Designing and Implementing Outcome Based Education (OBE) for Indian HEIs

Re-contextualising the formulation of OBE Architecture, Scaling and Assessments of the Outcomes

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After India signing the Washington Accord, National Board of Accreditation (NBA) has mandated Outcome Based Education and National Assessment and Accreditation Council (NAAC) has initiated OBE, thus requiring all Higher Education Institutions (HEIs) to follow the system of OBE.

Better Outcomes for Better Learning in India

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Washington Accord

"The Washington Accord model has become the international gold standard for mutual recognition of engineering education."

The Washington Accord is a constituent of the International Engineering Alliance (IEA), focusing on Engineering Education and competencies. It is an agreement between the signatory nations, for the mutual recognition and portability of the educational qualifications and professional competency of engineering graduates among the member nations of the accord.

A number of debates on engineering education were on during the 1990s. It has come to an end with a consensus to move from input-focused accreditation criteria to an output-based specification. The signatories of WA have decided to give an outcome-based specification for each programme. These outcomes will be considered as the professional base of the engineering programmes. The outcome approach has given the educational providers - freedom in the designing of programmes by keeping a watch on social sensitivity and psychological significance.

As per the directives of the Accord, the Signatories of WA have agreed to grant graduates of each other's accredited programs the same recognition and privilege they grant to their own accredited programme. This has facilitated the mobility of the graduates within the jurisdictions of the WA nations.

Now, there are about 21 members in the WA and India has become an official member from 13th June 2014 with a permanent signatory status to National Board of Accreditation (NBA). This was a significant step in enhancing the quality of the Indian Higher Education System to International Standards.

The Indian Scenario

Enjoying the Privilege of a permanent signatory, National Board of Accreditation (NBA) has mandated all the Graduate Engineering Programmes of the country to adopt the Outcome Based Educational Model with prescribed Programme outcomes in line with the Graduate Attributes set by the WA. The signatories of the WA are bound to a process of periodical peer review to ensure that each other's accredited programs are substantially equivalent and the outcomes are equivalent to global standards. In this regard, the NBA has unequivocally stated: "No OBE, No Accreditation".

In the general education stream, the National Assessment and Accreditation Council (NAAC) has initiated the process of OBE. As the primary step in the course of implementation, it has recommended to prepare a framework of OBE curriculum for various programs, by restating the curriculum in terms of Programme Outcomes (POs) and Course Outcomes (COs). At present, NAAC has issued new directives to the Higher Educational Institutions to include special credits to those institutions who have started with the process of OBE implementation, with separate weightage to the formulation of outcomes and Design of Assessment in the process of Accreditation. Thus, OBE forms a large component of the assessment, contributing to about 3% of the total score.

What is OBE?

OBE is an educational approach which aligns each part of the education system around predetermined goals or outcome. This approach ensures that each student, on completion of a course or programme, should be able to know or do what the course or programme has set as a goal or outcome.

OBE is a model of education that rejects the traditional attention on what the programme provides to the student. Instead, it focuses on making the student demonstrate what the student is able to do on successful completion of the learning experience.

Positively, OBE is a paedo-centric educational approach which shifts its focus from instructional objectives that could be termed as teacher's intentions to the observable and guaranteed product or outcomes. In this system, the entire process is viewed from the student's perspective in terms of outcomes.

Technically, OBE integrates Psychological, Philosophical, Sociological and Technological principles and practices into education. It is structured in such a way that it keeps the scholars actively involved in productive activities and affirms the students' progress at each stage with appropriate indicators. OBE enhances the higher educational platform to a place of intellectual adventures and makes the scholars socially productive and accountable. It also prepares the students with the appropriate knowledge, skills and attitudes to fit into any career or profession the programme envisages.

The benefits of OBE

Most of the countries around the world have adopted OBE. According to WA, the signatories are bound to adopt the programme outcomes on the lines of the benchmarked outcomes prescribed by the WA nations. It would enhance the quality of education to international standards.

The OBE system and strategies are so designed to guarantee the outcome of education. Hence the output of the system will be more **valid, reliable and productive.**

The OBE system enhances the **clarity of focus**. The students and the teacher will have clarity on the end outcome so that they could construct the knowledge and streamline the learning activities to ensure the outcomes. Here, all the activities could be planned backwards from the planned outcome so that the students and teachers will have a clear idea of what knowledge or skills are needed for actualizing the outcome.

The feedback at every stage of learning through the specified indicator will reinforce active learning among the students.

OBE provides more room for **flexibility**. Here, the learning becomes need-based; so the teachers will be able to structure lessons and strategies according to the needs of the students. It is not dogmatic with respect to method and strategies. It is highly **student-centred** where the teachers are in the role of a guide who inspires the student activity.

Students are actively involved in various activities too. This helps the students to be more and more **responsible** for their learning activities.

OBE provides space for peer evaluation, self-evaluation and evaluation from the part of employers regarding the performance of the students. Hence, evaluation is more **realistic.**

OBE provides an **authentic quantified profile** of the student's competencies in terms of POs and PSOs which will be highly useful for the students for getting a placement according to their competencies.

OBE will be helpful for **validating the performance of the institution** in terms of the Mission, Vision, PEOs, POs, PSOs and COs.

Important Terms

Programme Educational Objectives (PEO): These are statements that refer to what the graduates are expected to do within a few years of graduation.

Programme Outcomes (PO): These are the broad statements about the Knowledge, Skills and Attitude a graduate develops on completion of the programme.

Programme Specific Outcomes (PSO): These are programme-specific statements, that refer to what a student should know and be able to do on completion of the programme.

Course Outcomes (CO): These statements refer to the knowledge and skill the students attain on completion of the course.

Mapping: Mapping may be defined as quantifying the relationship between various elements of OBE. For the calculation of CO attainment, each activity needs to be mapped to the COs, using an appropriate scale. A four-point scale starting from 0 to 3 may be used to map the strength. Similarly, COs are mapped to the POs and PSOs.

Attainment: In OBE, Attainment is the score of a student or class or institution, against a certain outcome, on the same scale used for mapping.

The OBE Architecture

The OBE Architecture is a top-level plan for the OBE implementation in the institution. The architecture should be simple enough to convey itself to the stakeholders and broad enough to allow the required academic autonomy to the faculty.
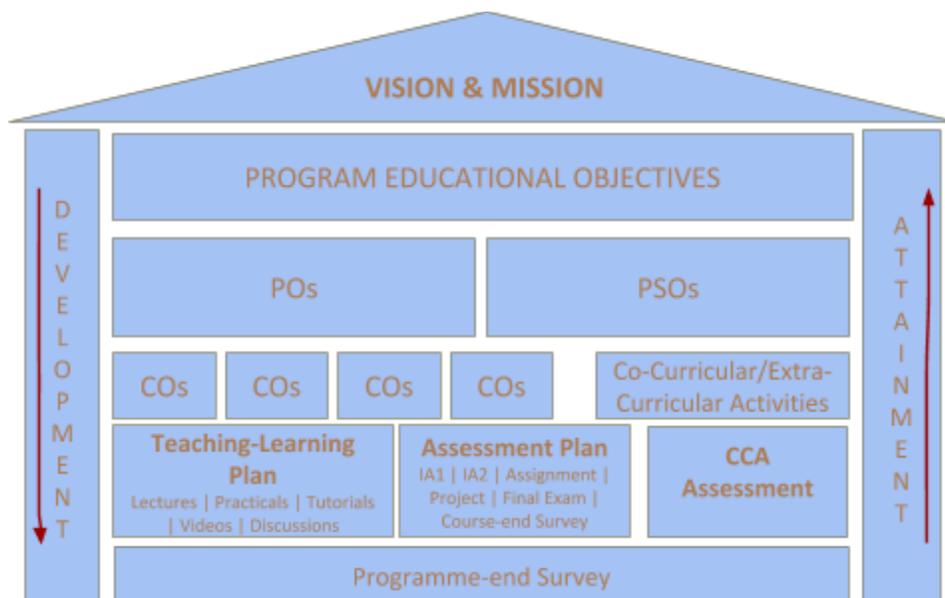
Organisational Structure for OBE

As in the case of every organisational process, OBE also needs relevant organisational structure and roles, for effective implementation. While this may vary based on the existing organisational processes, the following are the major responsibilities.

Elements of OBE	Responsibility/Roles
Vision, Missions, PEOs, POs	The Management
PSOs	HOD, Department
COs	Faculty in charge of the Course

It will be better to have committees for defining elements, mapping strengths, etc. But it may be good to have an individual at Course/Programme/Department/Institution levels to ensure that the relevant processes and activities are implemented in a proper manner.

The Process of OBE

The process of OBE implementation consists broadly of 3 phases - Identification of Outcomes, Designing the Curriculum and Teaching Learning activities as well as Design of Assessment Strategies

Identification of Outcomes

The building block of OBE is outcomes at different levels of hierarchy. In the formulation of the OBE model, PO and PSO has to be formulated considering the nature of the programme and social significance. These outcomes are materialized and measured through various course-related and other co-curricular activities. Hence, appropriate course outcomes (COs) related to each course are formulated as per the nature of the content in the course. Outcome Based approach has accepted Blooms Taxonomy for standardization of the verbs that indicate various levels of attainment in each outcome.

Designing the Curriculum (Teaching Learning activities) for OBE

In designing the curriculum, learners should be placed in the first position in the curriculum design. Here, students are permitted to construct knowledge and skills on the lines of the outcomes. Hence, the curriculum formulation should adopt a design-down technique. The curricular activities should be selected in the light of "Traceback the strategy from the desired end result".

The curriculum should also be in accordance with the principle of expanded opportunities so that the students should be able to adopt the strategies comfortable to their ways and style. OBE Curriculum places a high expectation on the learner, here curriculum should push the learners beyond the limit of his normal possibilities so that the learner is deeply involved with the issues of learning.

Design of Assessment Strategies

Since OBE attainments are mostly based on course-level assessments, extreme care should be applied while designing the assessment plans and tools. All the COs should be sufficiently assessed using the right mix of direct and indirect methods. Some of the key points to be noted in this regards are:

- **Formative Assessment** - Fix the learning indicators and point to outcomes
- **Assessment Rubrics** for Activities - Prepare qualitative statements and assess the strength of each rubric to outcomes
- **Summative Assessment** - Prepare the examination design incorporating the strength of COs, Bloom's Taxonomy, difficulty level and types of questions
- **Development of Scoring Key** and linking it with the attainment of COs

At the end of the OBE process planning, each of the Courses shall have a CO-linked Course Plan, similar to the following.

Topics	Course Outcomes	Learning Activities	Assessment Methods	Learning Indicators

The OBE Attainment

Student scores weighted with the mapping to COs can lead to the estimation of CO attainments. CO attainments and mapping to POs/PSOs shall provide their respective attainments.

Following is a *sample PO Attainment for a student*, based on the Graduate Attributes as per the NBA. This PO scorecard can serve as an authentic profile of the student competencies.

Graduate Attributes (PO)	Attainment
Engineering Knowledge	2.3
Problem Analysis	1.8
Design and Development of solutions	2.1
Conduct investigation of complex problems	1.7
Modern Tool Usage	1.6
The Engineer and Society	2.4
Environment and Sustainability	2.1
Ethics and Conduct	2.6
Individual and Team Work	2.7
Communication Skills	2.4
Project Management and Finance	2.1
Life-long Learning	1.8

A CO level attainment card would be big and elaborate but could be more meaningful than a regular Course Transcript.

Similar scorecards could also be prepared at the class level or institutional level.

All such scores would be more meaningful when a threshold for attainment is preset and the scores are compared against them.

Implementation Challenges

Since OBE means a shift to a new paradigm, the Indian HEIs may face various challenges during the implementation. Strategising for the expected challenges in the institution is essential for the success of OBE implementation. Some of the common challenges faced are:

- Resistance to Change
- Lack of Time in the Calendar
- Issues in the validation of the outcomes
- Selection of teaching-learning strategies
- Complexity in assessment practices
- Assessment based on mapping threshold
- Scaling of the scores to ensure validity
- Ensure the validity of Indirect assessment

The Final Note

Implementation of OBE for Higher Education System in India is at an evolving stage. There is a lot of ambiguity and confusion existing across the higher education system of the country. Huge diversity in the approach in implementation and assessment could well be identified even among the neighbourhood institutions. Standardization of approaches for a reliable and valid OBE implementation and assessment is yet to happen. So, it would be advisable to move along with the best practices after a clearcut understanding of the concept and purpose it serves.

About the Author

Dr. Sunil Job K. A, the Chief Consultant of Academic Solutions at ipsr solutions ltd. is a PhD in Education and has over 25 years of teaching experience. Areas of Expertise include Outcome-Based Education (OBE), Bloom's Taxonomy, Open Source, Data Science and Statistical Analysis, Data Visualization and Presentation, Machine Learning, Research Methodology, and Optimization Techniques.

He has been a resource person for various National conferences and workshops on Outcome Based Education (OBE), Syllabus and Evaluation Design for OBE, Bloom's Taxonomy, Using Bloom's Taxonomy in Education and Evaluation, Data analytics and Machine Learning.

About IPSR

ipsr solutions ltd delivers cost-efficient, **accreditation friendly AI and OBE-enabled academic solutions** for HEIs to improve their quality in academics. Premier products include **QnSmart,** a Question Bank system with inbuilt Bloom's Taxonomy Model and **deQ,** an academics management ecosystem specially designed for Higher Education Institutions (HEIs) to ensure quality across different processes in academics.

The mentor panel for the Academic Solutions wing includes Vice-chancellors, Registrars, NAAC Peer Team members, College principals and Controller of Examinations (CoEs), who provide **consultancy** for OBE Implementation, Accreditations and other best practices.

IPSR is also the winner of '**Best Education Technology Solution Provider – 2019'** from Integrated Chambers of Commerce and Industry (ICCI), New Delhi and enjoys the support of 250+ institutions including Universities, Autonomous Colleges, Technical/ Non-technical institutions as well as various agencies and individuals working in the Academic domain.

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