Micro-project: A Curricular Reform in Maharashtra State, India

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Abstract

This 'evidence-based practice' paper relates to an innovation in engineering education programs in the Western region of India. It endeavors to discuss the concept, design, implementation and evaluation of the *micro–project*, the one of its kind innovation introduced for the first time in the Indian engineering education system. The curricula of Indian education systems in general, and Indian engineering education system in particular, have often been criticized for the lack of provision of sufficient practical work and experiential learning which is much required to prepare the students for the world-of-work. They often do not get opportunities to work in real life or near-to-real life situations, apart from their final year major projects. To minimize this deficiency, the authors evolved a 'Competency–Focused Outcome–Based Curriculum' model for engineering education programs. This new curriculum model is implemented for the first time in 17 different engineering diploma programs, which is being offered simultaneously in over 452 polytechnic colleges geographically spread out across the whole state of Maharashtra in the Western part of India, where more than 75,000 students are assessed every semester. Apart from other innovations introduced in this curriculum model, the most significant one i.e. *'micro–project'*, is being discussed in this paper. This *micro–project* is embedded in each course of all the 17 engineering diploma programs. As there are about 30 courses in a normal three-year program, every student gets opportunities to work in about 30 different groups for undertaking 30 different micro–projects depending upon the elective courses being chosen by him or her. With continuous feedback from the teachers, every student has to generate a micro–project report (apart from the model/product) at end of each course which serves as an indirect tool to assess the attainment of the course outcomes and competency of the respective course. As the students progress through the different courses of the respective engineering programs, they get ample opportunities to integrate different types of skills-sets very much required by the industry, thereby enhancing their employability levels.

Keywords

Micro–project, Competency–Focused Outcome-Based Curriculum (OBC), course outcomes (COs), skill-sets, assessment, portfolio.

1. INTRODUCTION

This 'Evidence-based Practice' paper is about an innovation related to outcome-based engineering/technology education which the authors experimented in the state of Maharashtra in the Western region of India and also pilot tested in a UG engineering program. In India, the 4-year UG engineering programs are of 8 semesters involving about 40 different types of courses. Whereas, the 3-year engineering diploma programs (typical to India) are of six semesters [6] with about 30 courses that are being offered in most of the conventional branches such as Civil, Electrical and Mechanical and other branches of engineering in the 2128 polytechnic colleges spread across India to produce technologists for the wage employed and self-employed types of industries.

During the past two decades in India there has been a massive upsurge of students seeking admission in higher engineering education programs in India. This resulted in the sudden unplanned mushrooming of large number of engineering and technology institutions all over the country leading to the deterioration of the quality of education. In an attempt to address this quality issue, the authors evolved the innovative *'Competency–Focused Outcome-based Curriculum (OBC)'* model (see Appendix 5). This model is presently implemented in the 17 engineering diploma programs since July 2017 [1] by the Maharashtra State Board of Technical Education (MSBTE), Mumbai and being offered in the 452 technical institutions geographically spread miles apart across the whole state of Maharashtra (see figure 1).

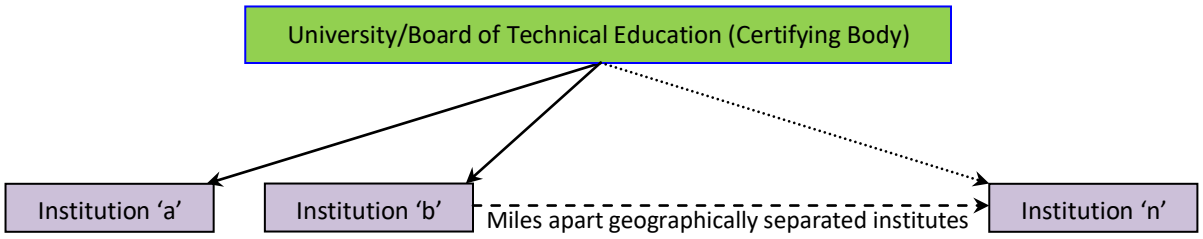


Figure 1. Centrally Controlled University Affiliated College System of India

Of the several innovations, a major one that was incorporated in this new curriculum model was the seamless integration of the separately offered 'laboratory course' (seen in the curricula of some universities), as part of the whole course [Earnest & Gupta 2016]. By this strategy, the related underpinning theory required for each practical activity of the 'laboratory course' gets connected with the identified *'Practical Outcomes'* within the curriculum of the same course [1]. This leads to a better understanding of the curriculum, much required for the development of the technology related skills as well as the related soft skills. Moreover, this strategy also accelerates the development the pre-determined industry identified *'competency'* of the respective course.

The *micro–project* innovation, is another major innovation introduced in this same '*Competency–Focused OBC'* model. "Experiential learning in education is for sustainable futures", reports UNESCO [4]. "The first and foremost beneficiary of experiential learning is the student"[5]. Although experiential learning is common in several countries, the design and implementation of the concept of *micro–project* is the least exploited strategy in engineering education system of India. Therefore, the authors weaved in the *micro–project* into the '*Competency–Focused OBC'* model. It is in this context, that the *micro–project* innovation becomes significant, which may look similar to'experiential learning'. However, it is different in many ways and has its unique characteristics in the context of engineering education systems in India, as discussed in this paper.

2. NEED OF THE MICRO–PROJECT

Often, the curricula of engineering programs in the Indian engineering education system, is criticized by the industry for lack of provision of practical work to address the real life or near-

to-real life experiences in order to prepare the graduates for the world-of-work. Much literature reports of this scenario. Brahadeeswaran [2012] states that "for defining the Program Objectives, the faculty members of the program must continuously work with local employers, industry, Research and Development advisors, and the alumni". It is in this context, that the *micro–project* has been so designed, that it provides a platform to the student to develop the ability to work in real life or near-to-real life settings, collectively or individually.

It is often a common practice in the Indian engineering education system – both in UG and engineering diploma programs to offer a course as a 'major project' only in the last semester of the program. The following weaknesses of the 'major project' are often voiced by the Indian industry at various fora:

a) The sudden offering of a 'major project' in the last semester often becomes an overwhelming and bewildering experience for the weak and average students as, till that time they are rather 'spoon fed' in the classroom and laboratory. Although it is a group work, many students are not able to take up the challenge of the major project, and they avoid the 'major project' allotted to them. Instead, they often resort to unethical practices of getting the project work done by some external agencies (peculiar to the Indian scenario) by paying for their services. Therefore, by doing just one 'major project' work, the students do not get enough experience in the institute to handle the real projects when they reach the industry.
b) In such a scenario, often the main objectives of the project work of developing skills such as, planning, leading teams, communication, working in teams, decision making, and such others do not get developed by just one 'major project' offering in the last program. This is much to the disadvantage of the student, as most of the times the 'major project' is a group activity. Therefore, the requisite project handling *skill-sets* hardly gets developed as it is offered only once in the last semester.

However, a few universities may have an additional course as a 'minor project' in the last but one semester, which is rare. Due to above reasons, the employability levels of the engineering graduates drastically deteriorated over the past years. To address this problem, the *micro–project* was introduced in every course, from the first to the last semester in this '*Competency–Focused OBC'*. As the students move to higher semesters undertaking the different types of *micro–projects,* some of the social skills and attitudes (see section 3.1) which are 'embedded' in the *micro–projects* also get developed. This is due to the 'repeatability' factor which is the key to any skill development. The 'soft skills' are also acutely required by the industry in the graduating students, along with the technology related skills. As the students climb up the semester of the concerned program, the students gain ample confidence to undertake the more complex *capstone project* [1] of the last two semesters intended to integrate several of the competencies related to the different courses.

3. MICRO–PROJECT IN 'COMPETENCY–FOCUSED OBC'

"Students showed a higher level of satisfaction with this educational method *(micro–project)* in comparison to the traditional one" [Ceniceros, 2015]. The Association of American Colleges and Universities (AAC&U) and others are tuning the outcome attainment in a

competency model as part of the national focus' [Carriveau, 2016]. World over, the call for competency measures and individualized instruction is on the rise. It is also in this context the innovative *'Competency–Focused OBC'* model (see figure 2) was evolved by the authors. The *micro–project* embedded in this model functions as a 'vehicle' to buildup the various skill-sets to develop the industry-identified and industry-focused 'competencies' of the respective courses.

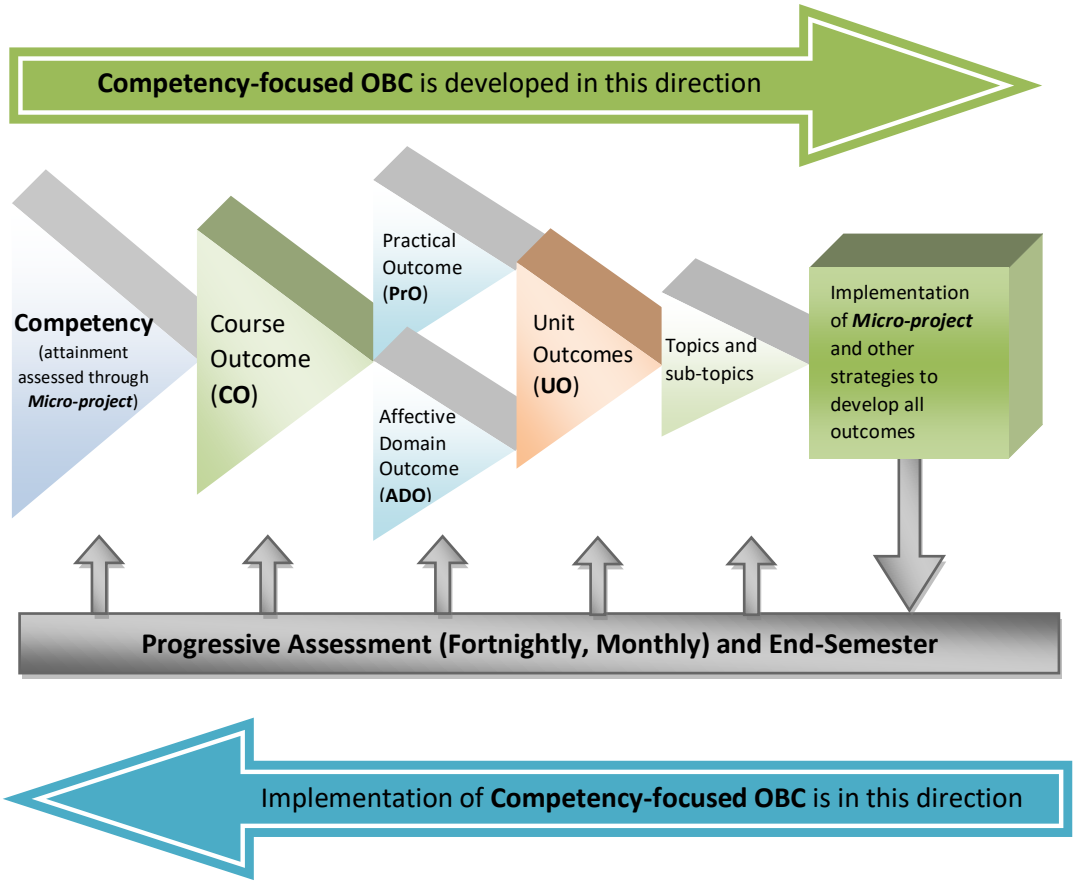


Figure 2. Micro-Project in 'Competency-focused OBC'

When implementing the *'Competency–Focused OBC'*, the major emphasis of all activities i.e. classroom-based teaching-learning activities, laboratory/workshop/field-based activities and others, are all focused to facilitate the development of the competency in the student of each respective course. By definition [Earnest & Gupta 2016], "*the competency is a macro-level statement, which indicates the integration of various skill-sets related to the three domains of learning i.e. Cognitive, Psychomotor and Affective, in order to successfully perform a specific industry job"*. Since the course outcomes (COs) are sub-sets of the competency, they are also industry-focused and are defined as *"statements which integrate skill-sets related to the three domains of learning required for performing the relatively smaller tasks of the respective competency"*. It is in this backdrop, that the *micro–project* was evolved which is intended to integrate two or more COs in order to attain the pre-determined industry-identified competency [1] of the respective course.

Basically, the *micro–project* is intended to mainly help the students in order to continuously integrate the different skills related to the three domains of learning that they acquire part-by-part, as they progress through the courses and the various teaching learning (T-L) activities during the semesters. As the students' continuously undertake the *micro–projects*, they repetitively get ample opportunities to actively and fully get involved in the T-L processes to acquire the various skills. Following are some of its salient features:

a) The *micro–project* in each course takes advantage of the 'project method' of learning.
b) Every *micro–project* is to be chosen related to the competency of the respective course.
c) The *micro–project* should address two or more of the COs.
d) The development of the *'soft skills'* is also one of the objectives of the *micro–project*.
e) The *micro–project* is undertaken by a group of not more than 6 students. Hence, the weaker students are benefitted, as they tend to get 'educationally pulled up' due to the presence of brighter students in the group.
f) In the later semesters, *micro–projects* may be given to individual brighter students.
g) It requires about 16 hours of work by the student during the semester (i.e. one hour each week).
h) It is intended to be undertaken other than the classroom hours such as, recess time, in the workshop, laboratory, garden, in the playground, at home and other places.
i) The resources are to be provided by the respective institutions, barring minor expenses.

By the end of each semester, the *micro–project* serves as a tool to assess the attainment of the competency of the respective course.

3.1 Design Characteristics of the Micro–Project

The *micro–project* in each course could be of different types, such as, industry application oriented type, internet-based, workshop-based, laboratory-based, library-based, field-based, or it could be a combination of any of these types. In fact, the *micro–project* in each course is intended to serve as a 'vehicle' to develop in the students, not only the technology-related skills but also the related 'soft skills' related to the engineering program as they progress through the semesters. Some of them are given here:

a) Identify problems which need solutions in the area related to their branch of engineering.
b) Show the attitude of enquiry.
c) Derive different possible solutions creatively.
d) Prepare project proposals.
e) Prepare project reports.
f) Identify the information suggesting the cause of the problem and possible solutions.
g) Assess financial implications and feasibility, based on preliminary studies.
h) Collect relevant data from different sources (books/internet/market/suppliers/experts and others) through surveys/interviews.
i) Prepare the technical proposals and reports.
j) Interpret the collected data and to generate useful information from them.
k) Show concern for use of environment friendly material and cost reduction.
l) Prepare required drawings and detailed plan for execution of the work.
m) Achieve the targets through persistent work.

n) Attempt alternative solutions/execute alternative plans, in case of failures.
o) Use relevant machines and equipment/instruments safely.
p) Develop the prototype/model of the desired equipment/instrument and such others.
q) Incorporate safety features in products.
r) Work independently for the responsibility undertaken.
s) Participate effectively in group work.
t) Ask for help from others, when required.
u) Present generated information in the form of relevant charts/graphs in seminars and panel discussions and acknowledge the help rendered by others in success of the *micro–project*
v) Confidently answer the questions asked about the *micro–project*.

Although, all the above cannot be developed through a single *micro–project*, but a few of them do get developed through each *micro–project*. Some of the skills may be repeated several times in many of the *micro–projects* in the different courses as the students advance through the concerned engineering program, increasing the chances of repeatability of the skills and thereby ensuring their attainment.

Another characteristic of this *micro–project* is the write-ups, other than the model/product (if any) – *'Micro–project Proposal'* (see Appendix 1) *and* '*Micro–project Report'* (see Appendix 2). A *'Micro–project Proposal'* of about two pages related to the planning has to be submitted by the students by the end of 4th week of the semester. The purpose of this component is to help the student to develop planning skills and also to ensure that students finalize their *micro–project* title in time and start working systematically to complete it by the 14th week of the semester. Since each *micro–project* is for a single course, it is not intended to be very complex and the completed '*Micro–project Report'* is expected to be about 15 pages, excluding the preliminary pages and references. An example of a micro–project is given below.

Example

With regard to the 4th semester [1] 'Instrumentation Engineering' Engineering Diploma Program, in the course on 'Industrial Transducers', for the pre-determined competency '*Maintain different types of transducers'*, a typical micro–project could be; '*Develop a simple automatic water level indicator for a domestic residence for a family of four people'*. The group of students will then start doing this *micro–project* and submit the *micro–project proposal* of about 2 pages by the 4th week of the semester in the given format (see Appendix – 1). To undertake this *micro–project*, the students would continue to learn the working of different types of transducers, their specifications, their connections, their suitability, the materials required and so on, through this course as the semester advances. Every fortnight, they will present the progress of the *micro–project* for the feedback and progressive assessment. This presentation may in front of the whole class (or only to their teacher) as decided by the concerned teacher and justify the progress being made and the contribution of each team member in doing the *micro–project*. By the 14th week, they will present the final *micro–project report* along with the demonstration of the model/ product (if any) in the presence of the whole class, as specified in the micro–project proposal, for the final evaluation.

3.2 Implementation of the Micro–Project

The success of any design lies in its effective implementation, which is even true for the implementation of the *micro–project*. Since the number of teachers to be trained were in hundreds, the authors conducted training workshops to develop 'master trainers' who fanned out across the whole state of Maharashtra and trained the other teachers in the 452 polytechnic colleges, through several regional training workshops. Further, the authors contributed in the publishing of 'Implementation Guide' [7] of the *'Competency–Focused OBC* (which includes the *micro projects* as well). Additionally, a booklet of 'Micro–project Implementation Guidelines' was also developed. Moreover, to implement the *micro–project* effectively, the respective course teachers take the following steps to provide greater clarity to the students:

a) On the first day of every course of the semester, the concerned course teacher guides the students regarding the features of the *micro–project* and the types that they can be opt.
b) Following this discussion, project groups of 4-6 students in each are formed with a group leader. As the leadership is rotational in every course, almost every student of the micro–project group gets an opportunity to work as a leader and as a team member as well.
c) The choice of the *micro–project* title is either finalised by the group or guided by the teacher.
d) The two-page *'Micro–project Proposal'* is to be presented by the student group to the whole class by the 4^{th} week of the semester for finalisation.
e) The progress of every micro–project is continuously monitored every fortnight throughout the semester, when each group presents the progress of their work as part of the progressive assessment.
f) By the 14^{th} week of the semester, the completed '*Micro–project Report'* along with the model/product (if any) is presented by each group to the whole class and submitted to the course teacher for summative evaluation.

Although the educational institution is to provide all the necessary resources to the students required for completing the micro–project successfully, sometimes, depending on the type of the *micro–project*, some meagre expenses may be required to be borne by the students. However, according to a general guideline circulated to all the 452 institutions, the total extra cost (if at all needed) for a micro–project (other than the institutional provisions), should not exceed the limit of Rs.1000=00. As there will be 3 to 6 students in each group, extra cost per student will not be more than Rs.200=00.

3.3 Assessment of the Micro–Project

Most of the skills mentioned in section 3.1 of this paper are not developed by summative assessment alone. Teachers inform the students in advance that marks for the *micro–project* are awarded not only on the completed product (if any) and project report, but also, on the learning efforts (i.e. the process*)* made by them in doing the *micro–project*. "Rubrics are a powerful tool of assessment which supports learning in work-based environment, rubrics guide learner's activities by increasing their understanding of the criteria for assessment and expected level of performance. Thus, rubrics work as a tool for certification, as well as for feedback" [Gough, John, 2006]. Accordingly, the rubrics developed for assessment of this *micro–project* (see

sample in Appendix-3) is given to the students in advance, so that they know the criteria on which they will be assessed. This facilitates to provide qualitative feedback to the students by the teacher and also help them to undertake the *micro–project* to the expected level of performance. Every fortnight, the *micro–project* work is monitored through presentations and 10 marks are earmarked for the *Progressive Assessment*. The marks allocated for each criteria in the rubric depends upon the relative importance of that criteria in the total performance. The following assessment methodology of the *micro–project* is used as guideline for awarding marks:

a) Out of the 10 marks, a maximum of 6 marks is based on the progressive assessment of the project work, which may be the same for all group members.
b) Remaining 4 marks would be based on individual contributions, to be decided by the teacher while taking the oral exam of each student after the final presentation.
c) An *Overall Micro–project Evaluation Format* is also designed (see Appendix-4). In this format, the attainment of the Course Outcomes, Practical Outcomes, Cognitive Domain Outcomes and Affective Domain Outcomes achieved through the *micro–project* are also considered by the assessor.

4. THE MICRO–PROJECT PORTFOLIO

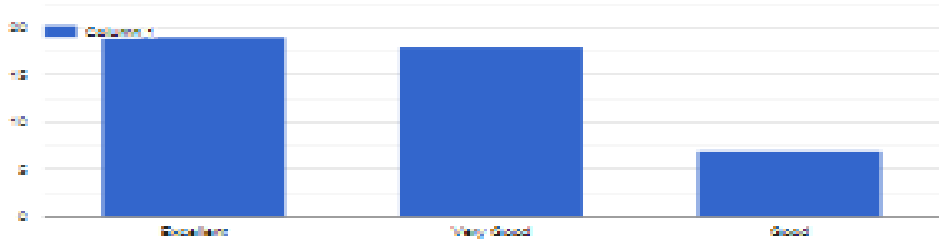
At the end of the semester, for each course, every student will possess the *Micro–project Report* along with the 'Teacher Evaluation Sheet' (see Appendix- 3 and 4). All these reports are compiled by each student as the *'Micro–project Portfolio'*. This portfolio gets built up and enriched with more *Micro–project Reports* as the student advance into the higher semesters till the end of the engineering program. This is one of the most useful by-products that emerges out from the *'Competency–Focused OBC'*. This *'Micro–project Portfolio'* serves as a very useful asset for every student especially during job interviews enhancing his/her employability levels. A feedback of an interim snap study [Kedar et al, 2018] reported that 'This *micro–project* innovation has been well received by the technical education system of Maharashtra', due to the high level of student-to-student level interaction and student-to-teacher level discussion, which increases the joy of learning.

5. UG MICRO–PROJECT EXPERIENCE

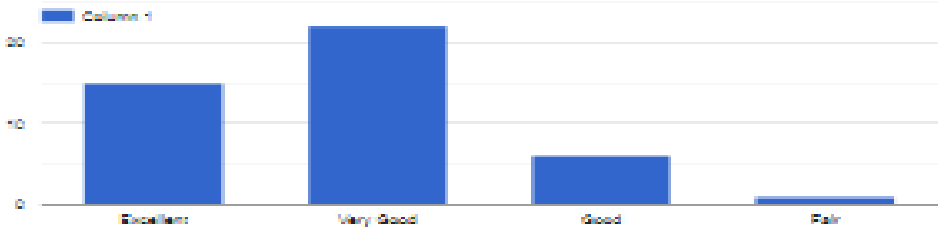
The concept of *micro–project* right from the first to the last semester is not being offered in any of the curricula of the 4-year UG engineering education programs in India. However, based on success of this micro–project innovation [1] in the engineering diploma program in Maharashtra, one of the authors pilot-tested this concept of *micro–project* in two UG courses of Electronics Engineering program of a state level university viz. 'Embedded Systems' and 'Integrated Circuit Technology' for 30 students who thoroughly enjoyed it. After the completion of the *micro–project*, a feedback from the students was taken, the analysis of which is illustrated in figure 3. As seen, the students reported better integration of course material with industry issues and got motivation to study more complex projects. This is an indicator that the students enjoyed working on these *micro–projects*. Hence, it could be experimented on a wider scale in other UG programs.

QUESTIONS RESPONSES 44

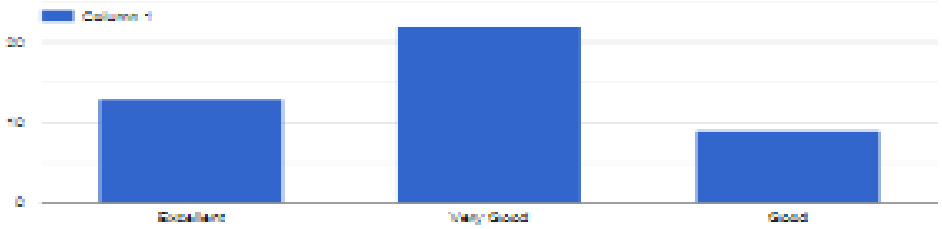
1. Interest generated by the teacher



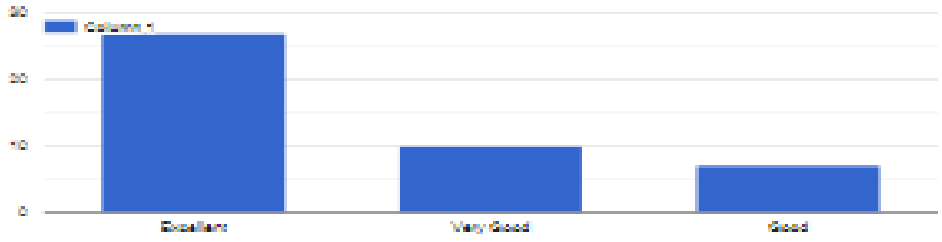
2. Ability to integrate course material with industry/other issues, to provide a broader perspective



3.Ability to integrate content with other courses



4.Accessibility of the teacher in and out of the class (includes availability of the teacher to motivate further study and discussion outside class)



5.Overall opinion about Micro-project

Figure 3. Feedback of Micro-Project Experience in a UG Electronics Engineering Course

6. CONCLUSION

This unique innovation of the *micro–project* introduced on a massive scale through the newly designed and implemented *'Competency–Focused OBC'* for the first time in India (perhaps in the world) in the engineering education system of India has proved to be a success. Soon after the implementation of the first semester of this curriculum, a snap study was undertaken [Kedar et al, 2018] for assessing the effectiveness of the *micro–projects* during the first stage of implementation, the results of which was encouraging, as both the students and teachers enjoyed it. Additionally, feedback on email and oral feedback by various polytechnic teachers across the state of Maharashtra, established that *micro–project* concept has been well received by the student and the teacher alike. Further, an offshoot of this innovation has lead to the buildup of the *micro–project portfolio* (a unique by-product) that can be showcased by the students during job fairs/interviews, thereby enhancing their employability levels. The feedback of the pilot tryout in the two electronics engineering UG courses was also quite encouraging (see figure 3). It was quite beneficial to many stakeholders on several counts, proving that this curricular innovation of *micro–project* can be further extended to other UG engineering/technology courses and programs in other states of India and maybe other parts of the world.

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Appendix - 1

PART A – Format for Micro–Project Proposal (2 to 3 pages)

(to be submitted at end of first 4 weeks of the semester)

Title of Micro–project

1. Rationale

(Importance of the project, in about 200 to 400 words)

2. Intended Course Outcomes

a) .....

b) .....

3. Literature Review

(Existing status, knowledge about chosen task summarized from books, internet and other sources in about 200 to 400)

4. Proposed Methodology

(Procedure in brief that will be followed to do the micro–project) in about 200 to 500 words)

5. Resources Required (major resources like raw material, tools, software etc.)

S. No.	Name of Resource/material	Specifications	Qty	Remarks
1				
2				

6.0 Action Plan (Sequence and time required for major activities for 10 Weeks)

S. No.	Details of activity	Planned Start date	Planned Finish date	Name of Responsible Team Members
1				
2				

Appendix – 2

Format for Micro–project Report after Execution in about 15 pages to be submitted at end of semester)

PART B – Micro–Project Report

Title of Micro–project

1.0 Rationale

(Importance of the project, in about 100 to 200 words. This is a modified version of the proposal after the work)

2.0 Course Outcomes Addressed

(Add to the earlier list if more COs are addressed)

a) .....

b) .....

3.0 Literature Review

(If additional literature review done, you may add in about 200 to 500 words)

4.0 Actual Methodology Followed

Write step wise the procedure of how the work was done, including which team member did what work and how the data was analysed (if any)**.**

5.0 Actual Resources Used (Mention the actual resources used)**.**

S. No.	Name of Resource/material	Specifications	Qty	Remarks
1				
2				

6.0 Outputs of the Micro–project

(Drawings of the prototype, drawings of survey, presentation of collected data, findings etc.)

7.0 Skill Developed / Learning Outcomes from this Micro–project

(in about 50 to 100 words)

8.0 Benefits of this Micro–project

(in about 50 to 100 words)

9.0 Area of Future Improvement

(in about 50 to 100 words)

****

Appendix – 3

Micro–Project Teacher Evaluation Sheet

Name of Student: ……..**Enrollment No.** ……...
Name of Program…… Semester: ……..
Course Title …….Code:……..

Title of the Micro–project: …….

Course Outcomes (COs) Achieved

a) ……
b) ……
c) ……

Suggested Rubric for Assessment of Micro–Project Evaluation

(Please tick √ in appropriate cell for each characteristic)

S. No.	Characteristic to be assessed	Poor (Marks 1-3)	Average (Marks 4 - 5)	Good (Marks 6 - 8)	Excellent (Marks 9- 10)
1	**Relevance to the course**	Relate to very few UOs	Related to some UOs	Take care of at-least one CO	Take care of more than one CO
			✓		
2	**Literature Survey /information collection**	Not more than two sources (primary and secondary), very old reference	At-least 5 relevant sources, at least 2 latest	At –least 7 relevant sources, most latest	About 10 relevant sources, most latest
3	**Completion of the Target as per project proposal**	Completed less than 50%	Completed 50 to 60%	Completed 60 to 80%	Completed more than 80 %
4	**Analysis of Data and representation**	Sample Size small, data neither organized nor presented well	Sufficient and appropriate sample, enough data generated but not organized and not presented well. No or poor inferences drawn	Sufficient and appropriate sample, enough data generated which is organized and presented well but poor inferences drawn	Enough data collected by sufficient and appropriate sample size. Proper inferences drawn by organising and presenting data through tables, charts and graphs.
5	**Quality of Prototype/Model**	Incomplete fabrication/assembly.	Just assembled/fabricated and parts are not functioning well. Not in proper shape, dimensions beyond	Well assembled/fabricated with proper functioning parts. In proper shape, within tolerance	Well assembled/fabricated with proper functioning parts. In proper shape, within tolerance dimensions

S. No.	Characteristic to be assessed	Poor (Marks 1-3)	Average (Marks 4 - 5)	Good (Marks 6 - 8)	Excellent (Marks 9- 10)
			tolerance limit. Appearance/finish is shabby.	dimensions and good finish/ appearance. But no creativity in design and use of material	and good finish/appearance. Creativity in design and use of material
6	**Report Preparation**	Very short, poor quality sketches, Details about methods, material, precaution and conclusions omitted, some details are wrong	Nearly sufficient and correct details about methods, material, precautions and conclusion, but clarity is not there in presentation. But not enough graphic description.	Detailed, correct and clear description of methods, materials, precautions and Conclusions. Sufficient Graphic Description.	Very detailed, correct, clear description of methods, materials, precautions and conclusions. Enough tables, charts and sketches
7	**Presentation**	Major information is not included, information is not well organized .	Includes major information but not well organized and not presented well	Includes major information and well organized but not presented well	Well organized, includes major information ,well presented
8	**Any other** *(depending upon nature of project: please write indicators using pen)*				
9	**Defense of the micro–project presentation**	Could not reply to considerable number of question.	Replied to considerable number of questions but not very properly	Replied properly to considerable number of question.	Replied most of the questions properly

Appendix – 4

Overall Micro–project Evaluation Format

Progressive Assessment		Summative Assessment		Total Marks 10
Part A - Project Proposal (2 marks)	**Project Methodology (2 marks)**	**Part B - Project Report/Working Model (2 marks)**	**Individual Presentation/Viva (4 marks)**	

Note

a) The teacher needs to fill the first 3rd columns of only one copy of this teacher evaluation sheet for these criteria for each group of students as per the above rubrics and criteria.
b) After giving marks in the 3 columns, make multiple copies of this filled teacher evaluation sheet according to the number of students in that group.
c) Then the teacher can give marks in the out of 4 marks for after the presentation/viva of each student in the 4th column of each sheet.
d) Then add up the total marks to get the total marks.

Comments/Suggestions about team work/leadership/inter-personal communication (if any)

……
……..

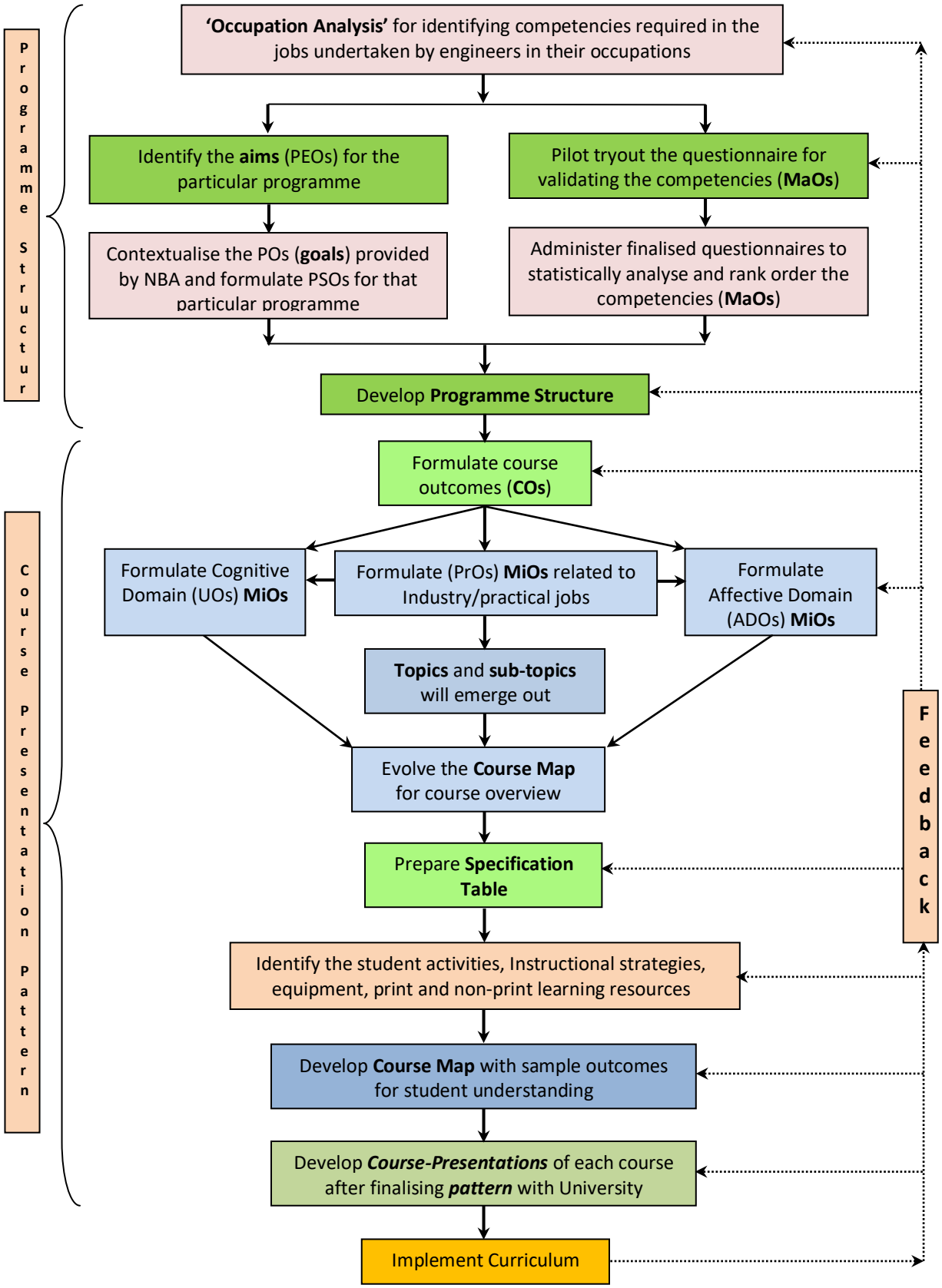
Any Other Comment:

……
……

Name and designation of the Faculty Member…….

Signature and date……

Appendix – 5



'Competency-Focused Outcome-based Curriculum' Development Model