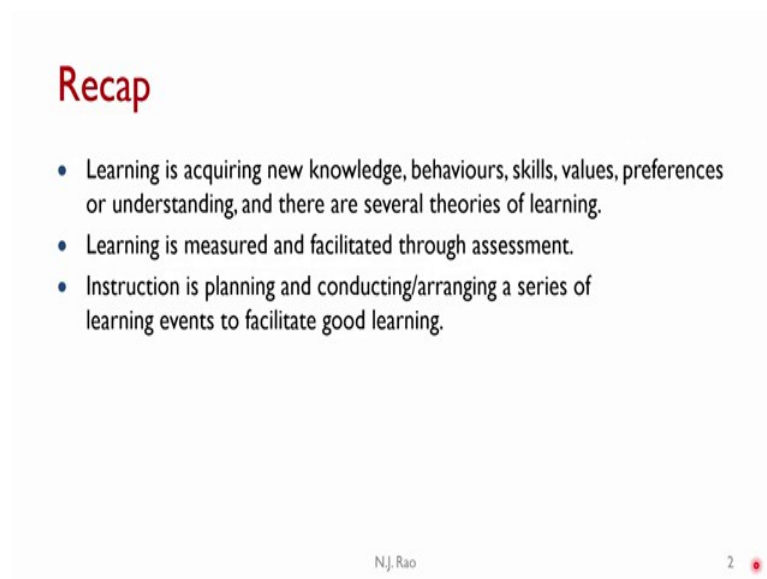


**Teaching and Learning in General programs (TALG)**  
**Prof. N. J. Rao**  
**Department of Electronics Systems Engineering**  
**Indian Institute of Science, Bengaluru**

**Lecture - 04**  
**What is OBE?**

Greetings and welcome to unit 4 of module 1 of TALG, Teaching and Learning in General Programs.

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**Recap**

- Learning is acquiring new knowledge, behaviours, skills, values, preferences or understanding, and there are several theories of learning.
- Learning is measured and facilitated through assessment.
- Instruction is planning and conducting/arranging a series of learning events to facilitate good learning.

N.J.Rao 2

In unit 3, we tried to understand the 3 key words in teaching and learning, namely the learning, assessment, and instruction. Learning is acquiring new knowledge, behaviors, skills, values, preferences or understandings. And, there are several theories of learning and there are likely to be more theories of learning as time progresses also.

Learning is measured and facilitated through assessment, that is the in my opinion very key issue that teacher will have to continuously remind himself or herself. Instruction is planning and conducting arranging a series of learning events to facilitate good learning. So, instruction is planning the learning events, that is what instruction is. While the instruction teaching and sometimes even education, these are all used synonymously, but in the field of education all these words have very specific meaning. Then, they need to be used in their specific with respect to the specific meanings for us to understand the each other as well as do our jobs better.

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**Unit Outcomes**

- MIU4-1: Understand the origins of Outcome Based Education
- MIU4-2: Understand what an outcome is and its most important features
- MIU4-3: Identify the level (PO, PSO and CO) of a given outcome statement and comment on its appropriateness, observability and measurability

N.J. Rao 3

Now, unit 4 aims at facilitating teachers to understand the origins of outcome based education. Understand what an outcome is and what are its most important features. Identify the level of an outcome, that is you write an outcome statement, then we have we identify presently multiple levels of those outcomes. It can be at the program level, it can be at a specific program level or it at the level of a course.

So, we call them PO, PSO and CO by looking at the outcome statement I should be able to identify to what category that outcome statement belongs. And, also one should be able to comment on it is appropriateness, observability and measurability, these are the expected outcomes of this unit.

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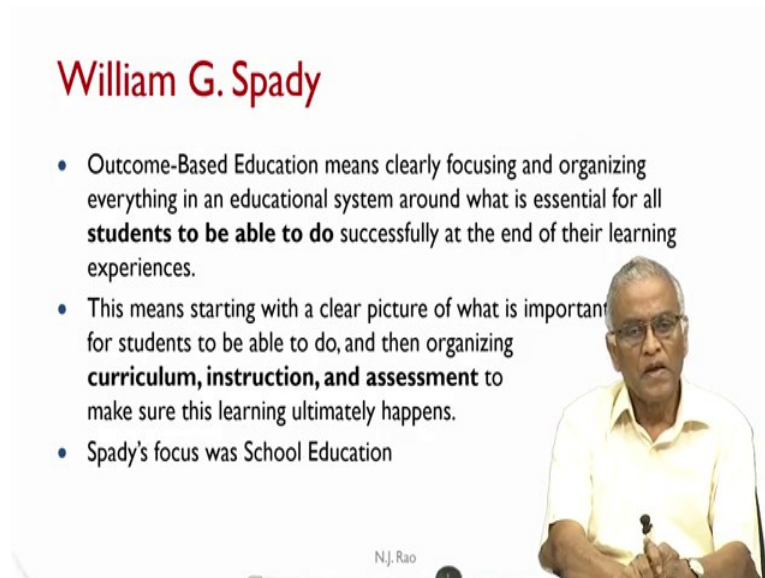
## How did OBE start?

- Policy makers and stakeholders in several countries have been emphasising since 1970s on the need to develop instruments to obtain comparable information on what students actually learn across schools and HEIs.
- The term Outcome Based Education was first presented by William Spady in 1994 through his book "Outcome-Based Education: Critical Issues and Answers", American Association of School Administrators.

Now, the OBE started back in 1990s, when many people started saying that you are doing you are teaching something in the class especially at the school level, but what did the students actually learn? We do not want to measure what you taught, but what we want to have information on is what the students have actually learnt. And, this is the movement that started in 1970s and from then onwards a people are looking for the learning outcomes rather than the teaching.

On the term outcome based education was first presented by William Spady in 1994 through his book, "Outcome-Based Education; Critical Issues and Answers" and it was mainly created for American Association of School Administrators. So, the outcome based education that word can be identified with William Spady.

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**William G. Spady**

- Outcome-Based Education means clearly focusing and organizing everything in an educational system around what is essential for all **students to be able to do** successfully at the end of their learning experiences.
- This means starting with a clear picture of what is important for students to be able to do, and then organizing **curriculum, instruction, and assessment** to make sure this learning ultimately happens.
- Spady's focus was School Education

N.J. Rao

The slide features a photograph of a man with glasses, wearing a light-colored shirt, sitting and speaking. The text is presented in a clean, professional layout with a red title and blue bullet points.

As per William Spady Outcome-Based Education means clearly focusing and organizing everything in an educational system around what is essential for all **students to be able to do** successfully at the end of their learning experience. Please note, we highlighted what the **student should be able to do**; not, what the teacher has taught. That is the focus of that. And, this means starting with clear picture of what is important for students to be able to do and then organizing, the curriculum, instruction and assessment to make sure the learning ultimately happens.

So, the starting point either for designing a course or designing a program are really the outcomes. You start with the outcomes and then from there you design your curriculum instruction and assessment. And, of course, Spady's focus was school education and this has been –being proposed and everybody comments on this, but even today even if you look around the world while everybody readily agrees; it should be outcome based education, but the full features of outcome based education, and are not do not seem to have been fully understood by the teachers, nor the subsequent thing like curriculum designing, instruction and assessment do not necessarily follow from the outcomes.

So, we have a long way to go to effectively take advantage; take advantage from the learner perspective of outcome based education.

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## Outcomes of Learning

are referred to in the literature as

- Outcomes
- Learning Outcomes
- Intended Learning Outcomes
- Instructional Objectives
- Educational Objectives
- Behavioral Objectives
- Performance Objectives
- Terminal Objectives
- General Instructional Objectives
- Specific Learning Outcomes
- Subordinate Skills
- Subordinate Objectives and
- Competencies.

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Now, there are several words used to look at outcomes of learning. After learning something happens that is an outcome, this outcome, are referred to in the literature as merely **outcomes, learning outcomes, intended learning outcomes, instructional objectives, educational objectives, behavioral objectives, performance objectives, terminal objectives, general instructional objectives, specific learning outcomes, subordinate skills, subordinate objectives, competencies.**

So, you have a whole bunch of words that are used and you can find many more words which are equal equivalent or same as outcomes.

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## What is an Outcome?

- An outcome is what the learner will be able to do/perform as a result of some learning experience
- In the context of formal education
  - An outcome of an education is what the student should be able to do at the end of a program/ course/ instructional unit.
- Outcomes provide the basis for an effective interaction among stakeholders

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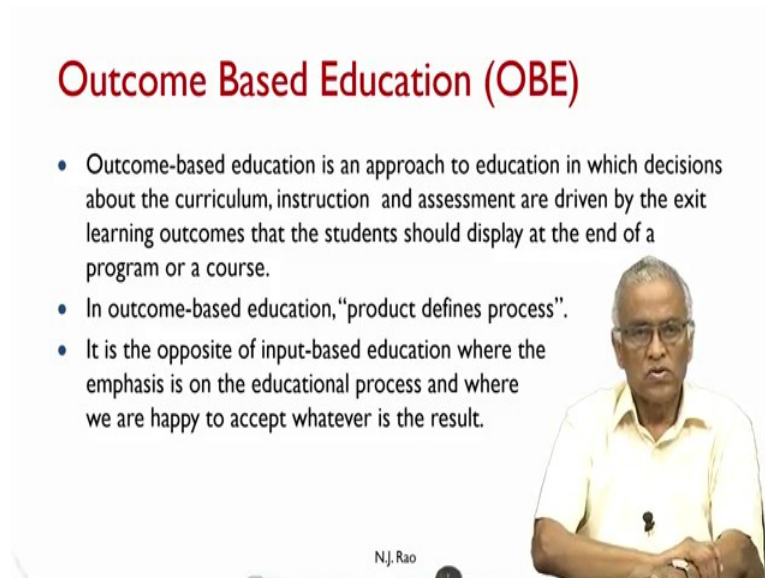
So, what is an outcome? An outcome is what the learner will be able to do or perform as a result of some learning experience. So, whenever I start instruction or when I start teaching; first thing the teacher need to know what is it that I want my student to be able to do? And, that will become our reference. So, how do I prepare him to become capable of doing something, that is what constitutes teaching or instruction.

In the context of formal education, an outcome of an education is what the student should be able to do at the end of a program a course or an instructional unit. For example, you have a 3 year program. So, at the end of a 3 year program, what you want your student to be able to do or I am teaching a course in BA economics on let us say Micro Finance. And, at the end of a course on Micro Finance what should my student be able to do, that becomes the course.

And within micro finance course, I have one instructional unit that constitutes let us say 4 hours of activity, at the end of 4 hours activity what should the student be able to do? That is an instructional unit.

There are whole lot of stakeholders with regard to education, whether it is policy makers, administrators, parents, potential employers, students, faculty, for these are all the stakeholders associated with any education process. And, the outcomes really provide the basis for an effective interaction among stakeholders not the list of topics that constitutes the syllabus of a course.

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**Outcome Based Education (OBE)**

- Outcome-based education is an approach to education in which decisions about the curriculum, instruction and assessment are driven by the exit learning outcomes that the students should display at the end of a program or a course.
- In outcome-based education, “product defines process”.
- It is the opposite of input-based education where the emphasis is on the educational process and where we are happy to accept whatever is the result.

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So, OBE or Outcome Based Education is an approach to education in which decisions about the curriculum, instruction and assessment are driven by the exit learning outcomes that students should display at the end of a course or a program. I am repeating what has been stated earlier just to reemphasize the outcomes really form the focus or starting point for the entire all the activities related to designing and conducting a program.

In outcome based education, the key principle is “product defines the process”. I want something to be I want to produce something, then what is the process through which I produce that product? So, the product is the outcome and the process is your teaching or whatever activities that you plan. The process is not unique, but we are we want the output the product to be produced in a having a certain specifications or certain properties.

Generally in non-higher education institutions people take the stand, it is mostly input based education. The teacher considers certain content is important for the student to learn. So, I keep teaching the content. And, the kind of emphasis that I put on various things are decided by the teacher, either apriori or online as you are teaching. And, then I may complete or a may not complete something and then what happens is whatever we get out of that we are happy with the result.

That means, it is a process driven rather than product driven, that is the present most of the input based education that is presently in practice in most of the places.

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## Advantages of OBE

1. Relevance - Outcome-based education promotes fitness for practice and education for capability.
2. Discourse - The process of identification of the outcomes within an institution promotes discussion of fundamental questions
3. Clarity - An explicit statement of what the educational process aims to achieve clarifies the curriculum to both students and teachers, and provides a focus for teaching and learning.

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Now, what are the advantages of OBE? We may repeat a few things, first is relevance. Now, when I write my outcomes what purpose am I writing this outcomes, is it because, an individual that decides these are important or there can be other stake holders fitness for practice?

For example, a graduate of this program should be able to do a few things; that means, he has to practice this. So, the practice defines what outcomes should be defined. Similarly, I want my student to have certain capability. I define that capability and work backwards. So, the relevance of what the student is learning is measured with respect to the fitness for practice and the capabilities that he gains.

And, another very important thing - the process of identification of the outcomes within institutes promotes discussion of fundamental questions. This we have seen through various workshops that we have conducted, when we put 2 or 3 faculty to sit together to design to identify the outcomes of a course or a program, they debate heavily, they argue with each other. In the process, everybody learns and what comes out as the product is lot better. Is much more meaningful, much better articulated and so, the outcomes themselves is a platform for discourse among the stakeholders or among the teachers.



And, there is clarity an explicit statement of what the educational process aims to achieve, clarifies the curriculum to both students and teachers and provide a focus for teaching and learning.

That means even for students and teachers to discuss something, the outcome statement becomes the focal point for discussion. So, there is a clarity; that means, a teacher may assume certain things without explicitly stating. And, the student may understand something on his own because there is no explicit statement in front of him. And, when we understandings are different; obviously, a good learning cannot take place. So, a clarity through an explicit statement will provide much better focus for teaching and learning.

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## Advantages of OBE (2)

4. Provision of a Framework - Outcome-based education provides a robust framework for integration of the curriculum.
5. Accountability - By providing an explicit statement of what the curriculum is setting out to achieve, outcome-based education emphasizes accountability.
6. Self-Directed Learning - If students are clear about what they are trying to achieve, they can take more responsibility for their own learning. Outcome-based education thus promotes a student-centered approach to learning and teaching.

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And, **provision of a framework** outcome based education provides a robust framework for integration of the curriculum, curriculum here would mean the entire program. You have a 3 year program and what is the connection between one course and the other the relationships among them and what exactly comes out. Outcomes of whatever, because you start from the top. And, and then you design your courses you can see all the connectivity, whether something is not connected is it intended or not. So, it provides a complete framework for critiquing a given curriculum.

And, **accountability** by providing an explicit statement of what the curriculum is setting out to achieve outcome based education emphasizes accountability. That means, I can

ask the students have you been able to achieve these outcomes or what teacher can ask himself or herself or the department can ask, have you facilitated the students to achieve these outcomes? The outcomes can provide the provide accountability.

And, then what happens when their when the outcome statement is clearly stated some of the students can directly look at it and then can take responsibility for their own learning, that is they do not have to wait until what the teacher has completed in the class, in terms of understanding what the output is, if they have a clear statement the student himself can plan his own learning. So, it promotes student centered approach to learning and teaching.

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### Advantages of OBE (3)

7. Flexibility - Outcome-based education does not specify educational strategies or teaching methods.
8. Guide for Assessment - The outcomes provide the framework for student examinations.
9. Facilitates Curriculum Evaluation - The outcomes provide benchmarks against which the curriculum can be judged.

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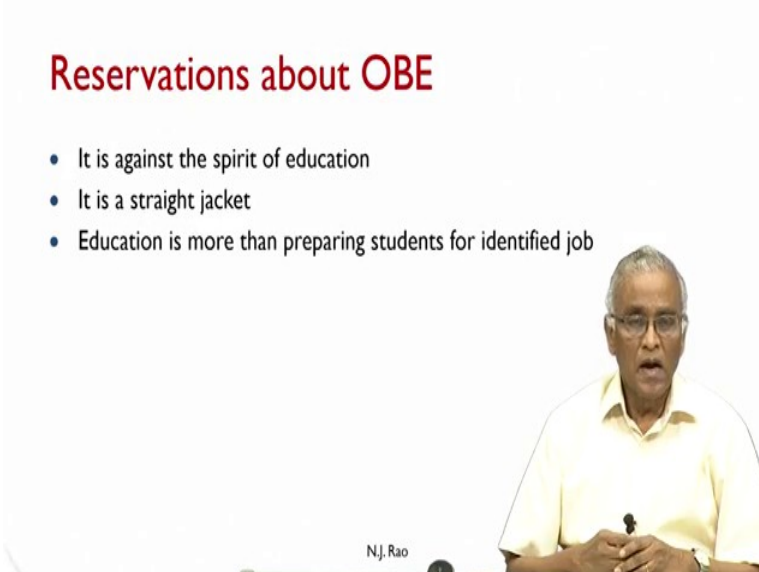
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And, then flexibility what should be remembered is outcome based education does not specify educational strategies or teaching methods. Just by stating an outcome, it does not mean that you are specifying this is how you should teach or this is how you must plan, no nothing of that kind.

So, many times a faculty believe that you are specifying the what you should be doing in the class all that you are saying is even writing outcomes is the role of a teacher. So, you are specifying you are deciding and you are assessing, the only thing you are asking is follow the sequence that is all. And, it also provides an excellent guide to the assessment itself.

This we will see later in the later module, how assessment can be designed starting from statement of outcomes. And, it also facilitate curriculum evaluation if somebody wants to look at how good is your curriculum, then if the outcomes provide the required benchmarks against which the curriculum can be judged. If somebody is written very low and outcome statements let us say. Somebody can say no this may not be satisfactory at this particular level and either the scope or the level of outcome will have to be increased or decreased that it can facilitate the evaluation of a given curriculum.

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The slide is titled "Reservations about OBE" in red text. It contains three bullet points: "It is against the spirit of education", "It is a straight jacket", and "Education is more than preparing students for identified job". In the bottom right corner, there is a video inset showing a man with glasses and a light-colored shirt speaking. The name "N.J. Rao" is visible in the bottom left corner of the video inset.

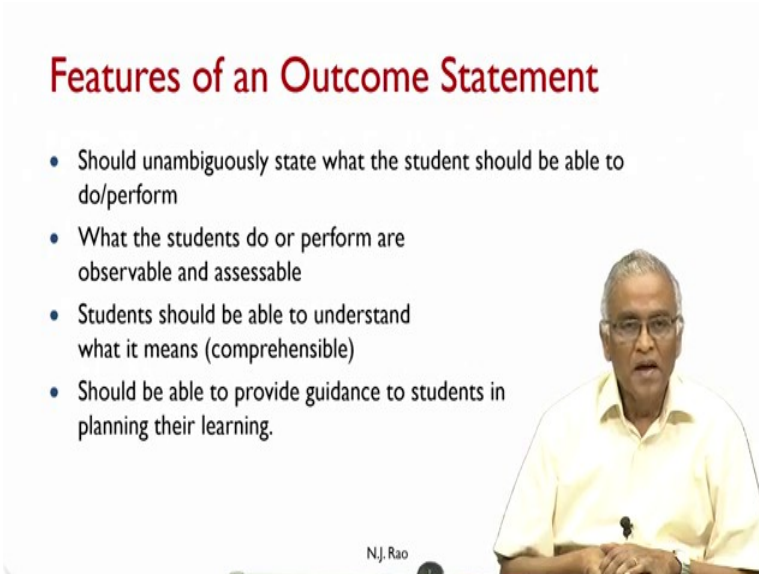
And, as we were going through I have already mentioned there are many reservations about OBE. Anything that you say, you try to do this the first thing is teachers will object, you are now tying my hand that is not the nature that is not as per this spirit of education. That is the first what I call generally knee jerk reaction. The movement you say you follow the process immediate statement is it is against this spirit of education or further if they want to be very strong they call it as a straight jacket.

And, they will also say education is more than preparing students for identified job. For example, the last one if you take, it is not dichotomous that is good learning or somebody getting educated whatever you call educated and preparing for a job, they are not mutually exclusive first of all. If, it is they are mutually exclusive, you have selected bad out outcomes for your program. And, it is certainly not a straight jacket because the

content, the instructional approaches assessment everything is in the hands of the teacher.

So, it is certainly not against the spirit of education. So, I feel that these reservations about OBE are misplaced, but still all faculty would not believe that, because they still consider any kind of intervention or interference is bad for education.

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**Features of an Outcome Statement**

- Should unambiguously state what the student should be able to do/perform
- What the students do or perform are observable and assessable
- Students should be able to understand what it means (comprehensible)
- Should be able to provide guidance to students in planning their learning.

N.J. Rao

Now, coming to **features of an outcome statement**, the outcome statement should unambiguously state what the student should be able to do or perform. There should not be any ambiguity in terms of the language or in terms of the output; there should not be any ambiguity. You should not use any vague words, we will spend more time on that kind of thing. And, another important one is when you write some a stay outcome statement; it should be observable; that means, and assessable.

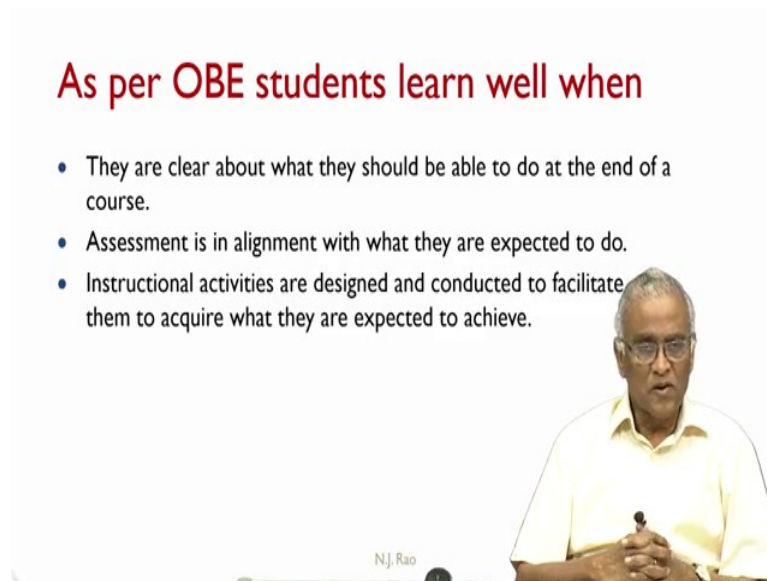
When students do or perform, because outcome statement is related to what student should be able to do or perform. Whatever that performance, whatever that is doing should be observable. And, also it should be measurable. If, it is not measurable I cannot. This is not an outcome. I cannot decide whether the outcome has been attained or not we will spend more time on that.

Student should be able to understand what it means? Comprehensible, it means you should not write in a language in a very complicated way where a student for whom it is

intended is not able to fully understand the meaning of that. So, it should be comprehensible and it should be able to provide guidance to students in planning their own learning.

We will look at some good outcome statements and all these features will automatically you will feel they are relevant. And, where they are violated will also give examples where you can see, what is exact, what is wrong with that particular outcome statement.

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**As per OBE students learn well when**

- They are clear about what they should be able to do at the end of a course.
- Assessment is in alignment with what they are expected to do.
- Instructional activities are designed and conducted to facilitate them to acquire what they are expected to achieve.

N.J. Rao

The slide features a video inset of N.J. Rao, a man with glasses wearing a light-colored shirt, speaking. The text on the slide is in red and black. The name 'N.J. Rao' is written in small text at the bottom left of the video inset.

Now, these are the three most important principles of not only OBE, you do not even have to take the OBE framework. First thing is they are clear about what they should be able to do at the end of a course. This is the most important when at the beginning of the course at the beginning of the semester one should communicate to the student very clearly, what they should be able to do at the end of that end of the semester.

This has been established very clearly through extensive field research, where the performance of the students has significantly improved just by merely communicating what they should be able to do at the end of a course nothing else. The, classroom instruction was not changed examination has not been changed, no change in the contents of the course, except they were communicated what they should be able to do at the end of a course and that itself has led to significant improvement in the performance of the students.

And, the second one which I have already stated principle or whatever you call assessment is an alignment with what they are expected to do, which I have already elaborated. And, the instructional activities are designed and conducted to facilitate them to acquire what they are expected to achieve; that means, my instruction whatever I do in the class should all the time lead the students to acquire what they are expected to achieve.

So, these are the 3 principles; if these 3 are followed the quality of the learning by the student will significantly improve.

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**Levels of Outcomes**

- Program Outcomes
- Program Specific Outcomes
- Course Outcomes (Course is what was/is sometimes referred to as "subject" or "paper" . The word "Course" was earlier used to refer to "Program".)

All the terms used here are identified by UGC and NAAC.

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Now, there are levels of outcomes as we have already stated, there are 3 **program outcomes** please remember that program represents an activity that is spread over several years. You can have a 2 year degree program, we can have a 3 year degree program, you can have a 4 year degree program. Program refers to a set of activities over a defined period like this.

Earlier this word course was used to represent a program. Even, today many colleges when they say course, it is actually program, but now these words what we are using are officially identified by both UGC and NAAC. So, we urge all faculty and all institutions to use these words. Program referring to certain under graduate program, under graduate degree as we call it this under graduate program of a 3 year duration. There are some 4 year duration undergraduate programs.

The program outcomes are the in terms of levels of outcomes, the program outcomes are generally discipline non-specific. We will we will elaborate more in the next unit; that means every graduate should attain these outcomes. That is what it means. Irrespective whether is whether is a graduate from a BA in music program, or a BA in philosophy, or BA in mathematics, he must attain these outcomes irrespective of the program that he is going through. And, there are program specific outcomes; if he is doing a BA in economics what specific outcomes should he attain, that is **program specific outcomes**.

Then, every program has several courses. Once again the course here earlier was being referred to as a subject or paper, they were loose words, but the word to be used is course; that means, a program has several courses. And, each course should have a set of defined outcomes. And, these words are as defined by a UGC and NAAC.

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## Program Outcomes (POs)

- POs are statements that describe what the knowledge, skills and attitudes students should be able demonstrate at the time of graduation from a general higher education program.
- POs are to be identified by the Institution/University
- They address both disciplinary and professional/generic competencies.

### Sample PO:

**Critical Thinking:** Take informed actions after identifying the assumptions that frame our thinking and actions, checking out the degree to which these assumptions are accurate and valid, and looking at our ideas and decisions (intellectual, organizational, and personal) from different perspectives.

Now, let us quickly go through these three types of outcomes. Program outcomes are statements that describe what the knowledge skills and attitudes student should be able to demonstrate at the time of graduation from a general higher education program, we are not saying which particular program.

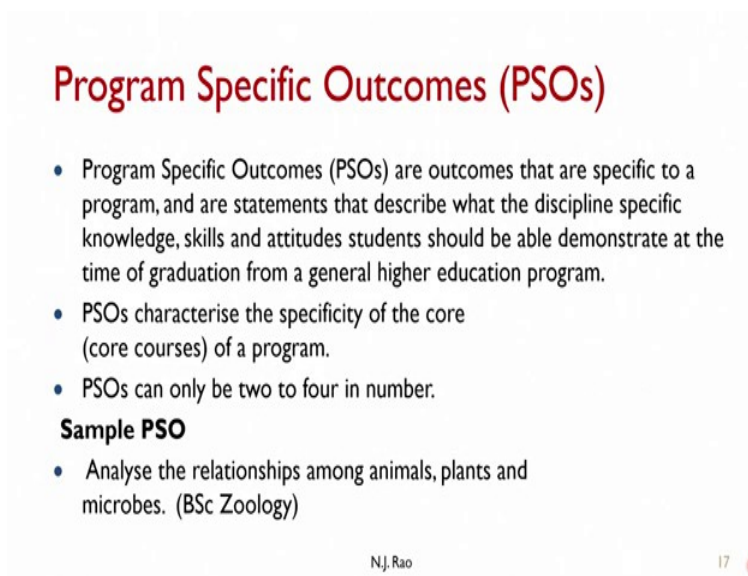
So, these POs as we call them, they are to be identified by the institution or the university. For example, a university or an institution an autonomous institution may be offering some 20 under graduate programs. Graduates of all the 20 under graduate programs should attain these program outcomes. They are discipline agnostic or they are



what otherwise we want to call it as professional in generic competencies, that is what we call them.

Now, a sample PO for example, is critical thinking. Everybody considers now generally on the drop of the hat any teacher will say; our student should learn to think critically. Now, that is irrespective of the program that he goes through. They take informed actions after identifying the assumptions that frame over thinking and actions, checking out the degree to which these assumptions are accurate and valid and looking at our ideas and decisions intellectual organizational and personal from different perspective. So, that is the sample of program outcome it has nothing to do with a particular discipline or a program.

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**Program Specific Outcomes (PSOs)**

- Program Specific Outcomes (PSOs) are outcomes that are specific to a program, and are statements that describe what the discipline specific knowledge, skills and attitudes students should be able demonstrate at the time of graduation from a general higher education program.
- PSOs characterise the specificity of the core (core courses) of a program.
- PSOs can only be two to four in number.

**Sample PSO**

- Analyse the relationships among animals, plants and microbes. (BSc Zoology)

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Now, you come to program specific outcomes. So, now, if we say I am doing BSc in Zoology I need to identify outcomes that makes sense with respect to the discipline of Zoology. So, program specific outcomes are outcomes that are specific to a program, and are statements that describe what the discipline specific knowledge, skills and attitudes students should be able to demonstrate at the time of graduation from a specific general higher education program. I should add that word from a specific higher education program.

PSOs characterize the specificity of the core of a program, we will again elaborate later. PSOs can only be 2 to 4 in number that is the requirement from NAAC. That is you do



not keep on writing a large number of PSOs. A sample PSO - analyze the relationships among animals plants and microbes.

Now, this particular thing might be attained through several courses that you offer ok, it is not just one course associated with this particular PSO.

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## Course Outcomes (COs)

- Course Outcomes are what students are required to demonstrate at the end of a course
- COs should be observable and measurable
- A course outcome addresses a subset of POs and PSOs

### Samples of COs

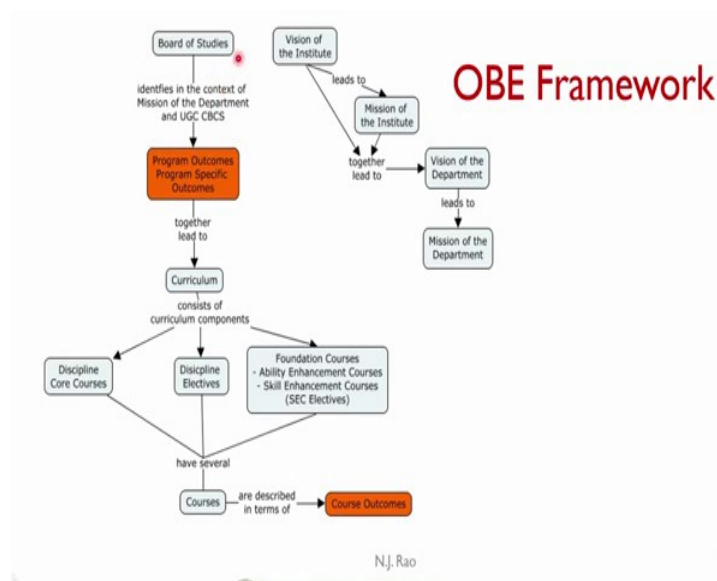
- Classify Protista up to phylum using examples from parasitic adaptation. (Course: Animal Diversity - Non Chordata)
- Compute the Energies and Wave functions of Hydrogen atom using Schrodinger equation. (Course: Quantum Mechanics)

Now, coming to **course outcomes**, course outcomes are what the students are required to demonstrate at the end of a particular course. And, they should be measurable and observable a course outcome should address. Now, what happens is - the POs and PSOs are at the level of the program. Now, how do we how do we attain them they need to be attained through a series of courses. Of course, courses plus some other activities you may have like projects, presentations, field trips, and so on, but majority of these outcomes have to be attained through courses.

So, what happens whenever I take a course, each course will address a subset of the POs and PSOs, that I write will go through that exercise later, but remember that if I have about let us assume 8 POs, and 4 PSOs, and this 8 plus 4 have to be attained through all the core courses. But, every course may not be able to address all the 12 PO sorry 8 POs and 4 PSOs, they are likely to address on their subset of them that should be remembered.

Now, these are 2 sample COs one is from a course called Animal Diversity-Non Chordata - compute the energies and wave functions of hydrogen atoms using Schrodinger equation, that comes from a course on quantum mechanics. That means, the student should be able to compute the energies and wave functions of hydrogen atoms that is the goal. And, on top of that you are also prescribing you are you should be able to compute those energies using Schrodinger equation, that is the specificity of the CO.

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This is a relationship of these outcomes in the present context. If you look at this the NAAC framework requires there has to be vision of the institute, which leads to mission of the institute and these two together vision and mission of the institute should also lead to the vision of the department in which the program is given, and vision of the department should lead to mission of the department.

And, the board of studies keeping the vision and mission of the department, the board of studies identifies in the context of the mission of the department and the UGC and CBCS, UGC CBCS we will elaborate later you that is choice based credit system, they have to identify the program outcomes and program specific outcomes. These two together should lead to the curriculum. Curriculum as per UGC frame work has 3 elements; one is **discipline core courses**, **discipline electives** and then you have what are called **foundation courses**, and foundation courses have ability enhancement courses, and skill enhancement courses.

Now, if you look at the discipline electives and skill enhancement courses these are electives; that means, these courses are not necessarily taken by all students. So, all students take discipline core courses and the foundation courses here. The ability enhancement courses together; these are the only ones that you can take you can take into consideration to achieve the program outcomes and program specific outcomes, but every course has to be defined in terms of course, outcomes. This is the broad relationship between right from the vision of the institute to the course outcomes.

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## Exercises

- Write two examples of Program Outcomes of your own undergraduate program paying attention to all the features of an outcome.
- Write two examples of outcomes of an undergraduate **course** offered by you, paying attention to all the features of an outcome.

Now, here we suggest that you do these two exercises; once again this is only to make sure by practicing a little bit you, you understand what an outcome statement is or what a course outcome is. Write two examples of program outcomes of your own undergraduate program paying attention to all the features of an outcome.

Write two examples of outcomes of an undergraduate course offered by you paying attention to all the features of an outcome ok. This is for just practice just to make sure all the features we talked about you are able to take into consideration. And, in the next unit 5, we try to understand the role of accreditation and the criteria according to which NAAC conducts it is accreditation. And, also understand the centrality of closing the quality loop at attainment of outcomes at the levels of COs, POs and PSOs. Closing the quality loop is the central principle of any accreditation process, we will elaborate that later.

Thank you.