Post- test	Experimental	50	2.55	2.93	1.54	8.09	0.01 level
	Control	50	1.65	1.33			

Table value of df 118 at 0.05 level = 1.98 and at 0.01 level=6.2

It is clear structure Table - 4 that the determined t - proportion for the post - test scores of Experimental and Control bunch is 8.09 which is critical at 0.01 level. It uncovers that there exists critical distinction between the post-test scores of Experimental and Control bunch w.r.t. scholastic accomplishment of the understudies.
The mean score of Experimental gathering understudies is 2.55 and it is higher than the mean score of Control bunch understudies. for example 1.65. It can thusly be said that mediation program as brilliant classes given by the examiner has profoundly huge impact on the scholarly accomplishment of Experimental gathering.

Table -5

Significance of difference between the mean post-test score of Experimental and Control group w.r.t. 'word reading' component of the reading skills of the students.

Test	Groups	N	Mean	S.D.	SE$_d$	t-ratio	Level of Significance
Post- test	Experimental	50	3.30	4.04	0.53	5.90	0.01 level
	Control	50	0.17	0.74			

Table value of df 118 at 0.05 level = 1.98 and at 0.01 level=2.62

Table - 5 shows that the determined proportion for example 5.90 is more than the table worth at 0.01 Level of Significance. It uncovers that there exits critical distinction between the post - test scores of Experimental and Control bunch w.r.t. perusing abilities of the understudies.

It further shows that the mean score of the Experimental gathering is 3.30 and it is higher than the mean score of Control bunch understudies, for example 0.17. Along these lines it is apparent that intercession program has huge impact on the advancement of word perusing abilities of optional school understudies with understanding challenges.

Table -6

Significance of difference between the mean post –test score of Experimental and Control group w.r.t reading comprehension component of the reading skills of the students.

Test	Groups	N	Mean	S.D.	SE_d	t-ratio	Level of Significance
Post -test	Experimental	50	2.35	4.27			
	Control	50	0.07	1.19	0.57	3.98	0.01 level

Table value of df 118 at 0.05 level =1.98 and at 0.01 level = 2.62

Table-6 uncovers that the acquired t - proportion i.e 3.98 is more prominent than the table worth 2.62 at 0.01level of significance. It makes the point clear that the understudies of the test bunch contrast essentially from the understudies of the benchmark group on the post-test scores of perusing abilities with the perusing understanding part.

The mean score of the understudies of the test bunch is 2.35 and it is higher than the mean score of control bunch understudies. for example 0.07. Hence it very well may be deciphered that the intercession program is viewed as compelling in beating the perusing cognizance hardships of the understudies.

It is clear from the above outcome that there exists a critical distinction between the test and control bunch understudies according to the scholarly accomplishment and perusing abilities of the understudies with understanding hardships. The outcomes uncover that the understudies who were presented to savvy homerooms instruction framework had the option to beat perusing abilities shortages by creating required understanding abilities. They were above to have more scholarly accomplishment than their own past accomplishment as well as in contrast with those in the benchmark group.

The previously mentioned discoveries are in concurrence with the examinations directed before on various classifications of youngsters in the different branches of knowledge. Walsh. Asha, and Sprainger (2007) said that through text material just the understudies understanding reactions and comprehension can incline toward a strict, frequently shallow level with little proof of construing, assessing, or basic perusing. It yields no useful outcomes. Abbott and Saikh (2005) detailed that print texts are presently debased as instruments to improve education accomplishment and in like manner there is little acknowledgment of a requirement for such work. He contended that advanced instructional method is going through a change in ontological importance conceivable with orchestrating innovations from one of reference to one of meaning, that is to say, from referential to creationist or creation rehearses. Wixson and Pearson (1998), Kress (2000), Begoray (2001), Dole. Duffy, Roehler, and Dyson (2003), Jewitt and Kress (2003), Bousted and Ozturk (2004), and Archer (2006) observed that brilliant homerooms with an innovative premise positively affect the advancement of understanding abilities and the improvement of scholastic accomplishment of the understudies at different levels.

VI. CONCLUSION

The current review is of more prominent significance in present days as there is a developing acknowledgment of zeroing in consideration on the instruction through innovation based shrewd homerooms. The educators need to assume key part to make the kid exceptional with every one of the mechanical offices and the expected climate. The training foundations, all the more explicitly the instructors, are required not exclusively to adjust in the new intelligent showing learning study halls yet in addition in learning the utilization and great treatment of the gadgets. Sound instructors, presumably, help in changing the social orders by deeply shaping the existences of their understudies. Furthermore, in this quick pacing hello tech society, it has turned into a need to oblige brilliant instruction framework through shrewd homerooms.

REFERENCES

Afolabi, A.K., Abidoye, J.A. & Afolabi, A.F. (2011) Effect of Instructional media on the academic achievement in chemistryof students in social studies at Junior Secondary Schools. Retrieved May 7, 2013 from http://www.unillib.unl.edu/LPP/PNLA.

Ali, M., Din, U., Naser, M. & Fraudullah, K. (2011). Effects of Audio-Visual Aids in student's learning at Secondary Levels in District Rawalpindi – Inter disciplinary Journal of Contemporary Research in Business 2011, Vol 2 Issue 10p439.

Apple computer (2002). The impact of technology on student achievement : A Summary of research findings on technology's impact in the classroom. Retrieved May 7, 2013 from http://www.apple.com/education/research

Armstrong, V., Barnes, S., Sutherland, R., Curran, S., Mills, S. & Thompson, I . (2005). Collaborative Research methodology for investigating teaching and learning: The use of interactive white board technology. Educational Review, 57(4), 457-469.

Asan, A. (2003). Computer Technology Awareness by Secondary School Teachers: A Case Study from Turkey. Journal of Information Technology Education. 2, 150- 163.

Best, J. W. (1983). Research in Education, New Delhi : Prentice Hall of India Pvt. Ltd.

Blurton, C . (1999). Report on New Directions of ICT-Use in Education: Hongkong University. Retrieved October 10,2012 from http://www.unesco.org/pv_obj_cache/pv_obj_id

Cox, M.J., Preston, C. & Cox, K. (l999). What motivates teachers to use ICT? Paper presented at the British Educational Research Association Conference, Brighton.

Crow, D. & Crow, A. (1956). Adolescent Development and Adjustment McGraw- Hill Book company, United States.

Desai, K.Y. (1985). Efficacy of different Instructional media in the teaching of Science. Ph.D. dissertation, Sardar Patel University,Gujarat. [11] Desai, R.H. (2001). A study of effectiveness of Programmed Learning in teaching of hysicisn IX grade, Ph.D. Dissertation, Punjab University, Chandigarh.

Dun & Bradstreet Information Services India Pvt. Ltd. (2010).Effectiveness of Educomp Smart Class program.Retrieved September 22 ,2012 from http://www.scribd.com./doc54129915educomp

Ebenzer, S.O. Collier (2004). A comparative study to evaluate the effectiveness of Computer Assisted Instruction (CAI) versus class room lecture (CRL) for computer science at ICS level Turkish. Journal of Online Educational Technology, 7(2), Article 2.
Ellis, J.D. (2010). Interactive smart boards technology: Does it promote individual student academic achievement? Retrieved September 22 , 20l2 from http://digitalcommons.brockport.edu

Emron, S . & Dhindsa, H.S.(2010). Integration of Interactive White Board Technology to improve secondary science teaching and learning.

Retrieved September 22,2012 from http://www.fedu.uaeu.ac.ae [17] Fletcher, J.D. (1998). Evaluation of the Stanford Computer Assisted Instruction Program. Journal of Educational Psychology, 63(4), pp. 597 – 602.

Good, C.V., Dictionary of Education (1973).(3rd Ed).New York: McGraw Hill Company.

Grant Proposal for Smart Education Program- Globsync Technology. Retrieved May 7, 2013 from http://www.slideshow.net/globsync/smart-class-education

Holman, S. & Gilbert, K. (2011) Research Report: The effect of smart board use in the secondary classroom on students mathematics achievement as measured by curriculum tests. Retrieved May 7, 2013 from http://action-research-umfwikispaces.com/file.view/gilbert+holman+2011.pdf.

Hurlock, E.B.(1989). Development of Psychology. New Delhi : Tata McGraw-Hills.

Abbott & Shaikh (2005) . Visual representation in the digital age: Issues arising form a case study of digital media use and representation by pupils in multicultural school settings. Language and Education, 19 (6),445.

Archer (2006). A multimodal approach to academic 'literacies' – Problematising the visual /verbal divide. Language and Education. 20(6).

Begoray (2001), Through a class darkly:visual literacy I the classroom Canadian Journal of Education. 26(2), 210-207.

Becker, H. (2005). Findings from Teaching, Learning, and Computing Survey: Is Larry

Cuban   Right?"   Teaching.   Learning   and   Computing.   (On-line). http://ww.crito.uci.edu/tlc/findings_/ccsso.pdf

Bousted & Ozturk (2004). 'It came alive outside my head.' Developing literacies through comparison: the reading of classic text and moving image. Reading.

Corporate Diary (2007). Smart Teaching and Learning Inside the Classroom.

Dole, Duffy. Roehler, & Pearson (1991). Moving from the old to the new: Research reading comprehension instruction. Review of Educational Research. http://www.uwsp.edu/education/I

Jewitt & Kress (2003). Multimodal Literacy. New York, NY: Peter Lang Publishing.
Kress (2000). Multimodality: Challenges to thinking about language. TESOL Quarterly, 34(2), 337 -340.

LDA Newsbriefs Education Committee (1998). Reading methods and learning disabilities- Newsbrief. Learning Disabilities Association of America. (On-line) http://www.Idonline. Org/ID_ indepth/reading/reading _ methods. Html.

Lincoln (1992). The humanist tradition. In P. Jackson (Ed.), Handbook of research on Curriculum. New York: Macmillan.
Sevindik, T. (2007). Future's learning environments in health education: The effects of smart classrooms on the academic achievements of the students at health college. Telematics and Informatics, 27(3), 314 -322.
Trifonas (2004). Text to images: The aesthetics of pictorial signs studies in Media &Information Literacy Education. 4(2).
Walsh, Asha, & Sprainger, (2007). Reading digital texts. Australian Journal of Languages and Literacy, 30 (1), 51.

Discussion on Achievement of Course Outcome with Respect to Teaching Modalities

Vanishree Pabalkar, Suruchi Pandey
Symbiosis International (Deemed University, Pune)

Abstract—**Outcome-based education proposes the model in the Education sector, that lays emphasis on having more clarity in the Education through an effective and Outcome based Pedagogy that is measurable. The measurable outcomes have defined exact ways to assess the performance of the student.**
Outcome-Based Education provides Students with exclusive skill sets combined with knowledge base through the innovative changes in the Pedagogy. While the conventional mode of Education emphasizes on what has been taught by the Teacher, Outcome based Education (OBE) emphasizes on what exactly has been learned by the students. The
delivery of the Pedagogy in the Online and the Offline mode stand slightly different. Teachers ought to engage students with innovative Pedagogy in the Online platform to ensure the learning is effective. This is not considered as the major challenge in the Offline platform. The effectiveness of the Teaching through innovative Pedagogy depends on the efficacy of the Teacher to a great extent.
The paper presents discussion on, Course Outcome (CO) and Program Outcome (PO) mapping, CO PO attainment and other related activities that are planned in the Offline mode
or in the Online mode that would be developed in a way that would help students achieve to these outcomes.

Keywords: **Outcome based, Education, Pedagogy, Innovation, Measurable, Course Outcome and Programme Outcome (COPO)**

I. INTRODUCTION

Outcome-based education is defined as the process followed by the Universities and Institutes with the aim of determining the performance of the student. The final performance of the student for a Program is the Outcome which is achieved by setting the appropriate CO PO for the all the courses in a given Program.
The CO is defined for each course in a Program. CO defines the objective planned to be attained through each assessment. This emphasizes the linkage of
each of the CO with the PO and the weightage that the CO carries. The weightage can range from High to moderate to low. For instance, in the conventional mode of Education, a student who has not performed good in an assessment would be allotted a mere passing score by the Teacher. Through the
Outcome based education, firstly the Pedagogy is designed in a way that best suits the requirement of all kind of students. The Advanced learners to the Slow learners have different ways to learn and therefore the performance of the students will vary. The Outcome can be determined and can be adjusted as per the needs that best fits and caters to all students. The desired outcome is attained when all the COs for a subject are set appropriately and are in sync with the industry requirement as well. Secondly, since the Outcome based Education is measurable, the same student instead of merely getting a passing score, can be rather given scores based on his analytical skills, meticulous calculations and Solving skills. This measurable method defines the specifics of the performance of the student. This paves a way to clearly understand the specific areas where the student needs to focus for better performance.
Outcome-Based Education provides Students with exclusive skill sets combined with knowledge base through the innovative changes in the Pedagogy. While the conventional mode of Education emphasizes on what has been taught by the Teacher, OBE emphasizes on what exactly has been learned by the students. The delivery of the Pedagogy in the Online and the Offline mode stand slightly different. Teachers ought to engage students with innovative Pedagogy in the Online platform to ensure the learning is effective. This is not considered as the major challenge in the Offline platform. The effectiveness of the Teaching through innovative Pedagogy depends on the efficacy of the Teacher to a great extent. The paper discusses in detail the various evaluations, CO PO mapping, CO PO attainment and other related activities that are planned in the Offline mode or in the Online mode that would be developed in a way that would help students achieve to these outcomes.
Higher education Institutions across globe have adopted to new teaching modalities in the new normal. From offline to online education and the blend of it with the hybrid mode. The present study is for Post Graduate course. Course outcome for an entire Semester in the Offline and a Semester in the Online mode has been considered for discussion. The study is relevant has adequate scope in the coming times since the future of education could be the Online or the hybrid mode of education in the coming times.

In the current study, Offline and Online modes for a Semester were considered. The CO PO were carefully observed for both modes and the achievement level of CO PO in both modes has been compared.

In the Online mode, where it was Unsupervised mode of Teaching Learning. In an Unsupervised mode of Teaching Learning, the student is learning in an environment, where he/she does not get to interact face to face with the Teacher and the peers. The pedagogy used in this mode of teaching included case study and Group discussions, making it an interactive classroom. This is an environment, where the student is compelled to refer to many sources on the Internet, other than the recommended study materials and books. The students do this to ensure that all contents are covered through one or the other reference material in the virtual platform. The evaluations for each subject were conducted in the virtual mode. The Program Objective and the Course Objective (PO CO) is explained to each student before the actual commencement of the course. The CO for each subject is met through the evaluations conducted. CO can also be met through the external exam question paper. Similarly, the same CO can be repeated in the Internal evaluations and the external examination as well.

II. THE CO PO PROCESS

Each subject is to be assigned to a faculty. The faculty is expected to have the CO designed and addressed according to the PO of the Program. Further to this, the faculty has to communicate the type of CO that would be aligned in the Teaching and convey the same to the students. In a scenario where the CO PO mapping and the linkage follows the pattern in which it was planned, then it ascertains the Transparency in the Teaching Learning process. The CO PO mapping and linkage can be tweaked subsequently based on the performance of the students.

The Course objectives for each subject are defined before the commencement of the course. The aim is to achieve and meet each of the Course objective and map it with the Program objective based on the difficulty level. The problem identified was that all COs were not met as desired in the virtual mode. It was observed that in the Outcome, that was based on the Pedagogy used in the Teaching Learning process, all COs were not fully achieved s per expectations in the virtual mode. 4 COs were identified and mapped for each subject in the Programme. Each of the CO was intended to be successfully achieved implying that the students performed well in each of the evaluation. Since the students missed out on the actual face to face interaction with the Teacher and also missed out on Peer learning, some minor loopholes cropped up. These loopholes could be clearly seen through the CO attainment level for a subject and for the entire Semester too. The nature of evaluation and the Teacher remained the same in both online and offline modes.

The CO PO attainment for the same subject was differently achieved in the offline mode. The Pedagogy in the offline mode too included case studies and Group discussion with the aim of making the classroom interactive. In the outcome, it was observed that the COs attainment was thoroughly achieved in the Offline mode. The face-to-face interaction with the Teacher and the actual learning imbibed through the Peer learning contributed in the process of attaining all COs as per expectations. Students used similar resources for coming out with their responses for cases and Group discussions. They did not refer to multiple other resources in this offline mode. In the offline mode, it is a Supervised environment, where the Teacher and other peers are present fact to face for nay interaction that the student intends to have. Peer learning is also effective in this mode. The Study material and other reading materials referred by the teacher were the main focus than other resources. This implies that the performance of each of the student is the outcome form a similar source. Students did not refer to multiple resources for Learning. Students relied on certain specific sources as recommended by the Teacher, in the offline mode, making it little complex as a process for Learning. Students do not refer to varied sources for Learning. The nature of evaluations and the subject remined same in the offline mode too. However, it was observed that in a Supervised environment, the students did not perform s good as the online mode.

III. TEACHING MODALITIES

Online education is considered to be one of the rapidly growing segments. Moreover, the emphasis of Online learning is prevalent in the Higher Education. The Online education provides with far more benefits than the education in the Online mode is one of the fastest growing sectors. Online education has been the fastest growing segment of higher education. Because it is so unlike traditional classroom-based instruction, many questions have been raised as to the quality of the education offered in the online modality. Still, throughout the higher education community, many have reservations about the quality of online education. Educators question whether the content of courses is altered and if student learning is diminished as classes are delivered through these different conduits of instruction. To examine this question, a study was completed at a university school of business to ascertain which of two instructional modalities - online or face-to-face - was more effective. A comparison was made of two sections of a graduate organizational theory course required for the MBA degree, one taught face-to-face and the other online. The purpose was to investigate whether the conclusion of the Department of Education was valid. Students from both sections

also completed a course evaluation report that provided subjective data on the effectiveness of the teaching modalities.

There is extensive literature comparing the strengths and weaknesses of online teaching versus face-to-face teaching. However, none of them address the opinion of students regarding the two modalities. Brownstein, Brownstein and Gerlowski (2008) compared the different modalities using an assessment rubric for two student essays. They found that learning outcomes were equally robust in either format. Gibson (2008) compared test scores from online and face-to-face sections of a course taught by the same instructor and found that the face-to-face students did slightly better than the online students. Chen and Jones (2007) examined two sections of a course, one taught face-to-face and the other taught primarily online and found that both courses had similar final learning outcomes. Haavind (2000) concluded from his research that it was more difficult to monitor discussion in an online environment than in a classroom setting. Wong and Tatnall (2009) found that the ability to track the progress of students with an online learning management system increased the instructor's ability to assess students' progress in a way that is not possible in a traditional course.

Several of the fundamental differences between learning online and in a traditional classroom setting were identified by McGovern (2004). These included the following: online learning requires students to have a certain level of computer skills and equipment that may not be necessary in the traditional environment; online instruction does not permit students the opportunity to learn by hearing since audio presentations are not normally available in online courses; and those online courses permit asynchronous learning rather than requiring students to be in a classroom at a given time and place. In a survey of online faculty who had also taught face-to-face classes, it was found that one of the main differences in the instructional methods was that the online courses depend so much on texts (Teaching, 2010). It was pointed out, however, that online courses are also able to bring in much more information from virtual sources and these can be more seamlessly integrated than in a face-to-face course. The faculty who was surveyed indicated that one of the main advantages of an online course was the fact students needed to write everything and this is seen as allowing for a deeper understanding of the material. Sipes and Ricciardi, (2006) also examined the nature of online and face-to-face education and concluded that the main difference is that online instruction is student cantered while traditional courses are instructor cantered. Sugar, Martindale and Crawley (2007) investigated the difficulty of transitioning from one mode to the other. Turball (2002) described his experience in translating his face-to-face course to the online environment. He points out that the process changes the instructor's role to that of a facilitator and creates a challenge to keep the learning active. One study surveyed an extensive list of students, from both domestic and foreign colleges and universities, who took classes in both mediums. The survey revealed that approximately 48% of the students preferred the the traditional mode of teaching learning while 34% preferred online classes (Kishore, Tabrizi, Ozan, Aziz, and Wuensch 2009). Another study found that there was no difference in the teaching functions of an instructor presenting the same material in the two different media (Alonso and Blazquez, 2009). Kirtman (2009), researching the difference between online and face-to-face instruction, found a significant difference in favour of the face-to-face students on the same midterm but no significant difference on the same final examination.

The present study aims to Compare and Contrast outcome of online and offline teaching for Higher Education. For the purpose of study one course and its outcome with two different modalities have been taken.

IV.   DISCUSSION

The researchers found that the Teaching Learning process was more effective in the Online mode than the Offline mode. The Pedagogy used, the methods of evaluations, the Teaching Learning process, all of these aspects are equally important and play a significant role in the achieving the desired Outcome. Teachers did adopt to several Student engagement tools in the Online mode, making the Teaching Learning process interactive, interesting and effective. The comparison was carried out for a given subject and for a complete Semester that was taught in the Online and the Offline mode. The nature of evaluations remained the same along with the instructor teaching the said subject. In spite of this the variation in the Outcome can be clearly seen in the charts mentioned below.
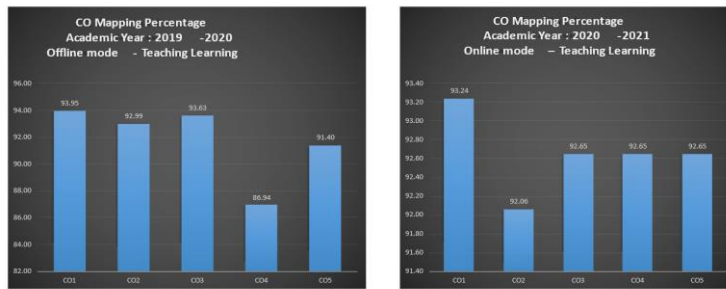
Co Mapping Graph

Figure 1: CO Mapping Graph for One subject.

Student wise CO's Attainment – Online mode.
All 4 Cos are achieved at a rate of more than 90 percent in each case in the Online mode. All evaluations' outcome came out to be more than expected in terms of performance form the students.

Student wise CO's Attainment – Offline mode.
All 4 Cos are achieved had a different level of achievement. The level of CO attainment is low compared to the Offline mode. The COs in other cases witnessed a huge varied difference in terms of the performance of the students.

Program outcomes (PO) define the measurable Learning outcome that is derived through the combination of all courses and the Course outcomes (CO) put in together. The COs of each course will be measurable through Direct and Indirect tools of Attainment of COs.

Direct Attainment: Internal class written assignment, with COs mapped
- Group Presentations mapped with CO
- Written test mapped with CO
- External ex question paper with CO mapped for each question
- Indirect Attainment: This is the way through which the outcome is measured by way of feedbacks
- Surveys
- Exit Interviews
- Questionnaires to stakeholders

The combination of all courses for a said Program defines the level of attainment of PO.
The detail is as below:
Teaching Learning in the Online mode (For entire Semester) PO attainment level - Table 1

Teaching Learning in the Offline mode (For entire Semester) PO attainment level - Table 2

V.   CO PO ATTAINMENT FORMULA

CO PO attainment of Outcomes: The Program Outcomes (POs) and the Course Outcomes (COs) are attained through the Pedagogy designed for each Program and for each course. The faculty teaching a course has to consider the expected Outcome and plan for the COs for each course of a Program. The measurable Outcomes are determined by the performance of the students for each course.

The Formula of CO PO calculation – Table 3

Overall CO Attainment Calculation:

Total Count	82	82	82	82	82
Blank Count	2	2	2	2	2
Attainment Count	80	80	80	80	80
Sum Of Student Obtained Marks	302	153	226	153	75
Average Marks obtained by each student	3.78	1.91	2.83	1.91	0.94
Converted Marks	75.5	38.25	56.5	38.25	18.75
Average Marks With Degree of Mapping	92.07	46.65	68.9	46.65	22.87
Total Student Attended (X)	82	82	82	82	82
No of Student Scored above (Y)	82	82	82	82	82
(Y / X) Percentage	100%	100%	100%	100%	100%

5 COs were considered for the calculation of CO attainment here. The attainment range lies between 60 to 90. For a batch size of 300 plus students the average marks for each course outcome are taken into account. The average marks with the degree of mapping are determined. The final student count with attainment level is divided by the number of students who had scored the set level of attainment and the final CO is measured.

Pictorial presentation of CO-PO linkages – Table 4
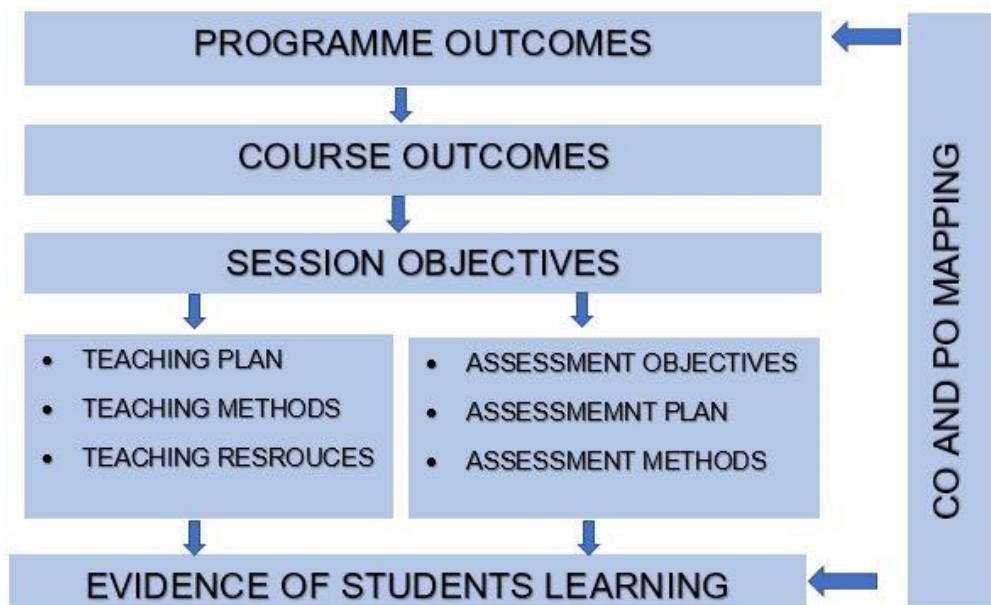
VI. CONCLUSION

Teaching Learning process is a process where the instructor has a defined method in the Pedagogy and a structured method is adopted to impart Quality Education. Before the actual commencement for the course, the students are given clarity on the Outcome based education, Pedagogy used in the classroom by the instructor. By doing this, the students get complete clarity of the Program Objectives, the Course Objectives, Pedagogy used, the nature of evaluations and the fact that his/her performance is based on all of these aspects together. The Outcome is based on the student's performance in the evaluation. The instructor's role is to make the Teaching Learning process interesting to the student to have the desired Outcomes achieved through an effective Pedagogy. This should ideally remain same irrespective of the mode that is used. In this research it has been witnessed that the CO attainment is better in the Online mode, which is an Unsupervised platform. The Co attainment was not very good in the offline mode, which is a Supervised platform.

REFERENCES

Brownstein, B., Brownstein, D., Gerlowski, D.(2008).Web- Based vs. Face-to-Face MBA Classes: A Comparative Assessment Study, Journal of College Teaching & Learning 5 (11) ,41-48.
Haavind, S. (2000, Fall).
Why Don't Face-to-Face Teaching Strategies Work In the Virtual Classroom? [Electronic version]. The Concord Consortium. Vol. 4 No. 3
Wong,L. and Tatnall, A.(2009).The Need to Balance the Blend: Online versus Face-to-Face Teaching in an Introductory Accounting Subject [Electronic version]. Issues in Informing Science and Information Technology, Vol.6.
McGovern, G. (2004, June). Teaching Online vs, Face-to-Face. [Electronic version].
CLENExchange, Newsletter of American Library Association Continuing Education Network & Exchange Roundtable. Vol. 20 No. 4
Sipes, K. A. and Ricciardi, V, (2006) Online vs. Face to Face: Is There a Difference in How Accounting and Finance Students, Learn in an Online vs. Face- to-Face Setting. SSRN. Retrieved September 9, 2010 from http://ssrn.com/abstract=894223
Turball, J. (2002). From Face-to-Face Teaching to Online Distance Education Classes: Some Challenges and Surprises. ASCILITE 2002 conference proceedings. Retrieved September 9, 2010, from: http://www.ascilite.org.au/conferences/auc kl and0 2/proceedings/papers/127.pdf.
Kishore, M., Tabrizi, M. H. N., Ozan, E., Aziz, S., and Wuensch, K. L. (2009). Correlates of Student Preference for Online Instruction over Face- to- Face Instruction. E-Learning. 6(4), 400- 415
Kirtman, L. (2009). Online versus In-Class Courses: An Examination of Differences in Learning Outcomes. Issues in Teacher Education. 18(2), 103-116

Alonso Dias, L., and Blazquez Entonado, F. (2009). Are the Functions of Teachers in e-Learning and Faceto-FaceLearning Environments Really Different? Educational Technology & Society. 12(4), 331-343

Chen, C. and Jones, K. (2007). Blended Learning vs. Traditional Classroom Settings: Assessing Effectiveness and Student Perceptions in an MBA Accounting Course. The Journal of Educators Online. 4(1)

Gibson J. (2008). A Comparison of Student Outcomes and Student Satisfaction in Three MBA Human Resource Management Classes Based on Traditional vs. Online Learning, Journal of College Teaching & Learning, 5 (8) ,1-10

Sugar, W., Martindale, T., & Crawley, F. E. (2007). One Professor's Face-to-Face Teaching Strategies while Becoming an Online Instructor. Quarterly Review of Distance Education. 8(4), 365-385

Smith, G.G., Ferguson, D.L., Caris, A (2010) Teaching College Courses Online vs Face-to-Face, (2001, April 1) The Journal - Digital Edition, Republished, 2010. Retrieved from *http://thejournal.com/articles/2001/04/01/teaching*-college- courses- online- vs- acetoface.aspx.

Carrol, N. Burke, Molly. (2010) Learning Effectiveness Using Different Teaching Modalities, American Journal of Business Education 65-76, 3 (12), Policy brief: The Impact of COVID-19 on children, April 2020: www.un.org www.ee.unesco.org

Online Article : https://www.weforum.org/agenda/2020/04 /coron avirus-education-global-covid19-online-digital- learning/ Accessed Nov 2021

Pandey, S., & Tiwari, S. (2022): Perceptual Difference Between Teens and Their Parents About Internet Usage. In S. Malik, R. Bansal, & A. Tyagi (Ed.), Impact and Role of Digital Technologies in Adolescent Lives(pp. 163-188). IGI Global. http://doi:10.4018/978-1-7998-8318-0.ch012

Peat, Mary & Franklin, Sue. (2003): Has student learning been improved by the use of online and offline formative assessment opportunities? Australasian Journal of Educational Technology. 19. 10.14742/ajet.1703.

Toquero, C. M. (2020): Challenges and Opportunities for Higher Education amid the COVID-19 Pandemic: The Philippine Context. Pedagogical Research, 5(4), em0063. https://doi.org/10.29333/pr/7947

Nixon, E., & Scullion, R: (2021). Academic labour as professional service work? A psychosocial analysis of emotion in lecturer–student relations under marketization. Human Relations. https://doi.org/10.1177/00187267211022270

Pandey, S. Chavla, M. Mathur, M. (2021): Good and Not so good of learning using Digital platforms: Experience sharing from PG students. Turkish Journal of Computer and Mathematics Education (TURCOMAT) 12 (7), 749-757

T. Muthuprasad, S. Aiswarya, K.S. Aditya, Girish K. Jha, Students' perception and preference for online education in India during COVID -19 pandemic: (2021)Social Sciences & Humanities Open, Volume 3, Issue 1, 100101, ISSN 2590-2911, https://doi.org/10.1016/j.ssaho.2020.100101.

Maestre Maestre, J. M. (2020): Finis Coronabit Virvs. Available online at: http://selat.org/data/documents/00_FINIS_CORONABIT_VIRVS_JoseMariaMaestreMaestre_SELat.pdf

Forte, G., Favieri, F., Tambelli, R., and Casagrande, M. (2020): COVID-19 pandemic in the italian population: validation of a post-traumatic stress disorder questionnaire and prevalence of PTSD symptomatology. Int. J. Environ. Res. Public Health 17:4151. doi: 10.3390/ijerph17114151

Roy, D., Tripathy, S., Kar, S. K., Sharma, N., Verma, S. K., and Kaushal, V. (2020): Study of knowledge, attitude, anxiety & perceived mental healthcare need in Indian population during COVID-19 pandemic. Asian J. Psychiatr. 51:102083. doi: 10.1016/j.ajp.2020.102083

Student Centered teaching learning approaches

Monika Sonmale, Minal Sonmale, Anuja Desai, Dipali Ghatge
Department of Computer Science and Engineering
Karmaveer Bhaurao Patil College of Engineering, Satara

Abstract— **Pedagogy refers to a student-centered teaching and learning (SCL) approach where educators are reflective in their theory, practice, and policy implementation in teaching/learning, resulting in positive impacts on the learners.**

Having a well-thought-out pedagogy can improve the quality of your teaching and the way students learn, helping them gain a deeper grasp of fundamental material. Being mindful of the way we teach can help us better understand how to help students achieve deeper learning.

Keeping in mind the importance of the pedagogical approach, we designed a pedagogy activity for the students. Pedagogy activity was posted on what's app group & On Gnomeo Moodle Site, Google Classroom, and sufficient time was given to the students to solve the activity.

Keywords— **Pedagogical Activity ,student centered teaching, gnomio**

I. INTRODUCTION

Pedagogical activity is the educative and educational influence of the course coordinators/ teacher on the student (students). The main motivation is to provide the best knowledge to the students, and self-development and self-improvement are very important for students, so keeping in mind the importance of this activity, we are going to conduct different activities for students with a different aims.

The ABL (activity-based Learning) technique is very easier to learn, enjoyable, improve understanding and increase learning confidence.

By adopting the ABL (Activity-based method of Teaching), the following points are used to observe student improvement.

1. Developed an understanding of the topic.
2. Improved interpersonal skills.
3. Willingness to participate in group activities.
4. Ability to relate the topic to real-life examples.

II. OBJECTIVES OF RESEARCH

1. To study the effectiveness of Activity based methods of Teaching employed during the Teaching Learning Process.
2. Providing the best knowledge to the students and self-development and self-improvement are very important for students.

Following Skills Enhanced in the students.

1) Improved Vocabulary
2) Reasoning
3) Problem-solving
4) Stress relief.
5) Effective stress relief.
6) Attitude of Persistence
7) Self-development
8) Confidence

Two main objectives for teaching learning: i) Interdisciplinary teaching and learning improvement and ii) Self-development of students.

Following are the day wise details of pedagogy activities conducted during the refresher program :

Sr. No	Name of the Activity	Unit	Online Googlemeet/Go ogleClassroom	No of Students Successfully Completed
1.	Crossword Puzzle	1,2	Google Classroom	71
2.	Online Test (Using TestMoz)	1 & 4	Google Classroom	70
3.	Think Pair Share Activity	3	Online Google Meet	52
4.	Word Scramble puzzle	5,6	Google Classroom	68
5.	jigsaw activity	All units	Online Google Meet	58

III. PEDAGOGY ACTIVITIES DETAILS:

1) Name of the Activity: CrossWord Puzzle Activity
 Crossword Activity: A puzzle in which words that are the answers to clues are written into a pattern of numbered squares that go across and down. In this activity you have to refer the description and fill up the appropriate words in the Puzzle .
This activity was shared with students on GoogleClassroom and also instructed them to upload   this on GoogleClassroom
Notification about this activities along with the rules and regulations for solving this activity was shared with students on GoogleClassroom of second year students.

Skills Enhanced: Improved Vocabulary, Reasoning, Problem-solving, Stress Relief

Class: SY

Name of the Course: Design and Analysis of Algorithms

Activity Based Learning

Crossword Puzzle

- Crossword puzzle containing keywords of DAA

Date: 02-07-2021

Time: 11.30 am to 12.30 pm

No of students: 75

No of students who attempted activity: 71

2) Name of the Activity: Fish Bowl Activity
Details:
- Paper chits of different points were formed, and students picked chits from a bowl of chits and
explained that point to the whole class
- Points in chits
Instructions, Types of instructions, Addressing modes, Operands, Types of operations, Assembly Language, RISC and CISC

Subject: Computer Architecture & Originations
3) Name of the Activity: Library Activity
Details of the activity:
Students were taken to the Library, and they were given an assignment of finding the latest updates in Machine Learning in online and offline technical journals available in our central college library.

Learning Outcome:
Students Learned details of various technical journals available in the Library, and they understood the relevance of Design and Analysis of Algorithms in current research.
Students Submitted the articles based on their reading during this hour. Group learning helps to boost the interest in said activity

4] Name of the Activity: Spin the Wheel of terminologies
Details of the activity:
The Wheel of Basic ML Terminologies will get spin; it will stop at some random terminology. Students are supposed to explain the terminology in a proper manner.
One terminology will be asked one by one by calling students names sequentially. For another one, volunteer answers will be expected. * will be given for each correct attempt.
 Link of theGame: https://wordwall.net/resource/31673511

5] Name of the Activity: SEARCHWORD
Activity Description: Students have to find the hidden words. A word
search is a word game that consists of the letters of words placed in a grid,
which usually has a rectangular or square shape. The objective of this puzzle is to find and mark all the words hidden inside the box. The words may be placed horizontally, vertically, or diagonally. Often a list of the hidden words is provided.Skills Enhanced: Improved Vocabulary, Reasoning, Problem solving, the attitude of Persistence, and Effective stress relief.

Name: _____

SENSOR , ACTUATOR AND IOT ACCESS

```
N  S  P  C  E  L  L  U  L  A  R  L  C  C  H  O  B  F
S  P  N  E  U  M  A  T  I  C  V  R  O  K  F  B  P  T
P  H  C  H  I  R  S  E  N  S  O  R  N  P  G  L  R  V
R  E  Y  R  Y  L  O  W  P  A  N  T  S  O  Y  U  E  L
O  W  P  A  N  D  M  J  L  S  I  H  T  S  R  E  S  O
X  T  E  M  P  E  R  A  T  U  R  E  R  I  O  T  S  S
I  Z  I  G  B  E  E  A  T  A  E  I  A  T  S  O  U  S
M  W  M  M  G  V  V  X  U  C  E  O  I  I  C  O  R  Y
I  I  K  Q  W  P  D  U  V  L  N  H  N  O  O  T  E  H
T  F  L  F  T  E  T  A  C  T  I  L  E  N  P  H  I  V
Y  I  W  A  C  T  U  A  T  O  R  C  D  R  E  N  U  S
T  A  C  C  E  L  E  R  O  M  E  T  E  R  C  H  D  Y
```

Find the following words in the puzzle.
Words are hidden → ↓ and ↘ .

ACCELEROMETER   LOSSY   SENSOR
ACTUATOR   LOWPAN   TACTILE
BLUETOOTH   MQTT   TEMPERATURE
CELLULAR   PNEUMATIC   WIFI
CONSTRAINED   POSITION   WPAN
GYROSCOPE   PRESSURE   ZIGBEE
HYDRAULIC   PROXIMITY

6] Name of the Activity: Online Test Activity

Conducted Online Test For Students On Design and Analysis of algorithms using different tools such as TestMOZ and Google Form

35

70 responses

Accepting responses

Summary   Question   Individual

📊 Insights

Average	Median	Range
8.97 / 10 points	9 / 10 points	6 - 10 points

Total points distribution

7] Name of the Activity: Think Pair Share Activity

Think-pair-share (TPS) is a collaborative learning strategy where students work together to solve a problem or answer a question about an assigned reading. This strategy requires students to (1) think individually about a topic or answer to a question; and (2) share ideas with classmates. Discussing with a partner maximizes participation, focuses attention and engages students in comprehending the reading material.

8] Name of the Activity: Jigsaw Activity
Subject Name : Design and Analysis of Algorithms
Course Coordinator: 1. Prof. Monika Sonmale
Date & Time:15/06/2020 10.30 am – 12.30 am
Platform used: Google Meet
Google Meet Link: https://meet.google.com/bft-ynoo-yjb

Number of Attendees: 58
Activity Name: Jigsaw
Details of Activity:
Jigsaw:
          Jigsaw is a best learning strategy that enables each student of a home group to specialize in one aspect of a topic (for example, one group studies Algorithm Design Techniques , another group studies Divide and Conquer). Students meet with members from other groups who are assigned the same aspect, and after mastering the material, return to the home group and teach the material to their group members. With this strategy, each student in the home group serves as a piece of the topic's puzzle and when they work together as a whole, they create the complete jigsaw activity.
In this Activity Students are helps to improve communication, listening, and It helps build student skill.
1)   Improved Vocabulary
2)   Reasoning
3)   Problem-solving
4)   Stress relief.
5)   Effective stress relief.
6)   Attitude of Persistence
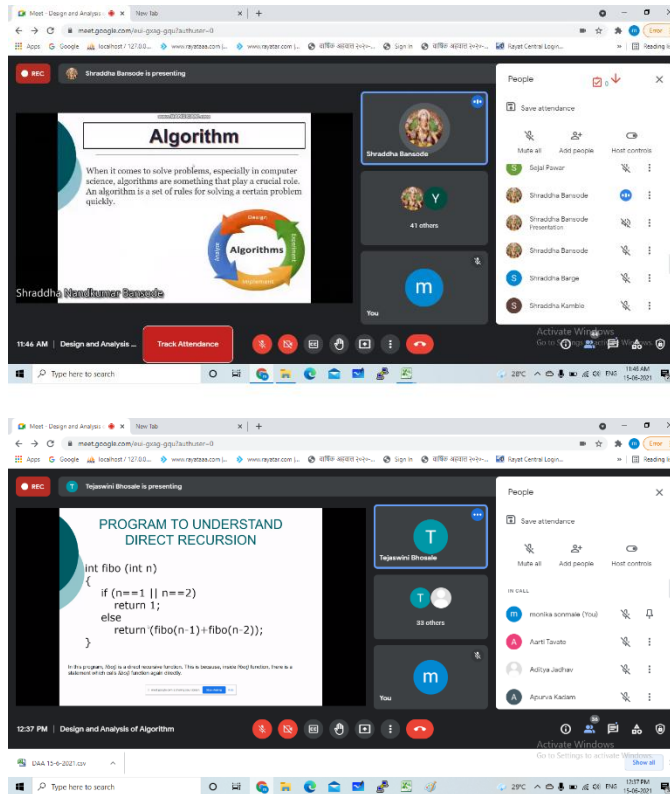
Screenshots during jigsaw activity

Session Plan For Courses:

Rayat Shikshan Sanstha's
Karmaveer Bhaurao Patil College of Engineering, Satara

Program: Computer Science and Engineering	Course: Design and Analysis of Algorithms
Class: S.Y. (CSE)	Course Code: BTCOC401

Session Plan

Time	Teacher Activity	Student Activity	Teaching Tool / Assessment Method / Resource used
20 min.	Conducting discussion on Greedy Technique	Listening and noting down	Lecture method along with PPT
	Discussion on Greedy Method and Examples of Huffman Coding	Participating in Discussion on Greedy Method and solve examples on Huffman Coding and sharing their opinion	Think – Pair - Share
15 min.	Summarizing output of discussion	Listening and noting down	Lecture method along with PPT
5 min.	Summarizing the lecture	Listening and noting down	-

37

IV. CONCLUSION:

Based on the final results and group discussion, this ABL study concluded that the student teaching learning approach is for student Improvement, motivation, and improving academic achievement in education. Teaching styles attract students and play a
Positive and good role in student motivation and improve academic achievement for better final results in Learning.

REFERENCES

1] Agustina Martı´nez-Garcı´a, Simon Morris, Michael Tscholl, Frances Tracy, and Patrick Carmichael "Case-Based Learning, Pedagogical Innovation, and Semantic Web Technologies" Voll 5, VOL. 5, NO. 2, APRIL-JUNE 2012
2] Aristeidou, M., Scanlon, E., and Sharples, M. (2017). "Design processes of a citizen inquiry community," in Citizen Inquiry: Synthesising Science and Inquiry Learning, eds C. Herodotou, M. Sharples, and E. Scanlon (Abingdon: Routledge), 210–229. doi: 10.4324/9781315458618-12

3] allard, H. L., Dixon, C. G. H., and Harris, E. M. (2017). Youth-focused citizen science: examining the role of environmental science learning and agency for conservation. Biol. Conserv. 208, 65–75. doi: 10.1016/j.biocon.2016.05.024
4] T. O'Reilly, "What Is Web 2.0? Design Patterns and Business Models for the Next Generation of Software," http://oreilly. com/web2/archive/what-is-web-20.html, Sept. 2005
5] P. Mika, Social Networks and the Semantic Web. Springer, 2007.
6] P. Brooks and L. Kahlich, "Reflections on a Two-Year Joint International Project Using Web-Cam Technology to Create New Opportunities for Student Choreographic Collaborations," Innovations in Practice, vol. 2, no. 1, pp. 41-48, 2009.
7] Bernhardt, E., & Hammadou, J. (1987). A decade of research in foreign language teacher education. Modern Language Journal, 71(3), 289-299.
8] Best, John W. and Kahn, J.(2009). Research in Education, Tenth Edition, PHI Learning Pvt. Ltd.,
New Delhi.

Project Based Learning in Discrete Mathematics

K. Swathi, B. Swathi Sowmya

CBIT(A), Hyderabad, Telangana, India

Abstract--Mathematics is strictly method-oriented course in engineering curriculum. In computer science discrete mathematics is a vital prerequisite to learning algorithms. The methods and techniques honed in discrete mathematics are convenient in studying and describing objects and problems in all branches of computer science. Project based learning (PBL) is the well-known learner -centered education method. PBL for discrete mathematics make learners to work together to solve real-world problems. Upon successful completion of the discrete mathematics course the students are able to know the concepts like symbolize the sentences using propositional logic, apply modular arithmetic for cryptography, discrete structures, combinatorial analysis, algorithmic thinking and application modeling. With PBL, the CSE and IT students are progressively given responsibility for their education. In this paper proposing the projects and the projects are open in the sense that there are many possible solutions. The projects are particularly designed so as to make students explore the significant and specific concepts in discrete mathematics. The proposed projects are fulfilling the prerequisite for the courses like Computer networks, Cryptography, Permutations, Combinations, Natural language processing and Artificial intelligence.

Keywords: Project Based Learning, Discrete Mathematics, Learner-centered.

I. INTRODUCTION

Nowadays, university education becomes more globalized. The change transformed the education system from teacher-centric to learner-centric or student-centric. The present industry demanding graduates employability. In engineering education innovation of new technologies necessitate innovation of new courses in curriculum with support of available basic courses.

The basic courses like discrete mathematics, probability & statics support current trending subjects like Natural Language Processing, Data Analytics etc., One of the novel methods of teaching learning is project-based learning. In the project- based learning integrating both the theoretical and practical concepts, and guiding the process to develop the applications which are helpful in real- life situations. The traditional method is lectures followed by written exam for a small group or large group of students. Here in project-based learning more communication is required between student and teacher and it is best suitable for small group of people. The project-based learning is best suited for small group of students and this process can be easily implemented by use of flip class room. The main objective of project-based learning is to increase the student's motivation and their involvement in the self-learning.

Innovation is defined as a novel idea or additional improvement of an existing product or application, process or method that is employ in a precise context with the intention to create a value added. To improve the involvement of student in learning the pedagogical practice always has too innovative. Familiarizing to learning levels of student and adapting to new pedagogical methods.

3- specific areas of curriculum innovation are presently transforming engineering education through Activity based, Project based learning (PBL), Problem based learning, group work, integrated learning.

In this paper discussed about the initiations carried out in Discrete Mathematics at undergraduate level of 3rd Semester. Our main focus is on Project based learning and group/ team work.

II. LITERATURE SURVEY

We can expect the high student outcome, if weimplement effective pedagogy consistently for a longer time irrespective the number of students available.[1]

The process of teaching has been examined by (CREDE) Centre for Research on Education, Diversity and Excellence. CREDE[2] gives the information about the importance of the pedagogy and the importance of teacher role. Here[3] listed the priorities for transformation, the faculty should take less theoretical classes and more practical programsimplementation need to be done.

Robin king [3] opined the innovation in teaching engineering students is challenge and teaching process transformed for students and is responsive for future socioeconomic and environmental contexts.

In curriculum[4] the conception includes the utilization of problem and project-based learning, group learning and threshold concept learning, supported by engineering education research and staff development.

Industry interaction plays a vital role in the Project Based Learning(PBL) education. In Spanish university introduced a mater's course in CSE including both technical knowledge and business subjects. Students designed business models and business practices, these models yields a broad level of satisfaction with PG degree compare to other similar programs. Wacharawan proposed a Project based learning framework to raise the efficiency of learning for the course content and the capability of development of professional skills of the students[5] Kizaki et al. reported a PBL education approach in which the evolution process transformed from an Agile process to a Scrum process[6].

III. PROJECT BASED LEARNING INDISCRETE MATHEMATICS

In the discrete mathematics the main concepts are like Proposition logic, Algorithms, Number Theory,Counting, Induction and Recursion, Probability,

Graphs, Trees, Modeling Computation. Conventionally the learning process of these concepts are done by lecture on the concept followed by assignment questions like problem statements. The students have to solve the problems. To improve the involvement of the student in the learning process of discrete mathematics (DM) adapting project-based learning. To implement project-basedlearning in DM proposing the projects related to topics like Proposition logic, Algorithms, Number Theory, Counting, Induction and Recursion,Probability, Graphs, Trees, Modeling Computation.

A. Projects based on Propositional Logic

The propositional logic helps to find the declarativestatements and the value of the statement like TRUTH or FALSE. The problem statement for minproject in the propositional logic as follows

Statement 1: Take a scenario(Annual day preparation, Organizing technical event) in your institute form the proposition statements and determine thetruthfulness of statement by applying the conjunction, disjunction, exclusive or, conditional statement, and bi-conditional of those propositions.

B. Algorithms

The step-by-step procedure to solve any problem is defined as Algorithm. We can estimate the time complexity and storage complexity to solve a problem is done by the algorithms. In the teaching and learning process daily different courses lecturesare taken by subject experts, based on this hereproposing a problem statement related to mini project in Algorithms.

Statement 2: Take the first hour starting time and last hour ending time and planning for 'n' talks, usethe suitable greedy algorithm to plan the most talks possible in a single lecture hall.

C.Number theory

In number theory the students are able to learn about number generation and arithmetic operations like GCD, LCM, Congruence on the generated integers. Based on congruence operation here proposing three projects

Statement 3: Pseudo random numbers generation for a sequence 'N' using the linear congruential generator.

Procedure to generate Pseudo random numbers

The most usually used procedure to yield pseudorandom numbers is the linear congruential method. To generate this series four integers are chosen: the **a is multiplier**, **m is modulus**, **x₀ is seed** and **c is increment**, with $2 \leq a < m$, $0 \leq c < m$, and $0 \leq x0 < m$. Yield pseudorandom numbers sequence $\{x_n\}$, with $0 \leq x_n < m$ $\forall n$, by successively defining a function

$$x_{n+1} = (ax_n + c) \bmod m$$

Statement 4: Take a string and encrypt the message and decrypt the message using RSA Algorithm. In addition to String apply the other type of data like image.

Procedure:
In the RSA algorithm follow the below steps:

✓ Two large prime numbers (p and q) are taken

✓ Find **n = p*q** and **Ø(n)= (p-1)(q-1).**

✓ Identify a number e where $1 < e < \textbf{Ø(n)}$

✓ Find $d = e-1 \bmod (p-1)(q-1)$

✓ Generated private key pair as (n,d)

✓ Generated public key pair as (n,e)

✓ The cipher text generated as follows

$$C = M^e \bmod m.$$

✓ The plain text is generated as follows:

$$M = C^d \bmod n$$

Statement 5: Derive a set of identity numbers, use a hash function to delegate them to memory locations where there are k memory locations.

D. Counting

Counting is used to identify the count of elements available in a finite set. Here identifying the number of elements in the set and also re-arranging the elements in the set so called Combination and Permutation respectively. Based on Combinations and Permutation proposing two projects.

Statement 6: Take the sum of 2-sections students as 'n' and the number students allotted per bench is 'r' find the r-permutations, with repetition allowed of the set {1,2,3,..n} and display the arrangement with RollNo.'s.

Statement 7: With the same 'n' and 'r' values find the list of all r-combinations with repetition allowed, of the set {1,2,3,...n} and display the takencombinations as RollNo.'s.

E. Induction and Recursion

With induction and Recursion, the students are ableto create type and function simultaneously and withthis process students able to create a larger type of data.

Statement 8: Construct an algorithm for defining whether a point is in the inside or outside of a simple polygon. Take the dynamic points and construct the polygon and fill the each part with different colors.

Statement 9: Given a non-negative integer 'n', determine the nth Fibonacci number using recursion and iteratively. Analyze either the number of operations or the time required to compute Fibonaccinumbers recursively versus that necessary to compute them iteratively.

F. Probability

The probability supports to identify the likely thingsto happen whenever we are unaware about outcomeof an event. Here proposing project related to probability.

Statement 10:Given a list of empirical probabilities and the words they take place in spam e-mails and in e-mails that are not spam, find out the probability that a new e-mail message is a spam.

G. Graphs

Graph is a non-linear data structure, here we have two elements like nodes and arcs. Nodes and arcs arealso called as vertices and edges respectively. Graphs are used in multidisciplinary domains. Proposing two projects related to graphs.

Statement 11: Demonstrate the organizational structure of your institute using directed and undirected graphs process.

Statement 12: Demonstrate the relation and connectivity between various committees or clubs available in your institute.

H. Trees

A tree is non-linear hierarchical data structure consisting of collections of nodes connected to eachother without forming any cycle or circuit. Here proposing projects using tree data structure useful inreal life situations.

Statement 13: Inspect hierarchical cluster trees anddemonstrate how are they used in real-life situations(Ex:- Construct your family tree)

Statement 14: Demonstrate the history and origins ofalgorithms to build minimum spanning trees from your institute to your home.

Statement 15: Illustrate the search techniques used by Googlebot, and other web crawlers and spiders used by different web search engines.

I. Modeling Computation

The students are able to create models for mathematical functions and simulate the function byapplying the input and verify the output. Modeling computation also useful in multidisciplinarydomains. Proposing projects related to modelingcomputation applicable in multidisciplinary domains.

Statement 16: Inspect how finite-state machines arehelpful in the examination of network protocols.

Statement 17: Outline how finite-state machines arehelpful in speech recognition programs

Statement 18: Construct the finite-state machine to how a student recognize as an employee in an organization

These are the projects we can expect in discrete mathematics and able to learn discrete mathematicsconcepts in a group work and in a challenging way.

IV. CONCLUSION

We conclude that not only for the computer science or programming courses we can able to apply the project-based learning process for Mathematical courses like discrete mathematics. With project- based learning the students are able to do Group work, involve in Group discussion. By the implementation of proposed projects, the students will acquire knowledge about discrete mathematics in multidisciplinary domains. Finally, we conclude that project-based learning process will improve the student communication, programming skills, with this the student become ready to work in industry.

REFERENCES

[1]   Entz, Susan. "Why pedagogy matters: The importance of teaching in a standards-based environment." Forum on Public Policy: A Journal of the Oxford Round Table. Forum on Public Policy, 2007.

[2]   Bok, "Pedagogy, Practice, and Teaching Innovation at Harvard". Pedagogy, classroom design, evaluation: the recent history at Harvard | Harvard Magazine 2016

[3]   King, Robin. "Innovative Approaches to Engineering Education" Journal of Engineering Education Transformations, 2017

[4]   "Fila, Nicholas D., and Ruth EH Wertz. "Towards Evaluating the Content"

[5]   I. Wacharawan, 'PBL Framework for Enhancing Software Development Skills: An Empirical Study for Information Technology Students', Journal of Wireless Personal Communications, vol. 76, no 3, pp. 419-433, 2014.

[6]   S. Kizaki, Y. Tahara, and A. Ohsuga, 'Software Development PBL Focusing on Communication Using Scrum', 2014 IIAI 3rd International Conference on Advanced Applied Informatics, Kitakyushu, 2014, pp. 662-669.

Industrial Internship: An Experiential Learning Pedagogy for Outcome Based Education in Higher Educational Institutes

Dipali Ramdasi, Pratima Kulkarni
Cummins College of Engineering for Women, Pune

Abstract— **Experiential learning is a pedagogy technique, in which, the students develop knowledge, skills, and values by direct experiences outside a traditional classroom-based learning. Experiential learning allows students to apply the theoretical knowledge gained during a program. This learning method is important for students in technical/ higher educational institutes as it contributes to improved learning amongst the students. Although laboratory sessions allow students to develop their skills, applying the skills to problem solving in various sectors of the industry can be implemented with industrial internship. This paper discusses industrial internship as an experiential learning pedagogy tool and how it makes the students career ready. In the era of outcome based education, this paper presents the mapping of program outcomes of technical/ engineering degree program on industrial internship. The results of mapping on program outcomes are illustrated with the help of feedback from students completing industrial internships. The analysis of the feedback ascertains that industrial internship is an effective pedagogy tool for experiential learning.**

Keywords— **experiential learning; industrial internship; outcome based education**

I. INTRODUCTION

O UTCOME Based Education (OBE) is a philosophy of education that is primarily based on outcomes or goals. This education method does not define a specific method of teaching or learning. The learning is said to be accomplished upon reaching a goal or outcome which is set before commencing the learning. The courses, opportunities and assessment are designed in a way where they support the attainment of outcomes.

Our country, India, is a permanent member of the Washington Accord and implements OBE in higher technical education like diploma and undergraduate programs since 2013. According to the levels of attainment of outcomes, an analysis is carried out to identify the gaps in the curriculum. Revisions in the curriculum of degree courses is carried out to bridge these gaps.

Higher Education Institutes (HEIs) frame their curriculum to satisfy the growing needs of the technological world. State-of-the-art technologies are offered to students as main courses, program electives or open electives in HEIs. The project-based learning methodology is also adopted for in-depth understanding of the topics. However due to technological disruptions, the HEIs have to scramble to their feet to provide a link between practical implementation of the knowledge imparted to students. One of the possible solutions to this is to give the students an opportunity to experience these state-of-the art technologies. This is made available by making certain changes in the curriculum. Laboratory sessions, workshops and hands-on sessions are included to enrich the learning of students. Thus, experiential learning pedagogy is adopted by many HEIs for the holistic development of the students. The experiential learning method has been an area of research for more than 50 decades This article presents the industrial internship as an example of experiential learning. Various researchers published their views on experiential learning. Some prominent theories, ideas and views are discussed in the next section.

II. REVIEW

Dewey (Dewey 1984) stated that education should be based on the quality of experience. The article strongly suggests that experience is a continuous phenomenon and interaction is an integral part of experience. The origin of every experience is a previous experience, and every experience leads to a new one, compelling the person to learn more. The article categorizes experience as mis-educative and non-educative. A mis-educative experience is the one that halts or disturbs the growth of future experiences. When a person has failed to do reflection, thus has not obtained anything for mental growth that adds to the knowledge base is a non-educative experience.

Researchers (Eder & Dignath 2021) presented a study of Lewin's Theory. Lewin's theory denotes learning as a relative process in which a learner develops newer insights or changes older ones. According to this theory, learning is not just a mechanical process of connecting stimuli and responses with biological organisms. Lewin's theory is popularly called field theory where the field is where a person is present at a certain time. The theory accounts matters and events that happened in past, present and the future, abstract and concrete as well as actual and imaginary. These are interpreted as concurrent aspects of a situation and contribute to the learning mechanism.

Educationists (Babakr & Kakamad 2019) comprehended Piaget theory. Piaget proposed that a learner actively generates knowledge through experience and interaction with the environment, using a constructive approach resulting in knowledge development.

Kolb (1984) states that learning according to experiential learning theory is the process where knowledge is created through transformation of experience. Knowledge thus results from the combination of grasping and transforming experience. The experiential learning framework mainly comprises of the experiential learning cycle, nine distinct learning preferences and four separate educator roles. The experiential learning cycle states the four modes of learning as:

1. Concrete Experience - In this, the learner encounters a concrete experience, which might be a new experience, a similar experience with different understanding or a new situation.
2. Reflective Observation of the New Experience - In this, the learner reflects the existing knowledge on a new experience and tries to identify the inconsistency between experience and understanding.
3. Abstract Conceptualization - The earlier mode helps the learner to learn from reflective observation and modify or conceptualize an abstract hypothesis, leading to this mode. This mode indicates that the learner has learnt from experience.
4. Active Experimentation - In this mode, the learner tries to apply the new or modified concept to the surrounding or situations. This leads to active experimentation.

In other words, it can be stated that learning happens through doing actions, observing the actions/ surroundings/ effects, thinking over the experience and trying again to formulate solutions.

Experiential learning encompasses a variety of activities including hands-on sessions, internships, research in related area, and work experiences in the relevant field. A well-planned activity, supervised and assessed learning opportunities that elevate the experience of students can stimulate academic inquiry and assists in gaining relevance to the knowledge acquired in the classroom setting.

Recent research shows that experiential learning does not replace but supplements traditional learning methods in the form of hands-on sessions to improve skill set, perspectives and relations. It improves the understanding level by allowing an individual a freedom to decide and explore a suitable learning path. Experiential learning has provided a pivotal role in various studies that make use of its theory as the analytical and logical framework to investigate its effectiveness in the process of learning.

Lai (Lai et. al. 2007) used experiential learning pedagogy technique to scrutinize the contribution of technology in this method. They speculated the probability of using technology to support and provide experiential learning. The results of this study ascertained that technology assisted students to broaden their knowledge base, affirmed the importance of experience and indicated that students get an opportunity to act and reflect upon their actions during an experience.

Alkan (Alkan 2016) investigated effects of experiential learning on achievement of students and teachers in the field of chemistry and the acquired process skills in the scientific field. Alkan stated that the experiential learning stages or process can "enable students to be aware of their professional identities, question their actions and note the importance of their suspicions". Alkan established that experiential learning positively impacts learners' academic achievements and learning outcomes as it promotes the four stages of the said process, viz. experiencing, reflecting, thinking, and acting upon their own experiences.

Some researchers (Arnold and Paulus 2010) used experiential learning theory framework to train the probable teachers, who were in their pre-service or training period. They discuss about how the future teachers learned about the probable use of technology by students in the classroom by using the technology or experiencing the technology themselves. The experiential learning pedagogy allowed them to predict the use of technology by students and potential challenges the students may face while using the same.

III. INDUSTRIAL INTERNSHIP

The changing nature and routines of work environments, the dominance of technology-driven processes, and the diverse needs of clients and recruiters are some of the challenges of HEIs in order to meet the demand for employable graduates. Several HEIs have made changes to their curriculum and have added industry internship as an integral part. Many industries have positively supported this internship-based curriculum by offering internship to deserving candidates. The industrial internship allows students to be industry ready and can embrace their career with broader skill sets.

Internships can be viewed as vehicles for learning and development of a student in several aspects. Learning implies a positive additive change, wherein, a student understands a topic or a concept better, leading to acquisition of newer abilities. Development signifies a qualitative deviation in the perspective of students' outlook towards the world and can develop constructive understanding of their experience. This is equivalent to looking at opportunities and experiences with a new vision or a new set of glasses.

An internship is very similar to an actual job, where the student gets an opportunity to work in a real, corporate setting and is many times allotted as a team member in a real project. It encourages the student to apply the gained knowledge in classrooms to interpret systems and processes in the industry. The industry internship gives a student an ad-hoc experience of pursuing a career in the related field. Industry internships are critical in terms of skill-building, networking with peers and colleagues, and employability of students.

Before opting for an industrial internship, a student acquires theoretical knowledge and to some extent practical knowledge of the technological advancements in the relevant field. However, setting up state-of-the-art laboratories for technically advanced courses is a challenge for HEIs. This lacuna is fulfilled by industrial internship. Also, when the student joins the internship program, the student encounters a concrete experience, which may be new or similar to an earlier one. The student reflects the existing knowledge on this experience and tries to find the inconsistency between knowledge and understanding of experience. Thus, the gap between existing knowledge and the experience are identified and the knowledge database is appended. Thus, learning of student takes place by abstract

conceptualization. The student then tries to apply the newly learnt or modified concept to the situation or surrounding. This leads to a newer experience and a newer understanding due to active experimentation. This clearly illustrates that industrial internship is an experiential pedagogy technique.

A. Industrial Internship Outcomes

Student learning and skill enhancement happens during internship. The outcomes of industry internship can be stated as follows: Students completing an industrial internship will be able to:

1. Gain practical experience in the industry environment
2. Apply knowledge and skills acquired in the classroom to solve complex engineering problems pertaining to the industrial sector of internship
3. Utilize modern engineering tools to complete given task
4. Apply a multidisciplinary approach to problem solving
5. Demonstrate understanding of professional customs and practices
6. Display refined oral and written communication skills

B. Internship Reports

The students are expected to write a comprehensive report of the internship completed. The report serves multiple purposes, and some of them are stated for reference.

- Give the student an opportunity to reflect on the professional aspects of the internship experience.
- Allow the student to describe the scientific and professional skills learned during the internship.
- Allows the student to explain theoretical knowledge applied in the company.
- Have the student to reflect on the initial goals of the internship and how they are achieved during the internship.
- Help the student develop written communication skills.
- Serve as an archival record of the internship experience.

The report covers the following sections along with the standard documents prescribed by the HEI.

1. Introduction

The introduction includes a description of the internship work and the scope of the work completed during the internship. It may include background information necessary to understand the work completed during the internship.

2. Internship Discussion

This section contains a discussion of the internship and should address the following points:

➢ What were the objectives and how were the objectives achieved?
➢ What skills (scientific and professional) were learned during the internship?
➢ Description of the problem statement you could work upon.
➢ Results/observations/work experiences obtained in the internship company.
➢ What challenges did you experience during the internship?

3. Weekly Overview of Internship activities

This section covers the activities done and tasks accomplished in every week of the internship. An elaborate description per week is expected.

4. Conclusion

C. Internship Evaluation

Evaluation of student performance during the internship assists the supervisor/ mentor to set rules and directives for the remaining period. The internship supervisor observes and evaluates the overall performance of the students along with the technical skills and abilities of the student (Fakhri 2019). The general evaluation parameters are listed below:

- Punctuality
- Professional Behavior
- Communication Skills
- Ability to learn new things
- Willingness to ask for help and guidance
- Seemed interested and enthusiastic about the internship experience
- Overall Performance

With the experience of working as an intern in the industry, completing a report, acquiring technical and communication skills as well as developing the ability to look at problems/ situations/ surroundings with a different perspective, the student is benefited with the strong takeaways of internship. Maher & Graves (2008) state that this learning will develop the skills required by employers in fresh graduates. It will enable students to acquire generic competencies and align their skills to improve their employment opportunities in a highly competitive market.

D. Benefits of Internship

A student completing an industrial internship earns the following benefits: (Karunaratne 2019)

- Gain practical experience within the industry environment
- Acquire knowledge of the industry in which the internship is done
- Apply knowledge and skills learned in the classroom in a work setting
- Develop a greater understanding about career options while more clearly defining personal career goals
- Experience the activities and functions of business professionals
- Develop and refine oral and written communication skills
- Identify areas for future knowledge and skill development
- Improve problem-solving and critical thinking skills
- Participate as a team member and build team spirit
- Understanding of professional customs and practices
- Identify, understand and work with professional standards and ethics
- Adopt effective documentation practices
- Understand the time management in professional organizations
- Understand sustainable development methods
- Experience mentoring from industry professional
- May get a pre placement offer

E. Case Study

A student's case study is presented for realization of industrial internship as an experiential pedagogy technique. A pre-final year Instrumentation student has generally completed courses on various unit operations in the process industry, configurations and settings required in a Distributed Control System (DCS) or Supervisory Control and Data Acquisition (SCADA), control strategies for these operations. The student is aware of the interconnections of systems and processes and can interpret P & I (Piping and Instrumentation) diagrams comfortably. However, when physical processes are involved, the dynamics of the physical process have to be accounted for while finalizing the settings and configurations. The physical processes may include high-capacity boilers, evaporators, complex transportation mechanisms and safety interlocks which may not be available in the laboratories of educational setups. When this student commences the industrial internship, the student experiences the processes and physical systems. Naturally, a reflection of existing knowledge is applied to this experience and the abstract concepts of physical systems turn concrete. This concept upgradation now initiates active experimentation, where the student tries to apply this knowledge to configure and set the physical process. This continuously leads to learning and knowledge updation and refinement of concepts, resulting in a gradual expertise in configuration and settings of operations in the process industry. The student also realizes the importance of the skills they possess and evaluate their viability based on their actual work assignment or task.

The interaction between the student and the industry supervisor allows the student to perceive the importance of various skills through interactions and discussions. Sharing and mentoring by the industry personnel appends the students' knowledge base and empowers the student to come up with newer ideas. Generating a report of the internship adds to the presentation skills. It also helps the student to relive the experience upon accessing the report. The industrial internship thus provided an appropriate avenue to the student to determine the importance of the skills acquired during academic sessions and identify the gaps to meet the skill set needed by the industries.

IV. METHODOLOGY

The pedagogy technique of experiential learning is considered as a very effective technique by both, learners and trainers. Industry Internship is a classic example of experiential learning. Students of the pre-final year get an opportunity to work in the industry. The outcomes of industrial internship are discussed with the students and guidelines for completing the internship are shared. The students' performance is evaluated by the industry supervisor or mentor from time to time. The student generates a report of the work carried out during the internship. Upon successful completion, the student is given a certificate by the industry. Feedback is taken from the students to understand their views. The feedback form is designed in a way, so that the majority of the outcomes of Internship are covered. The feedback questionnaire consists of the following questions:

1. Did the internship make a value addition in your practical knowledge database?
2. Were you able to develop the ability to suggest realizable solutions to engineering problems during your internship?
3. Did your internship give an opportunity to know about the current latest technologies prevalent in the industry?
4. Did you learn to develop Multidisciplinary approach towards problem solving?
5. Did you get an opportunity to enhance your professional behavior and ethical skills?
6. Did you get an opportunity to create effective reports &/presentations and design documentation during your internship?

The online survey of students who have completed an industrial internship of minimum 6 weeks is taken on a 3-point rubric scale (Andrade 1997) and analyzed for its mapping on the program outcomes.

The Program outcomes of Engineering degree Program as defined by the National Board of Accreditation (NBA) are stated below for

clear understanding of the mapping.

The Program outcomes defined by NBA are (Source: Accreditation-Evaluator's View, Program Outcomes By National Board Of Accreditation, https://Www.Nbaind.Org/Files/Peos-Curriculum-And-CoPo-Mapping-14-May-2016.Pdf)

At the end of program, graduate student will be able to:

1. Engineering knowledge: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
2. Problem analysis: Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
3. Design/development of solutions: Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.
4. Conduct investigations of complex problems: Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.
5. Modern tool usage: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.
6. The engineer and society: Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.
7. Environment and sustainability: Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.
8. Ethics: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.
9. Individual and team work: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.
10. Communication: Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.
11. Project management and finance: Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.
12. Life-long learning: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

The mapping of outcomes of internship and the feedback questionnaire on program outcomes are discussed in the section after results.
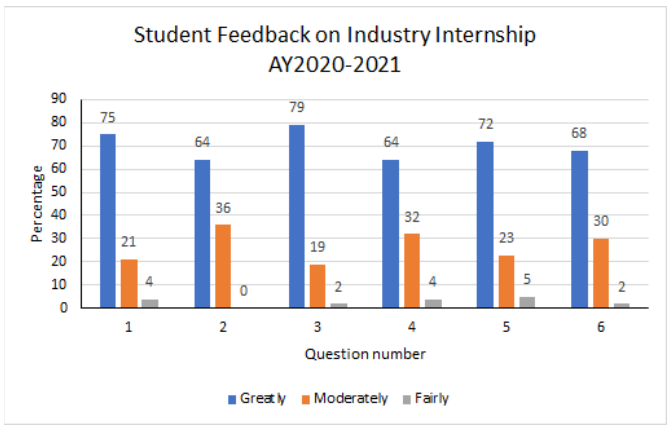

Fig. 1. Student feedback on Industry Internship in the academic year 2020-2021
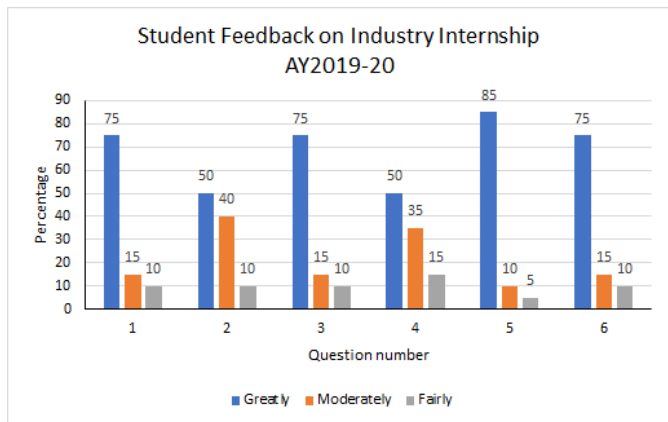

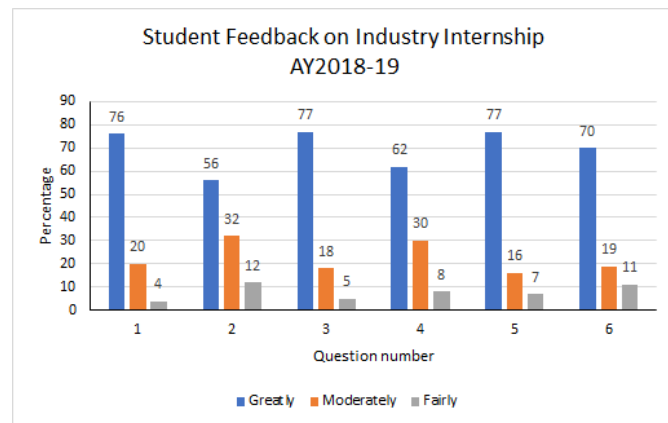Fig. 2. Student feedback on Industry Internship in the academic year 2019-2020

Fig. 3. Student feedback on Industry Internship in the academic year 2018-2019

V. RESULTS

The feedback responses of students who have completed an industrial internship with a minimum period of 6 weeks and a maximum period of 6 months is taken with the help of Google Form. The feedback responses are collected from students in the past three academic years. The X axis represents the response of every question in a 3-point rubrics scale. The Y axis is used to present the student response for that rubric in percentage. Fig. 1., Fig. 2. and Fig. 3. represent the feedback of Academic Years (AY) 2020-2021, 2019-2020 and 2018-19 respectively.

VI. DISCUSSION

This section presents a detailed discussion on feedback framework of industrial internship and mapping of each feedback question on internship outcomes and in turn the program outcomes.

The first question covers value addition and reflection of practical knowledge in the work environment. This question maps the outcome 1 of internship. It can be mapped on the program outcomes 1, 3, 4 and 6. The second question judges whether the student has developed an ability to suggest solutions to problems or situations that are implementable, realizable in terms of technology. This question maps the program outcomes 1 and 3. The third question assesses the student's exposure to latest technologies available for problem solving and realization. This question maps with program outcome 4. Real life problems cannot be categorized into specific branches of engineering. Such problems require a multidisciplinary approach to device solutions. The fourth question determines whether the student is able to develop such an approach. This question maps with program outcome 3 and 6. The fifth question judges whether the student's behavior in a professional environment has augmented and the student has broader understanding of professional ethics and responsibilities. This question maps with program outcome 8. The sixth question assesses the students' verbal and written communication. During the internship, students are expected to write reports, create effective documentation, present ideas and solutions. This question maps with program outcome 10. Thus, the feedback framework suggests that industrial internship cover six program outcomes.

The analysis of feedback responses of students indicate that the industrial internships contribute to a holistic development of the students. The student develops some new skills as well as enhanced existing skills and understanding. The feedback clearly indicates that more than 75% of students gained practical knowledge in the work environment, got an opportunity to explore the latest technologies, and broadened their understanding of professional ethics and responsibilities. An average of 60% students enhanced their ability to suggest realizable solutions and could develop a multidisciplinary approach to formulate solutions. More than 70 % of students could improve their communication skills and understood the methods of creating effective documents as required by the industry.

VII. CONCLUSION

A detailed study of experiential learning pedagogy is presented in this article. The four stages of experiential learning are discussed by reviewing ample literature in various fields. As HEIs run professional courses, the benefits of industrial internship are presented. The general process of industrial internship in the technological sector is presented and its relevance to the four stages of experiential learning are demonstrated. Industrial internship as a perfect example of experiential learning pedagogy is thus established. The framework of feedback from students is discussed along with the formulation of questionnaire and its pertinency towards the internship outcomes. The relation or mapping of internship outcomes with the program outcomes of engineering degree program devised by the National Board of Accreditation is elaborately discussed. The feedback taken of more than hundred students, who have completed a summer internship over the past three years is analyzed. The feedback reflects a better understanding of the concepts learned in theory classes, multidisciplinary view of probable solutions, improved communication and deeper understanding of professional ethics and responsibilities is observed. Thus, it can be concluded that the program outcomes stated for the engineering degree program in the outcome-based curriculum are attained.

REFERENCES

Alkan, F. (2016). Experiential learning: Its effects on achievement and scientific process skills. Journal of Turkish Science Education, 13(2), 15-26.

Andrade, H. G. (1997). Understanding rubrics. Educational leadership, 54(4), 14-17.

Arnold, N., & Paulus, T. (2010). Using a social networking site for experiential learning: Appropriating, lurking, modeling and community building. The Internet and higher education, 13(4), 188-196.

Babakr, Z. H., Mohamedamin, P., & Kakamad, K. (2019). Piaget's Cognitive Developmental Theory: Critical Review. Education Quarterly Reviews, 2(3), 517-524.

Dewey, J. (1986, September). Experience and education. In The educational forum (Vol. 50, No. 3, pp. 241-252). Taylor & Francis Group.

Eder, A. B., & Dignath, D. (2021). Associations do not energize behavior: on the forgotten legacy of Kurt Lewin. Psychological Research, 1-11.

Fakhri, A. A., & Munadi, S. (2019). The evaluation of industrial internship for vocational school of mechanical engineering in Tegal. American Journal of Educational Research, 7(11), 806-809.

Karunaratne, K., & Perera, N. (2019). Students' perception on the effectiveness of industrial internship programme. Education Quarterly Reviews, 2(4).

Kolb, D. A. (1984). Experience as the source of learning and development. Upper Sadle River: Prentice Hall.

Lai, C-H, Yang, J-C, Chen, F-C, Ho, C-W, & Chan, T-W. (2007). Affordances of mobile technologies for experiential learning: the interplay of technology and pedagogical practices. Journal of Computer Assisted Learning., 23(4), 326–337.

Maher, A., & Graves, S. (2008). Graduate employability: Can higher education deliver?

Model for Course Planning for improved Employability of Learner

L V Awadhani, A A Panchwadkar, S K Bhoite
PCCoE Nigdi

Abstract— **For course planning, the model proposed here is very useful. This model takes input as the current requirements of industries from a fresher relevant to the course. These requirements are then mapped with the Programme outcomes, Performance indicators and Bloom's learning levels. This analyzed information can be used for the course planning. The course planning with these inputs received from the model will take care of content planning, content delivery and evaluation ensuring the appropriate attainments enabling to meet the industrial expectations. The model proposed here will certainly help the students to learn the course with more interest and achieving higher levels of learning in all the three domains of learning. A case study for the course Machine Design is presented in the paper**.

Keywords— Course planning, Performance indicators, Cognitive Learning levels

I. INTRODUCTION

Employability of graduates is very crucial and sensitive issue that decides the selection of the institute by the learners before registering for the programme. The employability not only depends on the curriculum design, but also equally relies on the effective learning by the graduates. Employability is governed by three key attributes Knowledge, skills and attitude in the graduates. It is also influenced by networks, professional identity and active citizenship. The three key attributes of employability are addressed through the graduate attributes defined in the outcome based education model. To address these attributes, various opportunities available to an institute or University are design of curriculum meeting the expectation of the employers at large, planning and execution of curriculum delivery and assessment. The institutes or Universities implementing OBE, take care of attainment of these graduate attributes/ Programme outcomes. The attainment of Programme outcomes is done through the attainment of course outcomes in the programme. In this process a key role is played by the teacher in appropriate planning, delivery and assessment of the courses. The work presented here focuses on the course planning that leads to improvement in the employability of the graduates.
.

II. COURSE PLANNING

Education liberates the intellect, unlocks the imagination and is fundamental for self-respect. It is the key to prosperity and opens a world of opportunities, making it possible for each of us to contribute to a progressive, healthy society. Learning benefits every human being and should be available to all. Keeping this in mind course plan can be chalked out. In line with the improvement in employability of the learner, the exact requirements of the employers can be known by conducting surveys, through discussions. A number of job provider sites are available which may be browsed for the course relevant job opportunities to the learners. This survey will precisely define the expectations of the employers which can be the input for the course planning. Once the exact needs for the prospective designations are listed down, it shall be mapped with the graduate attributes defined in OBE structure and the learning levels in Cognitive, Affective and Psychomotor domains appropriately. Table 1 represents the mapping of employer needs with the graduate attributes and the learning levels. This survey was conducted from job provider website for the post of design engineer in February 2020. The course outcome statements shall be formulated by considering the employer needs and the curriculum. The course outcomes shall be mapped with appropriately with the graduate attributes. The content delivery micro-plan shall be prepared in line with the course outcome statements. The internal assessment tools shall be planned that will ensure the attainment of the graduate attributes. For design of the assessments, the competencies and performance indicators shall be used referring the exam reforms policy [7]. Table 2 and 3 represents the mapping of the course outcomes, assessment tools, course end survey questions and the results for two courses mapping with the employer needs for the designation of Design Engineer. The assessment results can be used for planning the remedial actions for ensuring the attainment by all the learners. Figure 1 indicates the overview of the model discussed here. At the end of the course a course end survey can be conducted to verify the feedback of the learners on the course outcome attainments.

.

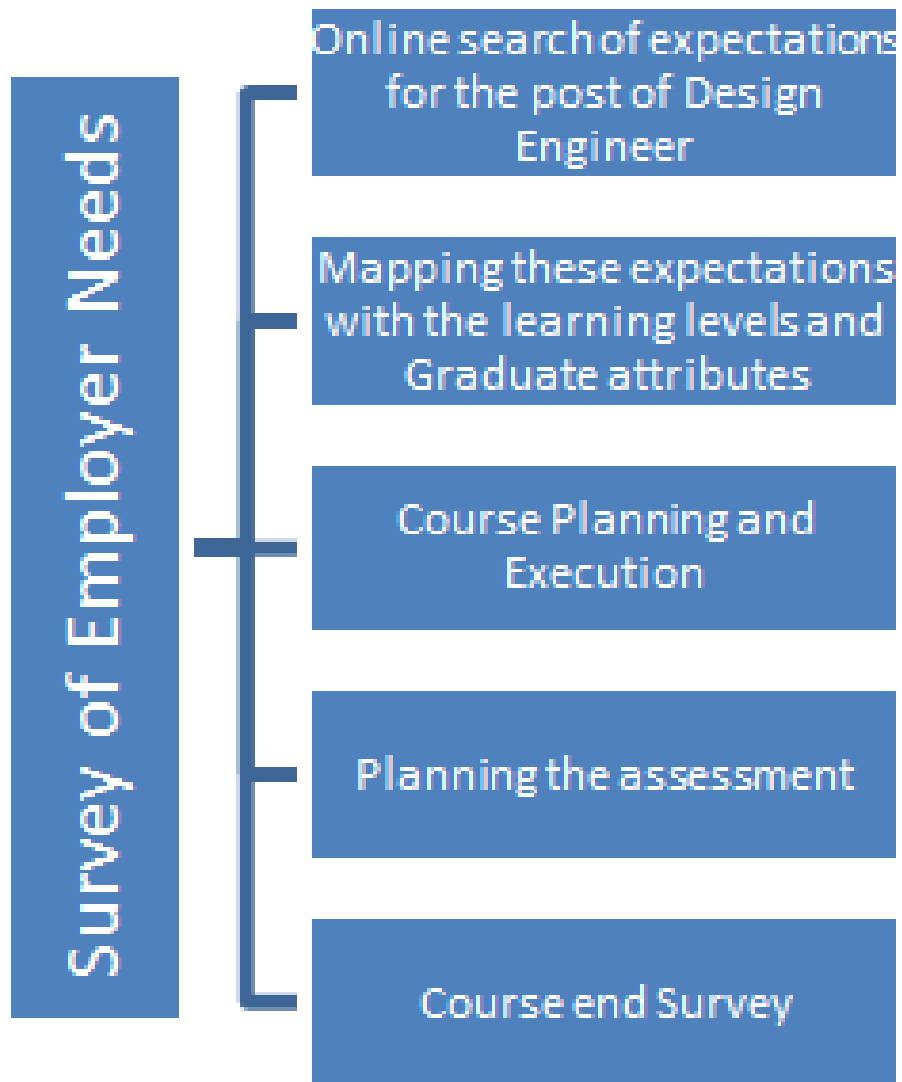**Figure 1 Overview of Course Planning Phases**

Figure 2: Detailed Structure of the Course Planning

Table 1: Online Employer Survey (conducted in February 2020)

Sr. No	Job Description	Mapping of Graduate Attributes	Mapping with Learning Levels
	Mechanical Design Engineer		
R1	Understanding and Hands on Experience of Plastic and Sheet Metal Part Design and ability to take Design decisions related to domain specific considering Packaging. Tooling and Manufacturing Feasibility.	GA 3	Cognitive:5
R2	Expertise in working on Mechanism and Closure Systems with proficiency in Kinematics design.	GA1, GA3	Cognitive:4
R3	Knowledge of Stack-up, plastic material for automotive Interior and Exterior components	GA 6	Cognitive:3
R4	Must be capable to perform Design Reviews with the Team member in a structured manner.	GA 4	Cognitive:5
R5	Knowledge of regulatory requirement - European & US	GA 8	Cognitive:2
R6	NX Part Design, GSD, Drawing, Team Centre. Knowledge of DC methodology.	GA 5	Cognitive:3
R7	Ability to communicate in English language. Knowledge of German language will be an added advantage	GA 10	Cognitive:3
R8	Tasks are done timely and are well understood and clarification is initiated if needed.	GA 11	Affective:5
R9	Must be a Team Player; should have the attitude to work with the team & also shoulder individual responsibility wherever needed. Selected candidates will be working onsite in Pune.	GA 9	Affective:3

Table 2: Course Planning for Machine Design-I Course based on the Employer Survey

Course Outcome	Requirements mapped from survey of Employer Expectation and GA	Content Delivery Tool/ Activity	Assessment method	Course End Survey	Additional GA Mapped	Performance Indicators
Student will be able to identify and understand failure modes for mechanical elements and design of machine elements based on strength.	R1,R7, R6, R8, R9 GA1, GA3, GA5, GA10	Design Project on real life application of Knuckle Joint/ Cotter Joint/ Turn Buckle	Unit Test- I, Insem Exam, Viva	To what extent you have understood failure modes and design based on strength in Design of machine elements?	GA4, GA9, GA11, GA12	1.1.2 1.4.1 3.1, 3.2, 3.3, 4.1.1 5.1.1 10.1.1 10.1.2 10.3.1 12.1.1

Table 3: Course Planning for Design of transmission systems Course based on the Employer Survey

Course Outcome	Requirements mapped from survey of Employer Expectation and GA	Content Delivery Tool/ Activity	Assessment method	Course End Survey	Additional GA Mapped	Performance Indicators
APPLY the principle of Spur & Helical gear design for industrial application and PREPARE a manufacturing drawing with the concepts of GD&T	R1,R7, R6, R8, R9 GA1, GA3, GA5, GA10	Design Project on real life application of gearbox	Unit Test -I, In sem Exam, Viva	To what extent you have understood design spur and helical gears for industrial application?	GA4, GA9, GA10, GA12	1.1.2 1.4.1 3.1, 3.2, 3.3, 4.1.1 5.1.1 10.1.1 10.1.2 10.3.1 12.1.1

After conducting the internal assessment, the deviations in the expected attainments were identified and the remedial actions via conduction of special sessions, assignments and viva to ensure their learning to the requisite levels in the three domains were conducted. Finally, the course end survey with the questions mentioned in Table 4 was conducted online. The responses were analyzed and the attainments above 3 on a five point scale are shown in Table 4.

Table 4: Course End Survey Details

Course Outcome	Course End Survey	% of responses above 3 on a 5 point scale
Student will be able to identify and understand failure modes for mechanical elements and design of machine elements based on strength.	To what extent you have understood failure modes and design based on strength in Design of machine elements?	92.67
	Have you got enough opportunity to design the machine components based on strength through the design project 1	96.00
Student will be able to design Shafts, Keys and Coupling for industrial applications.	To what extent you have understood the design of shaft, keys and couplings used for the industrial applications?	87.33
	To what extent you feel confident to design shafts with considerations such as strength, rigidity, manufacture and assembly?	88.67
Student will be able to design Power Screws for various applications.	To what extent you feel confident to design the power screws for manually operated and motorized applications?	87.33
Student will be able to evaluate machine components under fluctuating loads	Are you able to design machine components subjected to Fluctuating, Cyclic stresses for finite and infinite life?	66.00
Student will be able to Evaluate & interpret the stress developed on the different type of welded and threaded joints.	Can you analyze the bolted and welded connections with different load cases such as eccentrically loaded, bending and torsion?	59.33
Student will be able to design various springs for strength and stiffness.	Can you design helical compression springs based on strength and rigidity consideration for given applications?	64.67

CONCLUSION

The model proposed here is based on the regular OBE guidelines with a change in the method to know current needs of the employers and attempt to attain the expected result of improving the employability. The model was used for Third year UG Mechanical Program. The actual increase in the employability will be analyzed after graduating the present batch. But it significantly impresses these learners and their satisfaction and enthusiasm is evident from the course end survey analysis.

REFERENCES

1. Creswell, J. W. (2012). *Educational research: Planning, conducting, and evaluating quantitative and qualitative research* (4th ed). Pearson.
2. Crouch, C. H., & Mazur, E. (2001). Peer Instruction: Ten years of experience and results. *American Journal of Physics*, *69*(9), 970–977.
3. Esakia, A., & McCrickard, D. S. (2016). An adaptable model for teaching mobile app development. *2016 IEEE Frontiers in Education Conference (FIE)*, 1–9.
4. Fellah, A., & Bandi, A. (2018). The Essence of Recursion: Reduction, Delegation, and Visualization. *Journal of Computing Sciences in Colleges*, *33*(5), 115–123.
5. Guzdial, M., & du Boulay, B. (2019). The History of Computing Education Research. In S. A. Fincher & A. V. Robins (Eds.), *The Cambridge Handbook of Computing Education Research* (1st ed., pp. 11–39). Cambridge University Press.
6. Hamouda, S., Edwards, S. H., Elmongui, H. G., Ernst, J. V., & Shaffer, C. A. (2019). RecurTutor: An Interactive Tutorial for Learning Recursion. *ACM Transactions on Computing Education*, *19*(1), 1–25.
7. Exam Reforms Policy, AICTE, New Delhi, November 2018.

The Role of Emotions in the Scholastic Development of Educators and Learners in Higher Education

Rishab Manocha

School of Fashion & Textiles, Pearl Academy, Jaipur, Rajasthan, India

.

Abstract— **Educational Institutions, and classrooms in particular, are emotional settings. Emotional experiences of both the educators and the learners, in higher education, can have a profound effect on their cognitive capacity to teach and learn. However, past studies have indicated to the fact that research in educational practices has often overlooked or neutralized the power of emotions. Owing to advancements in neuroscience, it has been scientifically proved that almost 90 percent of our judgements and decisions are motivated by emotion and not based on rational thinking or methodical considerations but relatively how we feel. This paper on the one hand, aims at analyzing how some emotions act as an impediment to tutor's and learner's classroom practices. On the other hand, this study also looks at the positive impact of emotions in education, and how they can contribute to self-regulation. Positive emotions such as delight, optimism and self-importance are believed to amplify both inner and outer motivation and encourage the usage of adaptive teaching and learning methodologies.**

I. INTRODUCTION

After successfully completing my industry internship program in Hyderabad, back in 1997, I was much enthusiastic about taking up teaching on a full-time permanent basis. It was soon after my first couple of years as an educator, that I comprehended the fact that educating learners requires a considerable amount of bodily, cerebral, and emotional energy to withstand continuous perseverance and unfaltering determination. I perceived a remarkable amount of changeability in my emotional capabilities at work; exhilaration, delight, egotism, anxiety, susceptibility, compassion, and hope on the one hand, whereas infuriation, apprehension, anger, frustration, pain, helplessness, and disillusionment on the other. As an example, family accountability, financial status, and cultural backgrounds were significant contextual factors that molded the emotions of delight, pride, and optimism in the studies by Imai (2010) and López and Cárdenas (2014). Consequently, both Kyriacou (2001) and Lewandowski (2003) have pointed out in their research that frustration happens to be predominantly prominent from the outlook of well- being since it upsurges tutor stress and burnout. An imperative structure for managing frustration is Emotion Regulation (ER), which also happens to be a collection of cognitive and behavioral approaches with the help of which, people may impact the power of their emotions, duration, and their symptoms (Gross, 2014). It wasn't until I began working as an Art Therapist[1] supporting adults with learning disabilities, that I realized there existed a whole world of research and literature on emotions in educational practices.

Being emotional and sensitive also forms the basis for compassion and empathy. While working at the Hammersmith and Fulham Council2 in London, being a key worker for 3 young teenagers with ADHD3, I was responsible to work in partnership with their families, to create a trusting relationship with them and to ascertain their strengths and enabling them to be in control, as much as possible, of their choices. My duties here allowed me to attain an amplified and deeper response to other's physical, emotional, and social stimuli. However, sometimes, I feel, that my overly emotional nature and being deeply caring about others, has been taken advantage of, which has eventually resulted in somewhat unpleasant experiences for me.

Emotions are instinctively categorized by individuals using 'feeling words' such as "frustration," "anger" or "happiness," which aid them to make meaning from their experiences (Scherer, 2005, 2009). An educator involves sensitive work that can revolve around deeply emotional familiarities ranging from delight to anger. As a result of this, educators may feel emotionally drained occasionally. While at work in London, I often witnessed my associates struggling to deal with their sentiments at work. I repeatedly observed educators' expressions of powerful reactions stimulated by teacher-learner interactions. Regardless of whether they were teacher assistants or expert practitioners, they had to deal with fluctuating emotions towards learners in their class. I still remember an instance wherein a colleague became very unsatisfied with her learners' lackadaisical attitude towards her subject. The effect of this ongoing concern took over her completely and one day she stormed into the staff room crying aloud, complaining about the disrespect she was subject to, by her learners. In another instance, an expert tutor seemed infuriated at her student's violation of the code of conduct in the classroom. I have observed similar instances that have instigated educators to hold on to deep rooted, unnecessary emotional afflictions that have resulted in them either discontinuing employment or being asked to resign. It seems evident, that in many institutions, teacher emotions are much ignored, and educators are expected to deal with them personally and alone. Without proper management and coping, however, educators may experience disillusionment about the profession quite early in their careers.

[1] Art therapy is a distinct discipline that incorporates creative methods of expression through visual art media. Art therapy, as a creative arts therapy profession, originated in the fields of art and psychotherapy and may vary in definition.

[2] Hammersmith, Fulham, Ealing and Hounslow Mind is an independent charity which has been delivering mental health services and support to London residents for over 30 years. Local community services include Advice and Information, Advocacy, Community Support, Psychoeducation, Services for Children and Young People and more. https://www.hfehmind.org.uk/

Peterson (2006, p. 20), has very clearly pointed in his research that "positive institutions can encourage the expansion and display of positive characteristics, which in turn enable positive subjective experiences." Previous studies in this area have suggested that emotional exhaustion is a major component of cynicism about careers in education. For this reason, I am interested in studying the most salient emotions that educators experience in the classroom and how these might lead to a better understanding of how they feel and can be supported. Another aspect of interest is the internal and external process of emotional regulation of educators. Externally, how do educators regulate their emotions in the classroom? Do they choose to publicly express their emotions to learners, or do they choose to suppress their emotions?

It is perhaps this need that requires to be answered by ways of examining teacher performance through the medium of emotions. The implications of emotions in Educational Practices cannot be marginalized. Feelings and emotional reactions in diverse situations can be defined as an amalgamation of emotions provoked by altered physical and cognitive fluctuations.

I have always considered myself to being a very emotional and sensitive person which has allowed me to being able to pick up on the sentiments and feeling of people around me, and be cognizant of their needs, and as a result, behaving in such a way so as to help them feel good. Perhaps therefore I was disposed to being part of a profession that requires heaps of patience and perseverance completely and one day she stormed into the staff room crying aloud, complaining about the disrespect she was subject to, by her learners. In another instance, an expert tutor seemed infuriated at her student's violation of the code of conduct in the classroom. I have observed similar instances that have instigated educators to hold on to deep rooted, unnecessary emotional afflictions that have resulted in them either discontinuing employment or being asked to resign. It seems evident, that in many institutions, teacher emotions are much ignored, and educators are expected to deal with them personally and alone. Without proper management and coping, however, educators may experience disillusionment about the profession quite early in their careers.

Peterson (2006, p. 20), has very clearly pointed in his research that "positive institutions can encourage the expansion and display of positive characteristics, which in turn enable positive subjective experiences." Previous studies in this area have suggested that emotional exhaustion is a major component of cynicism about careers in education. For this reason, I am interested in studying the most salient emotions that educators experience in the classroom and how these might lead to a better understanding of how they feel and can be supported. Another aspect of interest is the internal and external process of emotional regulation of educators. Externally, how do educators regulate their emotions in the classroom? Do they choose to publicly express their emotions to learners, or do they choose to suppress their emotions?

It is perhaps this need that requires to be answered by ways of examining teacher performance through the medium of emotions. The implications of emotions in the area of Educational Practices cannot be marginalized. Feelings and emotional reactions in diverse situations can be defined as an amalgamation of emotions provoked by altered physical and cognitive fluctuations.

I have always considered myself to being a very emotional and sensitive person which has allowed me to being able to pick up on the sentiments and feeling of people around me, and be cognizant of their needs, and as a result, behaving in such a way so as to help them feel good. Perhaps this is why I was disposed to being part of a profession that requires heaps of patience and perseverance.

1.1   Educator Emotions: The prominence of emotions in education encompasses educators just as much as it impacts learners. Educators are accountable not only for imparting knowledge to their learners, but also to be able to motivate them to express and learn. On the one hand, if educators are successful in generating enthusiasm about the course syllabus, the motivational benefits should ideally reach far beyond the course itself. However, on the other hand, if a tutor fails, the subsequent adverse emotions, such as apprehension or resentment, can rapidly destabilize motivation and the willingness to continue the course or perhaps even stay in school. Educators need to draw on their scholarly and emotional capabilities to effectively connect with learners and help them connect with the subject matter (Woolfolk Hoy & Davis, 2005).

It is widely known that emotions are a multi- dimensional occurrence that encompass numerous interconnected psychosomatic developments. These processes comprise of both cross-cultural and mental feelings and processes.
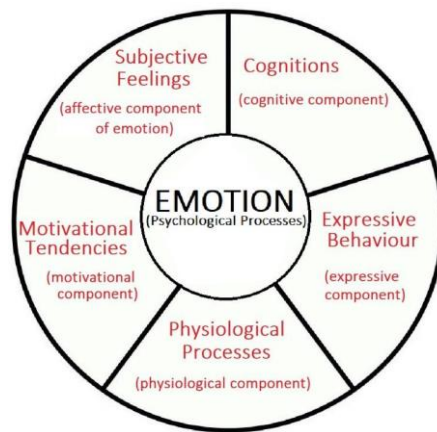
³ ADHD is one of the most common neurodevelopmental disorders of childhood. It is usually first diagnosed in childhood and often lasts into adulthood. Children with ADHD may have trouble paying attention, controlling impulsive behaviors (may act without thinking about what the result will be), or be overly active.

Past research in the area of Cross-cultural associations on Human Emotions research is not new and indicates to the fact that emotions are somewhat culturally located and are simply a singular occurrence as most human emotions are conjured in societal circumstances during human collaboration and interaction. In furtherance to accepting the cultural insinuations of educating learners in higher education, added emotional and psychological anxiety transpires when educators transition into a foreign country or to an unacquainted cultural setting, in a occurrence often known as "culture shock" (Pederson, 1995; Ward et al., 2001; Xia, 2009).

However, educators in Higher Education work in a professional environment that comes with a distinct set of display rules. While it is apparent, that their display of emotions need to be restricted in professional work settings as opposed to private and domestic environments, nevertheless, there is yet another aspect of cross-cultural emotional display, which requires much attention, and better known as 'context'. The way a person behaves in different relationships, depends on their role in a particular context or situation. A tutor will differ in his/her reactions which may be dependent on their role as a tutor, mentor, manager, counsellor etc. and will have a major impact depending on his relationship with his learners, boss, colleagues etc. Thus, it is evident that the mode of display of emotions is typically dependent on the interactive or collaborative partner, and this interdependency would the nature of the emotional display, as being either negative or positive based primarily on the relationship-quality. Research proposes that educators feel a better sense of personal achievement when they account having close connections with their learners. Subsequently, when their relationships include less conflict, teachers experience less emotional fatigue (Corbin et al 2019). The teaching quality within the generic dimensions framework, identifies three elementary proportions of the quality of imparting education: cognitive stimulation, classroom organization, and a supportive climate.
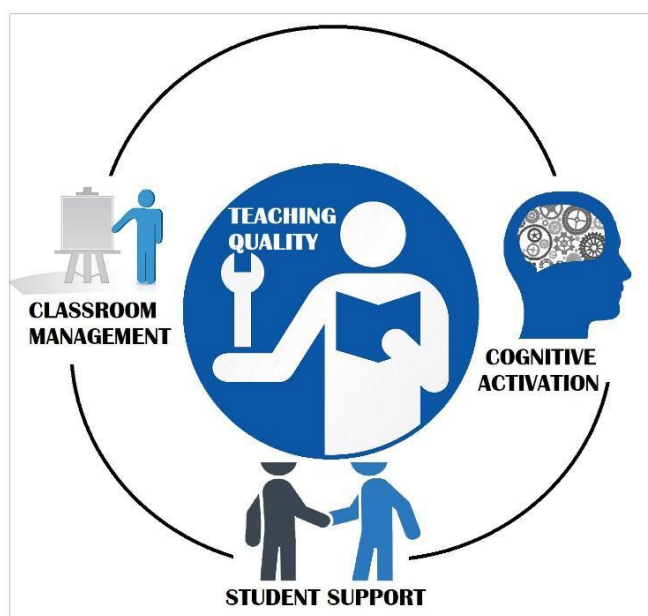
Emotions in education have garnered considerable attention especially in instructional environments. The experience of diverse emotions and their display and communication have a substantial influence on the quality of teaching practices and the overall socio-emotional climate of the classroom. As is apparent from past studies, literature on the emotional impact of teaching behavior in Higher Education remains somewhat limited and affective dynamics in teaching- learning procedures still remain fundamentally overlooked. Nevertheless, latest experiential data indicates that imparting education is something experienced emotionally and has a direct relationship with decreasing and increasing standards and parameters of teaching approaches both teacher centered and student centered. Recent research in this area has also revealed that emotions and relationships are intensely connected to one another: a study to understand teacher's reactions towards learners, would also encompass, the value of his/her relationship with learners as it impacts the quality of the emotion aroused. Subsequently, it can be said that the nature of emotions, have a direct link to the nature of relationships and that both have a relative effect on each other.

1.2 Learner Emotions: As discussed above, emotions have a big impact in teaching and affect the quality of classroom management, student-tutor interaction and overall cognitive stimulation. Likewise, emotional elements, both negative and positive, act as fundamental origins to the active learning process and are an integral part of student learning. Research in the past has specifically highlighted upon the impact of emotions on adult learning and many scholars have recommended for further study into this aspect of education. Research in this area, by Pekrun et al. (2010), draws our attention to a theoretical approach to teaching and learning, called the 'Control Value Theory of Emotions', Insight provided through their empirical analysis of the role of emotions in learning, has ben of much help to educators and learners.
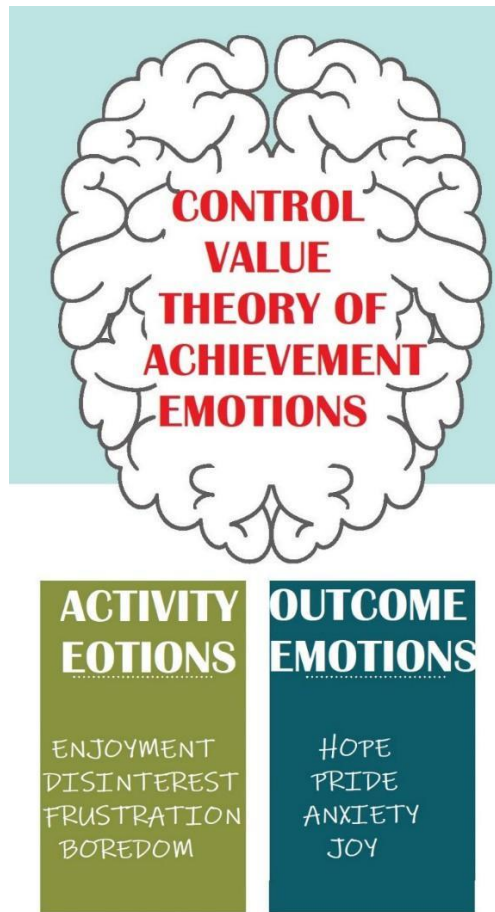
As in the case of educators, learners' accomplishment emotions are significant precursors of positive learning practices, as they are found to be closely linked to learners' progression, self-governance, and diverse learning approaches.

II. OBJECTIVES OF THE RESEARCH

This research paper aims at analyzing and studying the following:

1. Implications on the 'Learner' and the 'Learning Context' specificity of Teacher Emotions
2. Suitability of Higher-Education Institutions to align their Teaching Practices to Intercultural competency.(talk abt support)
3. Central role of Emotion Regulation in Higher Education Learning and Teaching Practices.

III. LITERATURE REVIEW

This Chapter consists of a Review of Literature, pertinent to the theoretical framework of this study. The Literature Review is presented under two separate headings.

Basic Assumptions:
- Learners undergoing emotional problems have difficulty in learning.
- Learners going through emotional complications subtract from the quality of life in the learning space; subsequently, other learners are effected in many ways.
- The tutor is accountable for assisting the emotionally disturbed learners to learn.
- There are multiple ways in which educators can support learners with emotional problems to attain learning.
- In the process of aiding learners with emotional difficulties to learn, the tutor, as a result, also experiences behavioral changes in him/her self.

1.	Control Value Theory and Emotions(Within Learners)
2.	Emotion Regulation Theory(Within Educators)

IV. CONTROL VALUE THEORY AND EMOTIONS

The limited amount of research conducted on the role of human emotions in the teaching and learning processes in learning environments, especially on account of the recent Pandemic, is now on the rise and consequently garnering much interest within scholars. Online learning for learners, is a multifarious concept, entailing three fundamental components i.e. cognitive, behavioural and emotional. An in-depth study on the interactive nature of all three components would enable educators and curriculum designers to offer engaging educational practices for learners. This section of the Literature Review reflects on Pekrun's (2006; Pekrun & Perry, 2014) control-value theory of achievement emotions to develop assumptions based on the mutual interconnection between emotion and achievement.

Two most widely acknowledged and researched educational and occupational pathways experienced within student's emotions are enjoyment and anxiety. Learners who enjoy learning a specific subject and enjoy doing tasks in that particular domain, are more likely to pursue professional careers in the same areas of expertise. In their research, Frenzel et al. (2018) studied the association between educator and learner enjoyment in technical classes. Results indicated that learner and educator enjoyment were positively associated even when controlling for students' previous technical studies enjoyment, and that the consequences of tutor enjoyment on learner enjoyment was facilitated by teacher enthusiasm. On the other hand, those learners, who experience anxiety and emotional stress in certain domains of study, are less likely to pursue careers in such domains. From a purely theoretical perspective, the control-value theory. On a theoretical level, control- value theory (Pekrun, 2006) identifies the fact that learner's outlook on their accomplishment or disinterest in a domain is directly related to and governed by, to quite an extent, on the characteristics of instruction and the tutor's instructional design. Previous research has proved how instructional design and tutor capabilities might augment or diminish the effects of learners' academic performance and achievement emotions. The analysis below extends a closer understanding of relationship between academic self-concept and achievement emotions, and by further examining whether emotional constituents of teaching quality influence these relations.

As an exemplar, learners will most probably appreciate learning if they find themselves competent enough and excited to be actively part of the learning activities, as a result of which they would have a high perception for both the activity and the learning material. On the other hand, if the learning activity is too challenging for the individual's competencies, the learner will have a low perception of the task at hand and will likely withdraw from the situation and become bored.

Cultural contexts pay an important role in shaping Emotion regulation. Learners coming to Pearl Academy bring with themselves a plethora of cultural backgrounds and diverse views about their self and environments. Learners coming from rural

backgrounds, hold a symbiotic approach to a reciprocal, interdependence. On the other hand, learners hailing from cosmopolitan urban backgrounds, consider their entity as a self- regulating personality where appreciation of self is valued over the consideration of the needs of others. These dissimilar outlooks of self and others impacts how each learner inevitably construes and regulates a variety of emotional experiences within learning practices. Research by (Matsumoto, 1990) shows that learners from the West are more probable to express negative emotions such as anxiety, anger, and revulsion both alone and in the company of others, while on the other hand, learners from the East are more inclined to do so only while they are alone.

I have many a times observed, that learners from cosmopolitan cities like Mumbai, Delhi, Bangalore and Kolkata, to name a few, find it easier to express emotions and demonstrate their distinctive inner attributes. Such learners grow up believing, for example, that positive emotions like happiness and self-contentment are remarkably valued as a symbol of mental well-being. In contrast, learners from more humble backgrounds and smaller towns may struggle to communicate and express their inner emotions initially, and take longer to *'fit in'*. This could perhaps mirror their simpler approach to a reliant approach to life, or even something as simple as finding it difficult to converse in a certain language that may act as an impediment to learning.

V. EMOTION REGULATION

Teaching is generally categorized as a highly demanding and much often considered as an extremely challenging profession in the Twenty First Century. I sometimes feel, in today's day and age, educators find themselves having a somewhat restricted control over the content of what they teach in a classroom, whereas, in contrast, the stress and anxiety placed on them, to deal with somewhat demanding learners coming from diverse backgrounds, can be quite unnerving. This pressure may lead to a surge of extreme emotional displays that need to be firstly monitored and secondly be controlled in order for positive learning to take place in the classroom.

Studies in the past, and learning from my own experience, both indicate to the fact that educators need to control their emotions to ensure that leaners have a positive experience of learning, and that, being overly emotional may hamper the ability of educators to teach. In instances were an educator feels their emotions could result in behavioral patterns that are not attuned with the perception of how an ideal teacher should perform, or they may interfere with their performance, the teacher may exhibit a somewhat untrue or manipulated emotion than is actually felt. It is needless to say, that educators, especially in the 21st Century are expected to regulate their emotions, and especially ones pertaining to a heated nature (e.g. anger) since learners who are repeatedly exposed to such emotions in class may as a result begin to feel disinclined towards the subject.

An increased number of educators are particularly aware of modulating their own emotions so as to keep them focused on academics alone.

I have, many a times, come across educators, who very strongly believe that exhibiting impulsive, irritated and angry behavior can be looked at as being utterly "disconcerting and appalling". Academic Institutions today must take measures to support educators regulate their emotions, not only to benefit learners, but to also assist educators to employ their emotions in creating a positive and inclusive learning environment. Universities, higher-education colleges and institutions need to use both preventive and responsive Emotion Regulation Strategies (ERS) in order to provide support to overly stressful educators who are unable to cope with their emotions and anxieties. Gross(2014,2015) clearly defines strategies as being referred to the cognitive and behavioral sequences that educators apply to accomplish their higher order goals. Such policies have been characterized in numerous experiential frameworks.

Whereas on the one hand, while Preventive strategies aim towards modifying situations so as to prevent a specific emotion to be triggered, on the other hand, responsive strategies are intended to modify emotional experiences as they occur. However, both strategies support educators to adaptively cope with difficult emotions.

While, Preventive Strategies involve modification of circumstances by employing particular classroom management approaches, Responsive Strategies include cognitive strategies that involve behavioral strategies and practices of positive thinking, as shown in Figure 4.
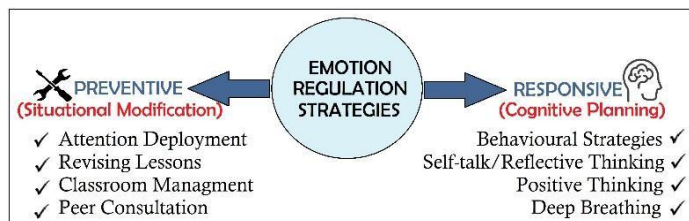
Many scholars have written about the fact that the employment of ERS can be largely impacted by Institutions and their 'Employee Support' or 'Human Resources Department', which can either bring educators and learners closer or push them apart.

In Elementary Institutions, it has been observed that educators established an advanced level of emotional understanding due to the fact that they are allowed to work within close proximity of their learners, as a result of which, a closer and much personal relationship can be fostered. In contrast, in Higher Education Institutions, educators are expected to uphold professional standards in their approach in keeping distance with their learners where they approached learners and treat them with professionalism as a result of which time spent together, interacting with the learners remained limited with an inadequate emotional understanding.

Research conducted by Hosotani and Imai- Matsumura (2011) examined the emotive competency of educators in Japan by analyzing firstly their emotional involvements, secondly their ways of emotional expression and lastly their usage of ERS. Educators monitored within the analysis identified emotions such as pleasure, annoyance, disgust, anxiety, and unhappiness. While educators claimed to have suppressed their feelings of anxiety and disgust, they also admitted to regulating their feelings of annoyance and unhappiness to a large extent. The overall findings of the study recommended for veteran educators to understand:

1) The essential requirement for Self-Regulation
2) The impact of ER on learners
3) The importance of ER as a skill that can improve both teaching and learning practices in Higher Education.

Additionally, the study also revealed the fact that there were some educators who claimed to have suppressed their emotional feelings significantly to an extent where they had subjected themselves to emotional burnout and exhaustion. Clearly, such educators were unaware of how self-emotions can be employed to nurture a positive relationship with learners as well as enhancing the teaching and learning understanding. Nevertheless, it is unclear, whether educators are able to comprehend how ERS they prefer influence self and others, and whether they possess the aptitude to respond sensitively in a way that aid emotional interactions or demonstrate emotional harmony.

A. ***Preparing Educators to Regulate Emotions*** *Past research in the area of ER within Teaching and Learning has laid much on its importance and its relationship to socio-emotional functioning. Undoubtedly, while Institutions train their employees to better deal with their emotional side, it is needless to say that theory of ER has to be put into practice especially for those on the forefront of education who need to be fortified with necessary tools deal with emotional interactions with their learners. Educators in Higher education must be given adequate training and exposed to 'Good Practices' to be able to better manage and cope with their own emotional experiences.*

Boyer's (2009) qualitative research examined how educators in pre-school, impacted the development of self-regulation in learners. Within the study, three focus groups were formed to understand their point of view on Emotion Regulation, comprising of pre-school educators. The study involved interviews and self- journaling by educators to enable reflection on emotional experiences in class. The findings from the examination indicated that educators were sensitive towards issues related to promotion of emotion- regulation and feel responsible for inculcating the same in learners at a young age.

Research conducted by Linnenbrink and Pintrich (2000) has proposed the idea that teacher emotions are not simply related to cognitive processes but may also impact on motivational processes, i.e. adverse emotions can diminish retention memory which utilizes holding and controlling data while several cognitive exercises carry out simultaneously.

Subsequently, optimistic emotions can widen thought processes and that those educators who experience positive emotions are in the position of producing better more concepts and strategies.

In contrast, adverse emotions diminish the likelihood of educators employing intellectual approaches to dealing with emotions in the classroom. Research by Sutton & Wheatley (2003), has also pointed out that emotions also influence segmentation, imagination and classroom management.

Educators recognize the importance of regulating their emotions but often think this means keeping their feelings hidden from learners (Carson & Templin, 2007). Research by Sutton (2004) emphasized the fact that educators assumed that their capacity to modulate their emotions was associated to their efficiency at work. Suppressing undesirable emotions have a tendency to be the most communal objective of ER strategies even though regulating optimistic emotion was also perceived as significant. Communicative surroundings have been perceived to have had a positive effect on the improvement emotional regulation ability of the individual. Educators who are found to be better accomplished at employing emotionally charged language and who take into consideration their emotional experiences as exemplars in their teaching practices, may be better equipped to deal with at regulating their own emotions during distressing situation. Reinforced by adequate research in the past, the debate on emotional experiences used as exemplars, by the teacher, in the classroom, could aid in shaping the improvement of both teacher and student emotion regulation strategies, and in fact even act as one. Denham & Kochanoff (2002), in their research have shed light on discussing emotional experiences with learners, and that it may help educators to shape a comprehensible body of understanding about emotional expressions, circumstances, and sources. Conversations on emotion-based learning can offer learners a tool to use in regulating their emotions, allowing them to distinguish between fluctuating instincts from decisive performance (Thompson, 1991).

Subsequently, educators in higher education can vastly benefit by talking to learners on a one-to-one basis about their feelings and sentiments to understand what the learner's value, and thus offering both educators and learners the opportunity to cultivate emotional knowledge by means of such supportive mediums. This way not only will educators be able to better understand themselves, but in fact also maintain emotional balance at work.

B. *Hypothesis Development*

The Hypothesis aims to find out the tentative answers to the research questions as given below:

(1) What experiences of 'Tutor Emotions' in class do learners report and how strongly do these emotions reflect, in their Learning Activities and Learning Outcomes?

(2) To what degree are Learners' emotions impacting their Learning process?

VI. RESEARCH METHODOLOGY

The emotions of educators and learners are considered pertinent not only for their own professional development but also for the effective operations of teaching and learning activities.

Nonetheless, exploration on emotions and their impact on teaching and learning practices has been slow to develop, and measures for their evaluation through surveys, questionnaires and self- assessment reports are commonly deficient.
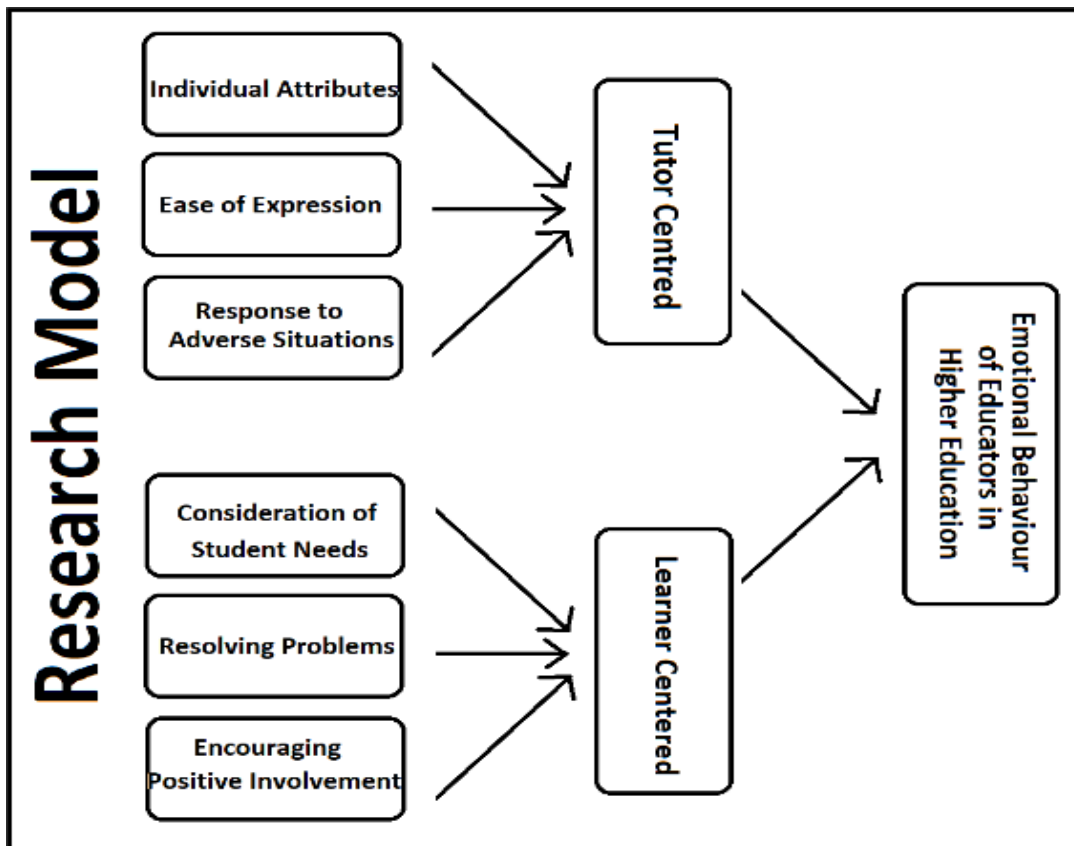
A. Educator Questionnaire

In this paper, data was collected from 100 educators working full time in 4 Design Institutions across the country i.e. Pearl Academy, NIFT, Amity University and Sharda University. I have used a five-level evaluation scale Questionnaire, to assess, to what extent a certain statement applies to educators of both theoretical and practical subjects. Responses from the same have helped me understand levels of emotions within selected educators who I believe, can most unswervingly influence learners' experience by designing learning environments that either encourage or lessen the manifestation of positive and negative emotions.

The quantification of data collection was executed separately for the learners and educators so as to determine the variance between the two perspectives and to gain a discrete set of data from the educators' responses that were not prejudiced by the learners' responses, and vice versa.

In the Tutor's questionnaire, educators were asked how much they agreed with each of the statements which were formulated as objective style items such as "I am good at making people feel better about an adverse situation" (1 = *Never*, 2 = *Very Rare*, 3 = *Sometimes*, 4 = *Often*, 5 = *Always*)

B. Research Model:

The Research Model (below) consists of six independent variables i.e. Individual Attributes, Ease of Expression, Response to Adverse Situations, Consideration of Students Needs, Resolving Problems and Encouraging Positive Involvement and one dependent variable Emotional Behavior of Educators in Higher Education

C. Findings

Table 1. - This questionnaire uses a 5-level Likert scale, to assess, to what extent a certain statement applies to each individual, as an educator.

1-never	2-very rare	3-sometimes	4-often		5-always		

No.	Aspects	1	2	3	4	5
				Rating (%)		

No.	Aspects	1	2	3	4	5
SECTION 1 (TUTOR CENTRED)						
INDIVIDUAL ATTRIBUTES						
1.	I consider myself to have an emotional character.	0	0	28	44	23
2.	When I receive praise, I work with more commitment.	0	3	19	42	34
3.	If I am in a good mood, I am quicker and more likely to solve problems.	0	2	14	46	36
4.	I can judge a person's inner feelings through their body language	0	3	36	43	15
5.	I am a good listener.	0	2	18	52	26
Findings: The section on 'Individual Attributes' clearly shows that almost half (90%) of the 100 educators agree to being good listeners having an emotional character. In contrast, a negligible percentage of educators claim to not having the same.						
EASE OF EXPRESSION						
6.	I find it easy to express my feelings and emotions.	2	5	29	29	31
7.	If I do not like something, I will express it immediately.	1	7	50	21	19
8.	My emotions are clearly visible through my body language	2	3	28	45	19
9.	I can express my feelings well.	2	7	36	30	25
Findings: The section on 'Ease of Expression' shows that nearly 90% of 100 educators are able to deliver their knowledge/experiences through their expressions rightly while others disagree to the same due to their non-expressive attitude in classroom practices.						
RESPONSE TO ADVERSE SITUATIONS						
10.	I can stay calm even in adverse situations.	0	4	52	34	0
11.	Even when people around me are disturbed, I can manage to stay calm.	6	8	31	37	14
12.	I learn from my unpleasant experiences and hence behave differently in the future.	2	5	22	52	19
13.	I am good at making people feel better about an adverse situation.	0	2	36	44	16
Findings: The section on 'The section on 'Individual Attributes' clearly indicates that max proportion, approximately 85% of the 100 educators are able to handle negative situations with an optimistic attitude while only few are not able to control their patience and respond negatively to unpleasant situations and make them more adverse.						
SECTION 2 (LEARNER CENTRED)						
CONSIDERATION OF STUDENTS NEEDS						
14.	I take into account diversity (for example, religious,ethnic diversity) of students in the delivery of my classes.	12	7	15	34	30
15.	I take into account student's special needs when planning and delivering classes.	1		19	44	34
16.	I prefer to resolve conflicts with students individually as opposed to doing so in pairs or in groups.	1	4	29	43	21
Findings: The section on 'Consideration of student needs' further points out that max proportion, approximately 80% of the 100 educators give special importance to student's personal needs while teaching and make it more effective rather than delivering lectures in the classroom as a whole.						
RESOLVING PROBLEMS						
17.	When I notice student(s) being agitated, I counsel them.	0	1	16	50	32
18.	When I notice students being tensed or tired, I try to change the subject or my teaching style.	0	2	14	60	21
19.	I don't mind academic discussions with students even after office hours.	0	2	25	47	24
Findings: The section on 'Resolving Problems' ascertains that more than 95% educators prefer solving student's academic problems on a priority, during or after the classroom sessions. A negligible percentage let these remain unresolved.						
ENCOURAGING POSITIVE INVOLVEMENT						
20.	In a discussion or an activity, I aim at including those who are less communicative.	0	4	18	50	26
21.	I encourage students to learn in pairs or groups.	0	2	27	49	20
22.	I encourage students to be patient with each other.	1	5	17	45	30
23.	In class discussions, when required, I encourage students to express their feelings and emotions about certain topic.	0	0	19	51	29
24.	I encourage students to have a fair and honest relationship.	0	2	11	42	43
25.	I encourage students to mutually help each other in the classroom.	1	0	11	49	39
26.	I praise students on their achievements, so others can feel motivated.	0	2	12	40	45
27.	In class, I encourage an optimistic attitude.	0	3	12	36	48
Findings: Finally, the section on 'Encouraging positive involvement' clearly indicates that approximately 90% educators focus on developing a positive learning atmosphere while only a few claim not to do so.						

D. Learner Panel Discussion:

To address the research questions, a qualitative focused semi-structured online panel discussion with an inductive strategy was conducted with a total of 10 National Institute of Fashion Technology[4] (NIFT) learners in order to study the field of emotional impact in learning that adhered to the theoretical framework of 'Control Value Theory'. Learners, who were chosen randomly and participated voluntarily, enrolled on the final year of the Under-graduate Fashion Design Program at NIFT were interviewed. They were briefed about the objectives of the study and it was pointed out that there were no wrong answers. No compensation was given for participating in this panel discussion which was conducted via zoom over a duration of 2 hours.The Panel discussion was designed in such a way that the questions relevant to the topic were divided into two broad categories:

1) ACTIVITY EMOTIONS - Student Emotions encountered during an Activity

Set up in 1986, NIFT is the pioneering institute of fashion education in India and has been in the vanguard of providing professional human resource to the textile and apparel industry. It was made a statutory institute in 2006 by an Act of the

2) OUTCOME EMOTIONS - Student Emotions encountered on revelation of an Outcome

The discussion commenced with an introduction of the aims and the procedure of the study, as well as their rights as voluntary participants. Next, the participants were asked preliminary questions about their general attitude towards learning at NIFT, to start the conversation.

Learners were firstly put forward questions based on emotions felt during an activity. Subsequently, they were asked questions based on emotions felt when the outcome of the activity was revealed. Learners were free to speak in any order on the question in discussion. Questions for Panel Discussion:

1. What can educators do to instill '*enjoyment*' in classroom activities?
2. Does '*enjoyment*' facilitate positive learning in a class activity?
3. Identifying whether learners are being themselves during an activity and whether they have the freedom to maintain their self-concept.
4. How much control, during an activity, do the learners feel they are being allocated from their educators, or do they had no control at all?
5. Do learners take classroom activities as a chore or as a pleasure?
6. Do they spend most of their time in class involved in the activity or are they busy with random thoughts?
7. Are learners prompted by difficulty from their educators or are they are never challenged in the classroom during an activity?
8. Do educators notice learners being bored or whether their feelings of boredom go unnoticed during an activity?
9. Are some educators' methods boring or is it their disinterest in a particular activity that makes them bored?

E. Highlights of the Discussion

Opening Statement - 'Educators, being key significant figures, who have both emotional literacy and professional literacy, can create a positive classroom climate, and their emotional support influences the overall impact on Learning.'

Student 1- *"When the teacher provides the learners*

Indian Parliament with the President of India as 'Visitor' and has full-fledged campuses all across the country. Over the years NIFT has also been working as a knowledge service provider to the Union and State governments in the area of design development and positioning of handlooms and handicrafts.

with cognitive feedback, it would help them to progress in their lessons, but when the teacher offers them not only cognitive feedback but also emotional feedback, this would increase our motivation and expectancy of success".

Student 2 – *"When a teacher is in a good frame of mind, which usually happens in the first half of the day, we gain more knowledge and the teacher is more energetic and this energy is also transferred to us."*

Student 3 – *"In our classes, when the tutor treats us with kindness and patience, I have a good sense of participation and this sense makes the class interesting to me to the extent that I see myself listening to the tutor attentively and involving in the activity".*

Observation: The imperative point is that learners are sensitive to their educators' behaviors and those educators who are not behaving in an angry way are much appreciated and respected by the learners.

Observation: Educators who are less anxious about their own lives, could create a better environment for the learners who in turn learn best when they are able to appreciate their educators professional as well as personal achievements.

Student – *"Last year, because of some financial problems, I was unable to complete the task given to me, and it gave me a feeling of shame and a negative feeling about the activity."*

Observation: Learners believed that the educators, who give consideration to the emotional aspects of learning, better understand the learners' social, cultural and financial problems, are those that can provide the best conditions for overall student development. On the contrary, educators who are not flexible to learning methods, display emotions such as annoyance and indifference towards the learners, can result in detrimental outcomes which demotivate the learners and may result in dropout and designation.

Student – *"It definitely makes one realize what we're learning in class is very pertinent to the industry and that it makes a difference to not only the organizations, but the people that these organizations are working with too."*

Observation: Most participants cited emotions of excitement and joy in activities conducted on campus, as opposed to being held online.

Responses reflected Pekrun's (2006) Control-Value Theory of achievement emotions, in which learners' involvement in positively-valued activities, where they feel being in control, leads to activity-based feelings of delight.

As another student reflected one afternoon, during a competitive activity, they were asked to use paper to make Japanese Kimonos[5] that would fit their own hands. When asked about the experience, the student reflected *"It was very exciting. We worked on a smaller scale, and made puppet-sized garments. The tutor was making his own prototype while guiding others simultaneously. So I guess I'd say, I felt very excited and with a sense of achievement and success."*

Observation: In other circumstances, there were learners who reported online activity-based feelings of anger and frustration, which Pekrun's (2006) Control- Value Theory of achievement emotions would ascribe to learners' perceiving that they had little control. The presence of anxiety and frustration in the current study suggests that this emotional category may be unique to *'Outcome Emotions'* felt at the completion of a task or at the time when final outcomes are revealed. Understandably, feelings of being anxious or upset may transpire more often before or after the outcome materializes. One student reflected that she felt particularly anxious during an *'Artificial Intelligence[6] (in Fashion Business)'* class activity given the nature of the content and its application. Such feelings of anxiety and frustration or being upset emerged from an inability or uncertainty about how to handle complex topics. These "negative" emotions were complex in that they did not necessarily pertain to negative outcomes directly related to the student (Pekrun, 2006). Nevertheless, learners with such negative retroactive emotional experiences were eventually able to identify greater meaning from them, rather than permitting them to become impediments that inhibited their progress.

A student had an inspiring experience at her textiles class that demonstrates the benefits of having an effective and passionate tutor. During the textiles activity, the textiles tutor spoke to her class about alternative ways of completing the activity, and alternative ways to recycle and upcycle materials should any student have financial limitations, whereas at the same time reinforcing the learners social responsibilities and strengthening the ideas of sustainable practices.

The student reflected, *"I was totally inspired by the tutor's love for her subject and his passion for what he does, and it inspires me to be that sort of teacher that affects our minds and sensitizes us to contribute in our own small ways."* The student reported feeling inspired by such educators and solutions to overcome difficulties or obstacles and consequently felt motivated to do likewise. This reflects the influence on learners' emotional experiences of indirect feedback from observing the achievement of others (Pekrun, 2006).

F. Findings

The discussion reveals that boredom can be a forerunner for unfavorable mind-sets and goes to prove that it is highly possible to initiate sniggered activities. The observations gathered from the discussions establish that the majority of the learners enjoy their time in class. On the other hand, more than half of the participants also reported that course studies represented a tedious chore for them especially in the final year. The dilemma that we face is that it seems the actual program does not signify the fundamental source for their feelings of enjoyment. Although a minority of the learners do find enjoyment in the activities and instructions presented by the educators, a majority of them find enjoyable times in class, stemming from the feeling of overall social relationships they form during the initial years. The rest, more than a quarter of the students, do not enjoy their time in class at all. Lastly, although educators do recognize, more often than not, when their learners are indifferent to classroom activities, however, the important question is whether they are equipped with the proper tools to deal with such situations?

---

[5] A kimono is a traditional Japanese garment and the national dress of Japan. The kimono is a T-shaped, wrapped-front garment with square sleeves and a rectangular body, and is worn left side wrapped over right.

[6] Artificial intelligence is the simulation of human intelligence processes by machines, especially computer systems. Specific applications of AI include expert systems, natural language processing, speech recognition and machine vision.

VII. CONCLUSION

We cannot overlook the fact that they were, are and will always be educators and learners in every Institution who tend to become disillusioned with their role, and exhibit an unsettling attitude towards their responsibilities, thus impacting on the overall process of teaching and learning in Higher Education. Diverse policies are being employed by Educational Institutions to try and support educators and learners with emotional and behavioral disorders to perform better. However, there is much more than can be done. Strategies need to be implemented to place learners in inclusion classrooms with least restrictive environments, however, there are times when due to the broader needs of the learners institutions need to look at giving extended control to learner, self-paced learning, and psychological guidance. This issue is important to monitor and control the attrition rate of learners and more importantly, to ensure learners can create their own program mapping based on their individual needs and abilities. With the increasing educational expectations of our economy, it is imperative that students complete their program of study with a fulfilling feeling of happiness and contentment and look forward to beginning their role in the industry. In order to ensure that such learners are given the same chance to succeed as other learners, more attention should be given to finding strategies and practices that have a demonstrated record of success. For example, programs that treat learners both in and out of school as well as programs that target academic and mental health issues have been shown to provide the greatest benefit to learners.

As an educator and mentor, it has been my experience that educators in numerous institutions, are often overwhelmed and frightened by learners whose emotional state and behavior is always unpredictable and often out-of-control. Although the sporadic attrition rate in most institutions is of growing concern, and most education providers occasionally feel helpless in extending support to such learners, it nevertheless damages the universities' relationships with these learners and their families, and aggravates the long- term academic and social problems for such drop-outs.

University Management, Human Resources and Student support coordinators need to know precisely how to support behavior changes in educators and learners with emotional issues to keep them in performing at their best abilities and supporting each other too. Apart being very personal to me, the topic of this paper is a lot more important and relevant on a provincial level. Providing successful teaching and learning experiences for people involved in academics will always remain a national social concern.

REFERENCES

Corbin CM, Alamos P, Lowenstein AE, Downer JT, Brown JL. 2019. The role of teacher-student relationships in predicting teachers' personal accomplishment and emotional exhaustion. J Sch Psychol. 77:1-12.

Frenzel, A. C., Becker-Kurz, B., Pekrun, R., Goetz, T., and Lüdtke, O. (2018). Emotion transmission in the classroom revisited: a reciprocal effects model of teacher and student enjoyment. J. Educ. Psychol. 110, 628–639. doi: 10.1037/edu0000228

Gross, J. J. (2014). Emotion regulation: Conceptual and empirical foundations. In J. J. Gross (Ed.), Handbook of emotion regulation (2nd ed., pp. 3-20). New York, NY: The Guilford Press.

Gross, J. J. (2015a). Emotion regulation: Current status and future prospects. Psychological Inquiry, 26(1), 1-26.

Imai, Y. (2010). Emotions in SLA: new insights from collaborative learning for an EFL classroom. Mod. Lang. J. 94, 278–292. doi: 10.1111/j.1540- 4781.2010.01021.

Kyriacou, C. (2001). Teacher stress: Directions for future research. Educational Review, 53(1), 27-35

Lewandowski, C. A. (2003). Organizational factors contributing to worker frustration: The precursor to burnout. Journal of Sociology & Social Welfare, 30, 175-186.

López, M. G. M., and Cárdenas, M. A. F. (2014). Emotions and their effects in a language learning Mexican context. System 42, 298–307. doi: 10.1016/j.system.2013.12.006

Matsumoto, D., & Ekman, P. (1989). American- Japanese cultural differences in intensity ratings of facial expressions of emotion. Motivation and Emotion, 13(2), 143–157. https://doi.org/10.1007/BF00992959

Pekrun, R. (2006). The control-value theory of achievement emotions: assumptions, corollaries, and implications for educational research and practice. Educ. Psychol. Rev. 18, 315–341. doi: 10.1007/s10648-006-9029-9

Pekrun, R., Goetz, T., Frenzel, A. C., Barchfeld, P., and Perry, R. P. (2011). Measuring emotions in students' learning and performance: the achievement emotions questionnaire (AEQ). Contemp. Educ. Psychol. 36, 36–48. doi: 10.1016/j.cedpsych.2010.10.002

Pekrun, R., Goetz, T., Titz, W., and Perry, R. P. (2002). Academic emotions in students' self- regulated learning and achievement: a program of qualitative and quantitative research. Educ. Psychol. 37, 91–105. doi: 10.1207/S15326985EP3702_4

Pekrun, R., Götz, T., and Perry, R. P. (2005). Achievement emotions questionnaire (AEQ). User's manual. Department of Psychology, University of Munich, Munich, Germany.

Pekrun, R., Lichtenfeld, S., Marsh, H. W., Murayama, K., and Goetz, T. (2017). Achievement emotions and academic performance: longitudinal models of reciprocal effects. Child Dev. 88, 1653– 1670. doi: 10.1111/cdev.12704

Pekrun, R., and Perry, R. P. (2014). "Control-value theory of achievement emotions" in International handbook of emotions in education. eds. R. Pekrun and L. Linnenbrink-Garcia (New York: Routledge), 130–151.

Peterson, C. (2006). A primer in positive psychology. New York: Oxford University Press.

Pederson, P (1995) The Five Stages of Culture Shock: Critical Incidents from around the World. London: Greenwood Press.

Scherer, K. R. (2005). What are emotions? And how can they be measured? Social Science Information,44(4), 695-729.

Scherer, K. R. (2009). The dynamic architecture of emotion: Evidence for the component process model. Cognition & Emotion, 23(7), 1307-1351.