TALE - 2 Course Design and Instruction of Engineering Courses
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Lecture - 07
Technology and Targets

Greetings, welcome to module 2 unit 7 of TALE. This is about the Technology for assessment and setting the Targets.

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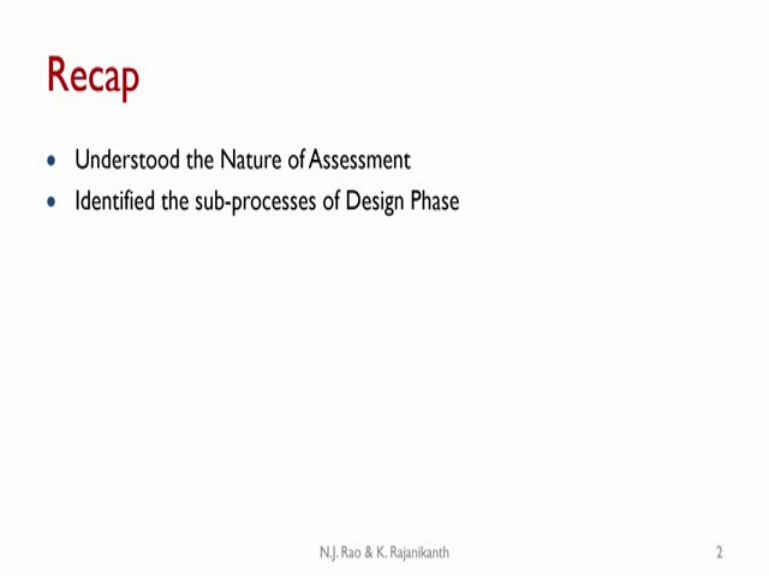

In the last unit we understood the nature of assessment. We identified the sub processes of design phase.

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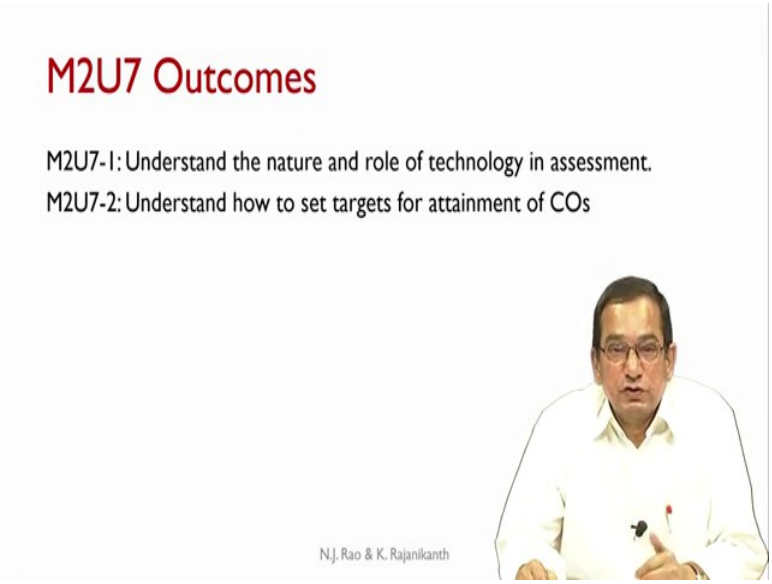

The outcomes for this unit are: understand the nature and role of technology in assessment and understand how to set targets for attainment of COs.

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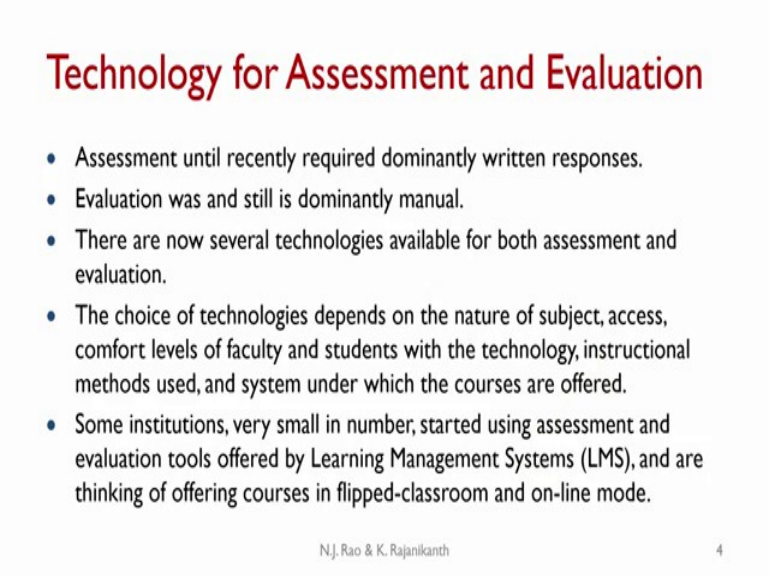

Technology for assessment and evaluation has become very important these days. Assessment, until recently, required dominantly written responses from the students. Evaluation was and still is dominantly manual, which means that setting the assessment instruments, collecting the responses and evaluating these responses of the students, consumed construable amount of faculty time. It imposed fair amount of load on the

faculty. Even in the university systems considerable resources and time of the university are devoted only to the assessment aspects or typically the examination processes.

There are several technologies available for both assessment and evaluation and a proper use of such technologies can considerably save the faculty time, make the quality of assessment better and ensure that the learning of the students also is deep. The choice of technologies depends on the nature of the courses, the content, the access, comfort levels of faculty and students with the technology, instructional methods used and system under which the courses are offered.

All these points do have a bearing on the kind of technology that can be used for assessment and evaluation. Some institutions, though at present are still very small in number, have started using assessment and evaluation tools offered by Learning Management Systems (LMS) and are thinking of offering courses in flipped classroom and online mode; sometimes in blended mode.

The learning management systems can be open source tools or proprietary tools purchased for the institute. But their use is becoming increasingly popular because of the reduction in the load on the faculty and the improvement in the quality of the assessment.

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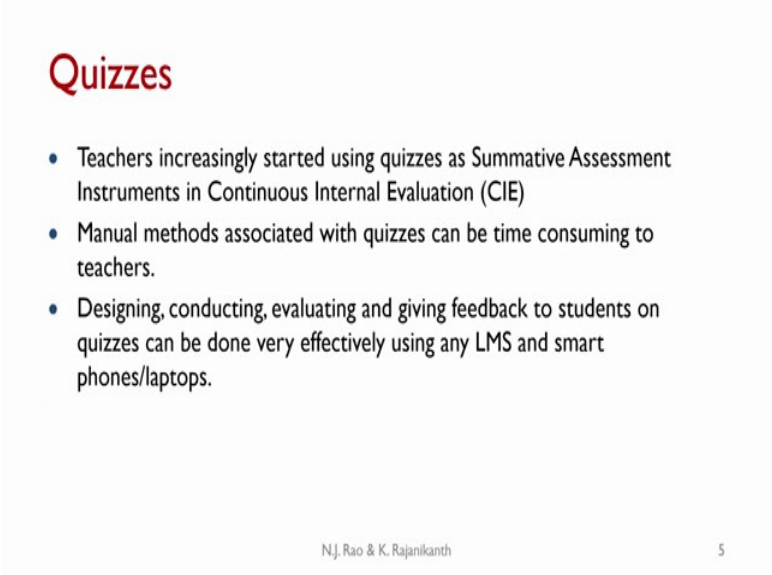

Quizzes: Teachers are increasingly using quizzes as summative assessment instruments particularly in Continuous Internal Evaluation or CIE. The manual methods associated

with quizzes can be time consuming to teachers. On the other hand, designing, conducting, evaluating and giving feedback to the students (which is also extremely important) on quizzes can be done very effectively using any LMS and a combination of smart phones or laptops. There are also open source tools available for conducting the quizzes and the learning management systems can provide the responses very quickly and people have begun using these tools.

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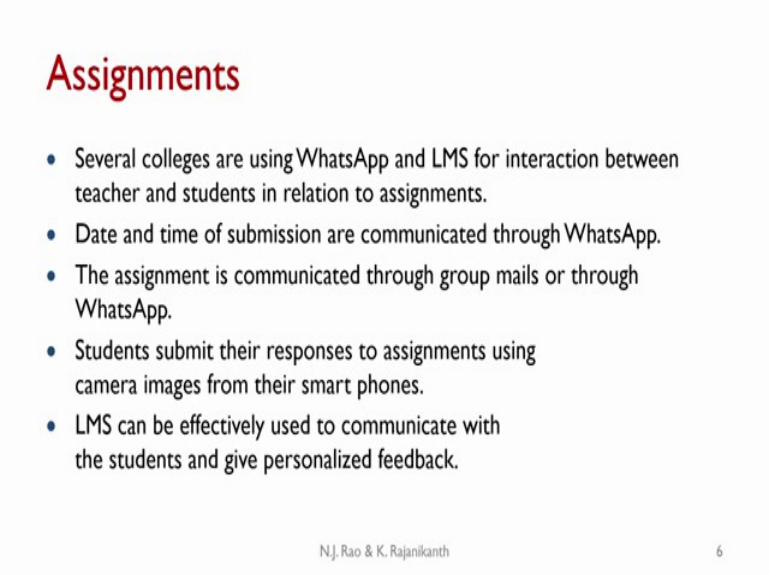

Assignments: Several colleges have begun using the social media like WhatsApp and LMS for interaction between the teacher and the students in relation to assignments also. Date and time of submission are communicated through WhatsApp. A specific group is created for the course and the students and the faculty are members of this group. So, date and time of submission can be communicated through such a group.

The assignment is communicated through group mails or through WhatsApp again, and students can submit their responses to the assignments using either camera images from their Smartphones or if the text is typed in the phone itself, directly by sharing the relevant WORD document or a PDF document. LMS can be effectively used to communicate with the students and give personalized feedback. And the use of such tools can make it not only less burdensome for the faculty, but more interesting for the students also.

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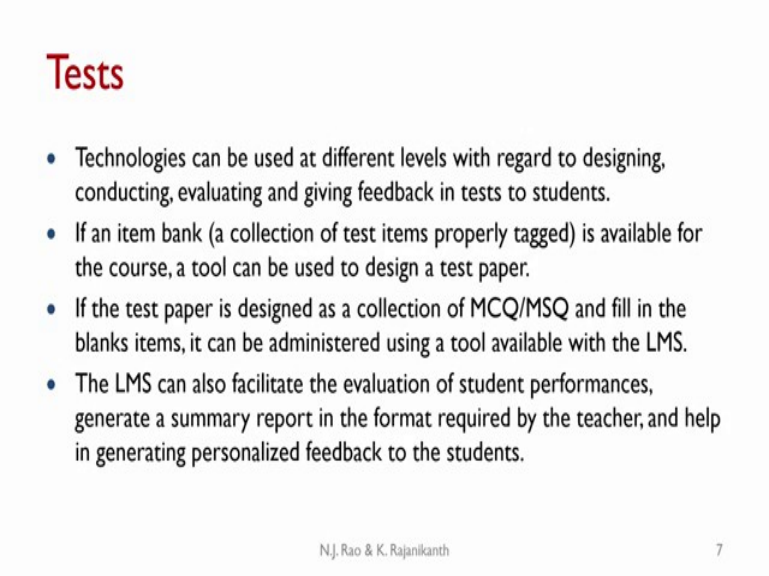

Tests: When it comes to tests, technologies can be used at different levels with regard to designing, conducting, evaluating and giving feedback in tests to the students. But this would require that certain prerequisites are met. For example, if an item bank- a collection of test items properly tagged, (we will discuss this item bank in greater detail in a later unit) - is available for the course, then it is very easy to have a tool that can be used to design the test paper; that is from the item bank the assessment items for required number of marks, in required number of items can be collected together and an instrument can be composed by the tool as per the structure specified by the instructor.

So, the job becomes much simpler and the quality of the assessment instrument will also be much better because the instructor can specify the pattern (we will discuss this in a later unit, the assessment instrument pattern). If such an item bank is available we can use technology to create a test paper.

If the test paper is designed as a collection of multiple choice questions or multiple select questions or fill in the blank items, then that can be administered using a tool available with LMS or one could also use open source tools which are also available today in fair variety. The LMS can also facilitate the evaluation of student performances; generate a summary report in the format required by the teacher and help in generating personalized feedback to the students. So, it can be seen that the use of technology in administering

tests, quiz, assignments - all these can make the assessment both deeper and meaningful, enjoyable to the students and reduce the burden on the faculty.

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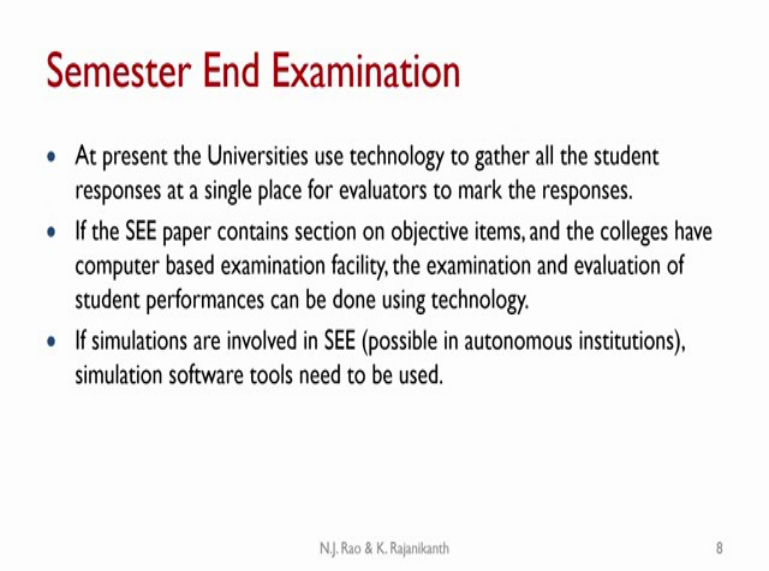

The semester end examination, when we consider, there are certain limitations. At present most of the universities are using technology only to gather all the student responses at a single place or at multiple places for evaluators to mark the responses. Basically the physical answer sheets are collected, they are scanned and the electronic versions are transmitted to the evaluation centers and the instructors evaluate these scripts in the electronic form and their evaluations are again fed back to the central servers and the total evaluation is done by a tool.

Primarily the technology is being used to gather the student responses, turn them into electronic form and make them available to the evaluators at designated evaluation centers. If the SEE paper contains a section on objective items (some universities are doing this; a part is there which a section on objective items) and if the colleges have computer based examination facility, the examination and evaluation of the student performances can be done using technology. It can be done centrally by the university also; the first part which has got the objective items can be evaluated electronically, considerably simplifying the amount of effort involved in completing the evaluation process.

If simulations are involved in the semester end examinations, which is possible in autonomous institutions, simulation software tools need to be used and they can be incorporated into the assessment context.

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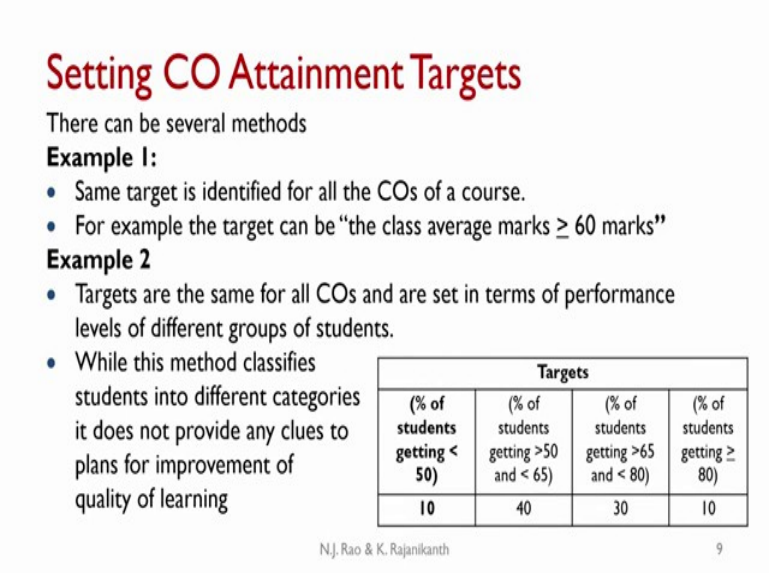

Next important thing would be setting the CO attainment targets. As we have seen earlier already, the writing of the course outcomes is one step, but we need to set a target attainment level for each CO. After delivering the course we have to determine what is the actual level of attainment of that outcome and then based on the set targets and attained levels the instructor has to decide whether to increase the target level for the next time or if the set target has not been achieved by the students do an analysis of why the set targets have not been attained and then plan improvement in the instruction in order to ensure that the students' attainments will be at a higher level (closer to the targets) next time.

So, this is closing the quality loop and in order to do this, it is necessary that we must set attainment targets for the course outcomes and this must be done upfront and this is an extremely important part of the design phase. There are several methods possible for setting the CO attainment. Here we will discuss only three / four examples, but a still wider variety of setting the targets is possible.

But what is important is that the institute as a whole must adopt one uniform way of setting the attainment targets, so some of the methods can be as follows. First example:

Same target is identified for the entire COs in a course. For example, the target can be that “the class average marks will be greater than or equal to 60”. Now this target is same for every CO and it depends only on computing the average performance of the students in the class. So, fairly simple method, but the information gathered is also quite limited and it has certain weaknesses with respect to closing the quality loop.

Example 2: Targets are the same for all COs, but are set in terms of performance levels of different groups of students. For example, I can say that percentage of students getting less than 50 will be 10, percentage of students getting greater or equal to 50 marks and less than 65 will be 40 percent, percentage of students getting greater than 65 and less than 80 marks will be 30 percent; and percentage of students getting more than or equal to 80 marks will be 10 percent. That means, now the class is being divided into the different performance groups and we are setting target for different performance levels. While this method classifies students into different categories, it does not provide any clue to plan for improvement of quality of learning.

If we are not able to meet these targets, in the sense for example, percentage of students getting greater than or equal to 80 is less than 10, but percentage of students getting more than 65 and less than 80 is greater than 30, what does it mean in terms of improving the instruction methods? That is not very clear, but it does give more detailed information about the performance of the students. But correspondingly computing the level of attainment would also be little bit more involved in this case.

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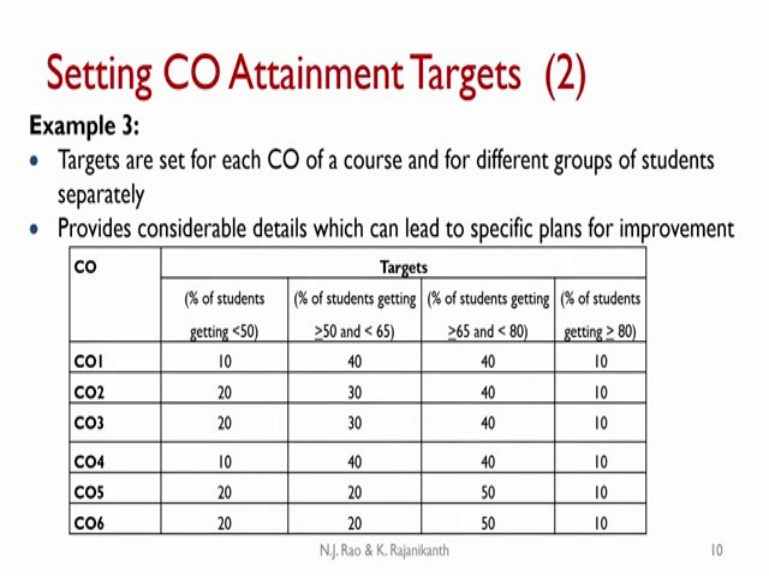

Another example can be: Targets are set for each CO of a course and for different groups of students separately. As can be seen in the table; each CO is considered separately and for each CO we set different targets for different groups of performances. For example, (assuming that there are 6 outcomes, we are setting different target levels of the percentage of the students getting less than 50 marks) percentage of students getting less than 50 the target is 10 percent for CO1, but it is 20 for CO2 and 20 for CO3 and 10 for CO4, 20 for CO5 and 20 for CO6.

This is considerable detail and this can be used to plan specific activities for improvements in the attainment when the planned targets are not met, but this is considerably more complex and it may take quite a lot of effort to compute these attainment levels in this particular fashion.

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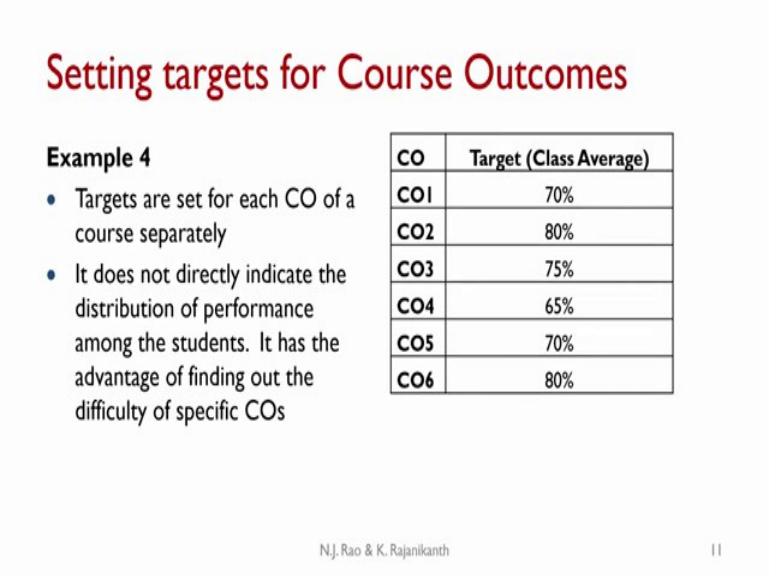

Yet another way of setting the targets for the course outcomes can be that the targets are set for each CO of a course separately. For example, the class average is the target set and CO1 it is 70 percent, CO2 - 80 percent, CO3 is 75 percent, CO4 - 65 percent, CO5 - 70 percent, CO6 - 80 percent. This allows the instructor to set the target based on the nature of the CO, the instructor's perceived complexity of that particular CO and the instructor's assumptions regarding the backgrounds of the students. Based on all these, the target can be set for COs at different levels.

This does not directly indicate the distribution of performance among the students, in the sense that within CO1 how are different cohorts of students performing or how are the different performance rangers distributed as we saw in example 3. That kind of information is not available. But it does have the advantage of finding out the difficulty of specific COs. Which are the COs, where the attainment levels are substantially lower than the targets or which are the COs where the attainment levels are close to the targets or exceeded the targets? This will give an indication to the instructor on the COs regarding which the focus has to be more next time we deliver the course.

The COs where the attainment levels are substantially lower than the target; where the performance gaps are substantial would require special attention the next time the course is delivered. And it is very easy to compute the attainment levels also because it is only the class average. We have to take the average performance of the students during the

Continuous Internal Evaluation or CIE and during the Semester End Examination or SEE and combine them appropriately based on the universe regulations to determine the class average.

Computing the attainment level is also relatively simple and it does give us an idea as to which are the course outcomes which need greater attention from the instructor the next time the course is delivered. So, this is one of the useful and simple ways of setting the target. However, instructor is free to choose the other mechanisms, other methods which we discussed like this way of setting the targets for different groups of students separately or setting the targets group wise, but common to all COs.

However, the first method of setting the same target for the all COs, really is not of much use in terms of improving the quality of learning by the students. So, either the second or the third or the fourth- one of these methods can be chosen, though the fourth method does have several advantages over the others in terms of simplicity of calculating the attainment and giving adequate information regarding specific COs that we can do.

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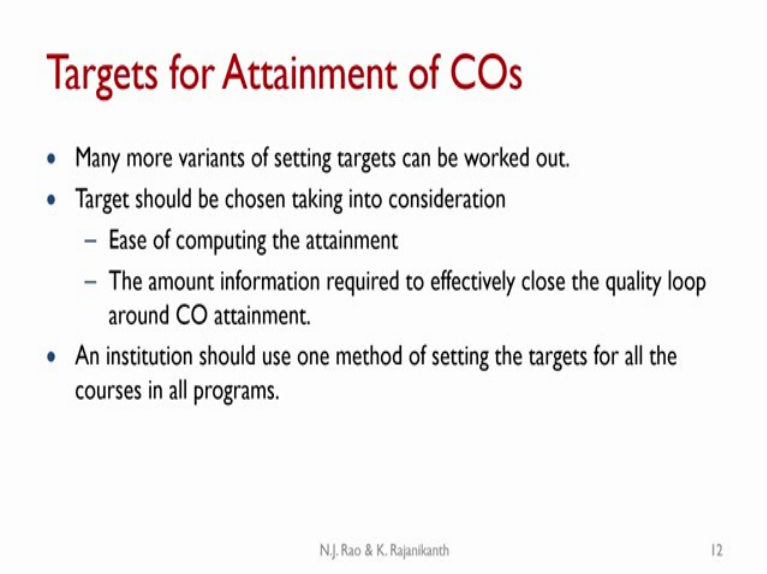

Now, many more variants of setting the targets can be worked out, a simple example can be that I can set the number of students who score more than 60 percent; (60 percent because it is the first class limit,) will be more than 70 percent of the class strength, some institutes have set targets like this.

So, there are many more variants of setting the targets, but target should be chosen taking into consideration ease of computing the attainment. Even if you are using a tool, it should be simple to compute the attainment and the amount of information required to effectively close the quality loop around the CO attainment (in the sense that figuring out the attainment level, comparing it to the target level and based on the performance gaps that are found, working out the improvement plans to raise the attainment levels the next time the course is offered); so, the amount of information required to effectively close of quality loop around CO attainment. Based on these two, targets should be chosen. But the most important aspect of setting the attainment targets for CO should be that the institution should use one method of setting the targets for all the courses in all programs; otherwise it becomes really chaotic. So, the institution can do certain brainstorming and choose one method of setting the target for all the courses in all the programs and that would be a convenient way of achieving the quality.

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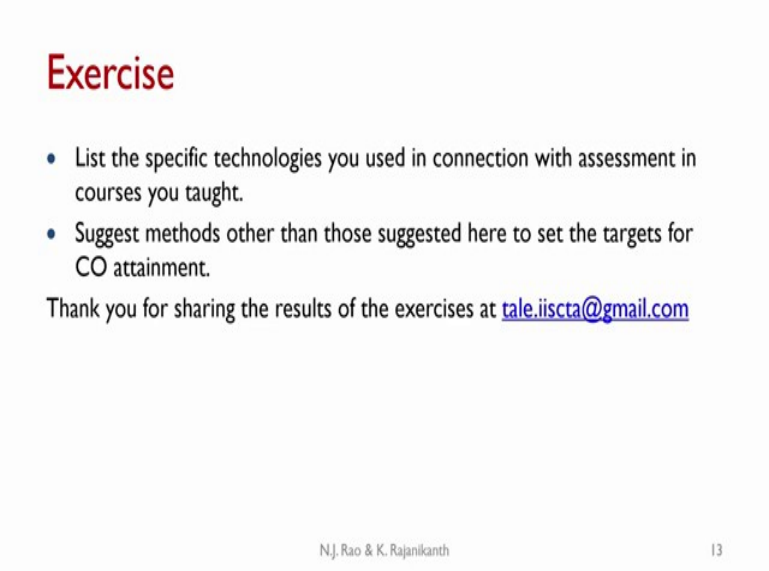

Please list the specific technologies you used in connection with assessment in courses you taught. Suggest methods other than those suggested here to set the targets for CO attainment. Thank you for sharing the results of the exercises at tale.iiscta@gmail.com

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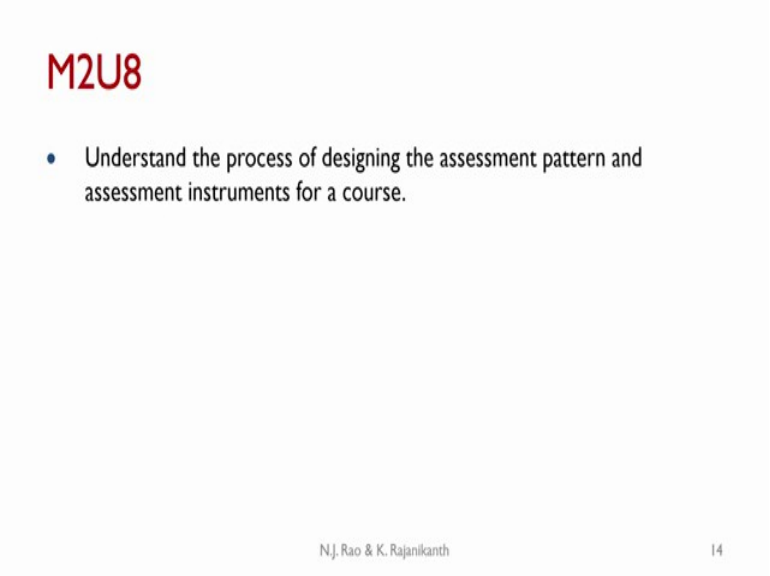

In the next unit, we will understand the process of designing the assessment pattern and assessment instruments for a course.

Thank you and we will meet again in the next unit.