TALE - 2 Course Design and Instruction of Engineering Courses
Prof. K Rajanikanth
Former Principal - MSRIT
Indian Institute of Science, Bengaluru

Lecture - 17
Exit Surveys for Projects

Greetings. Welcome to module 2, unit 17 on Exit Surveys for Projects.

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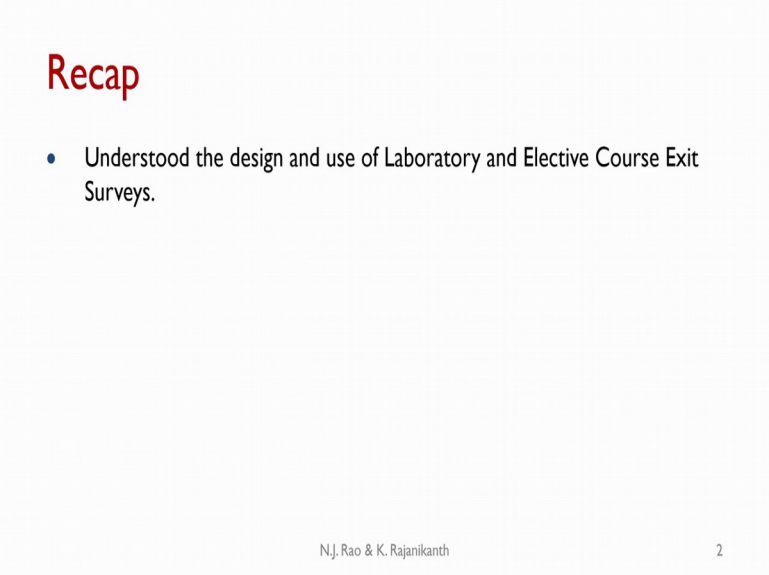

In the last unit, we understood the design and use of laboratory and elective course exit surveys.

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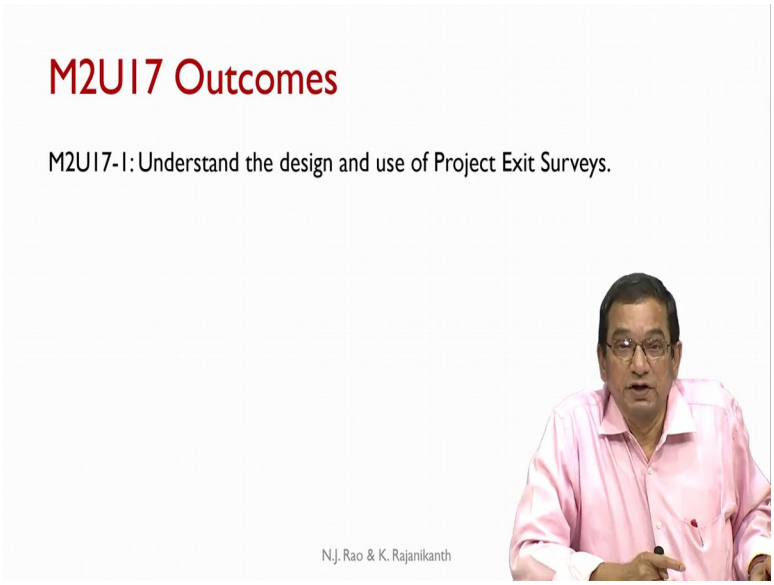

In this unit, we will look at the projects. The outcome for this unit would be "understand the design and use of project exit surveys."

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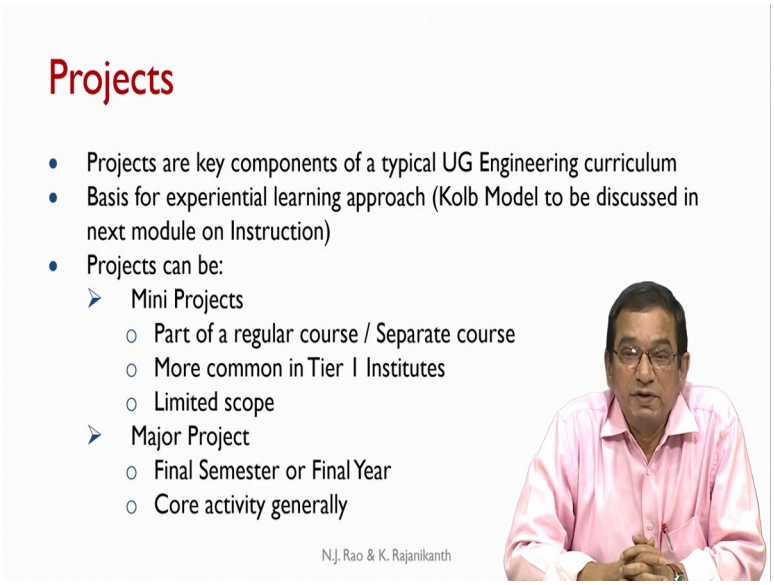

Projects are key components of a typical UG engineering curriculum. They become the basis for experiential learning approach, based on the Kolb model which we will be discussing in the next module on instruction. Now, there is again a large variety in which the projects can be offered. But typically, projects can be mini projects or the major project or the final year project.

The mini project again can be offered as a part of a regular course, usually in the place of an associated lab, but sometimes one can have a lab as well as a mini project or it can be offered as a separate course by itself. For example, with a credit structure of 0:0: 2; that means, 0 theory hours, 0 tutorial hours, 2 credits worth of lab, but that is a mini project. This is more common in tier 1 institutes.

However, in some tier 2 institutes also instructors are given certain amount of freedom in the way the continuous internal evaluation is implemented. Then, the instructor may offer the choice of a mini project to the students. It has a limited scope because it is done within a semester and also there are other courses through which the students go through. So, the mini project has a limited scope.

The major project is usually done either in the final semester or in the final year that is both 7th and 8th semester together and it has substantial credit weightage. So, it is a major activity for the students and in most of the institutes this is a core activity. A very small number of institutes do offer a choice to the students. They can do the major project or do some additional course work, but that is very rare. By and large, in most of the institutes, the major project is a core activity.

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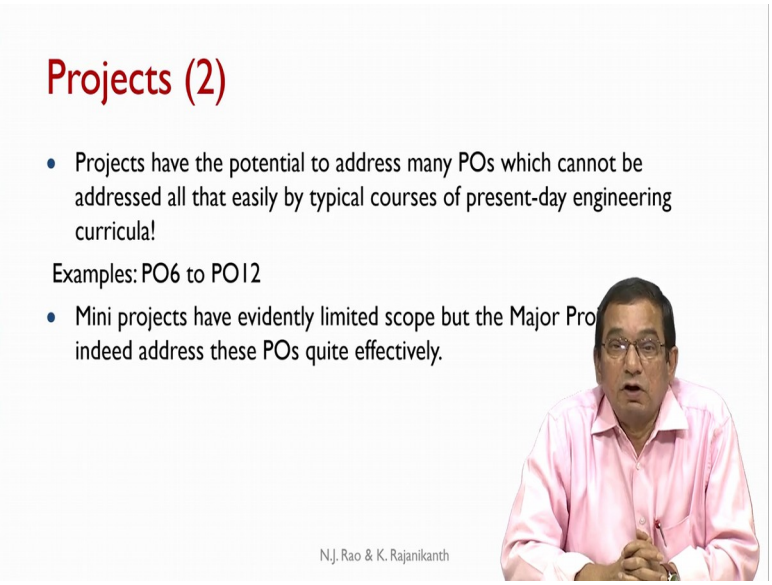

The importance of projects is that they have the potential to address many POs which cannot be addressed all that easily by typical courses of present day engineering curricula. In fact, the POs from PO6 to PO12, those related to engineer and society,

related to environment and sustainability, related to ethics, project management and finance - all this kind of POs - it is very difficult to address this through conventional courses that exist in the present day curricula. But, a project has the potential to address all these POs if appropriately planned and orchestrated.

Mini projects have evidently limited scope, but the major project can indeed address all these POs quite effectively.

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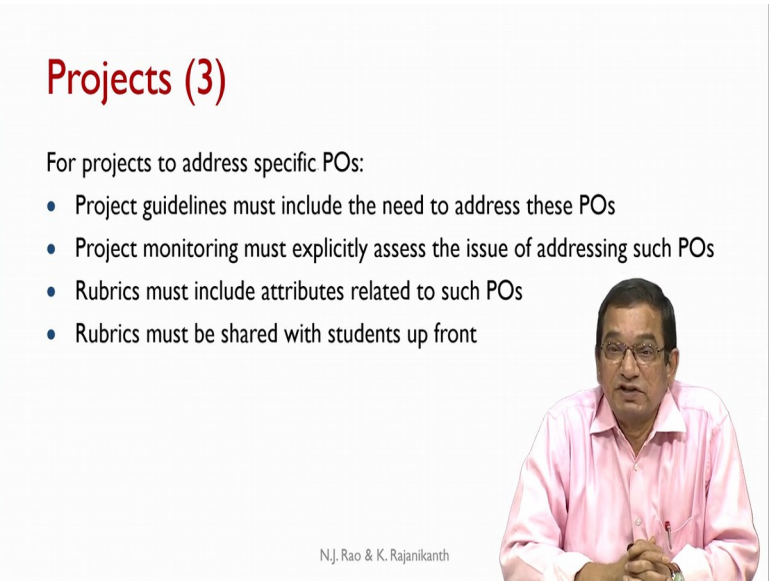

But, for even the main project to address specific POs, project guidelines must include the need to address these POs. For example, if the project is supposed to address the issue of ethics, then explicitly the guidelines must include something about plagiarism. So, similarly, if any other PO is to be addressed, the guidelines must be clear that students must address those issues while they are implementing their main project. Project monitoring also must explicitly assess the issue of addressing such POs. Whether the work is really addressing those POs or not - that must be included as a part of the monitoring activity.

Rubrics must include attributes related to such POs; then only we can claim that really the project is addressing those POs. And the rubrics must be shared as usual with the students upfront. If we take care of all these issues, then we can ensure that the main project addresses all these POs which are very difficult to address through conventional courses.

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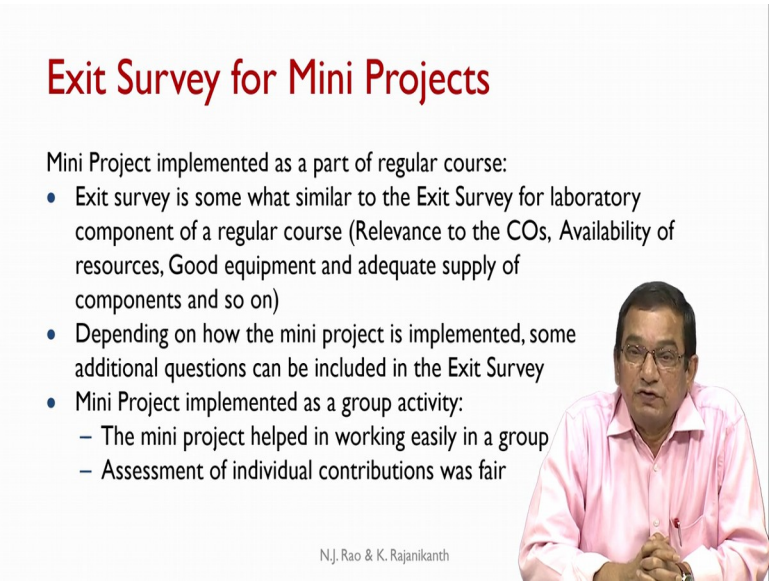

When we look at the exit survey for mini projects we have again options. The mini project may be implemented as a part of a regular course or it may be offered as an independent, separate course by itself. When the mini project is implemented as a part of a regular course, exit survey (to some extent) is similar to the exit survey for a laboratory component of a regular course; in the sense, whatever questions we ask there are applicable here also. For example, we can ask questions about relevance of the mini project to the COs of the course; availability of resources; good equipment and adequate supply of components and so on.

Depending upon how the mini project is implemented some additional questions can be included in the exit survey. For example, if the mini project is implemented as a group activity, -2 or 3 students combining together to execute the mini project -, then we can ask a question like – “the mini project helped in working easily in a group?”. This is evidently related to a PO concerned with teamwork. We can also ask a question – “assessment of individual contributions was fair?”. This is also related to teamwork.

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If mini project is offered as a separate course then some additional considerations come into the picture. When mini project is offered as a separate course, it is generally designed to provide good experiential learning to the students. It has a very sharp, but limited focus; in the sense that the mini project as a separate course is offered to provide a specific kind of experience to the students. Often, they have certain open-ended experimentation and they are exploratory in nature, but they do have certain limited focus.

Examples can be - design thinking in first year or sometimes in second year or in first year there could be activity related to social entrepreneurship and we might offer a mini project in that area. These are all mini projects offered as separate courses. Like any other course - a mini project also needs to be improved next time it is offered.

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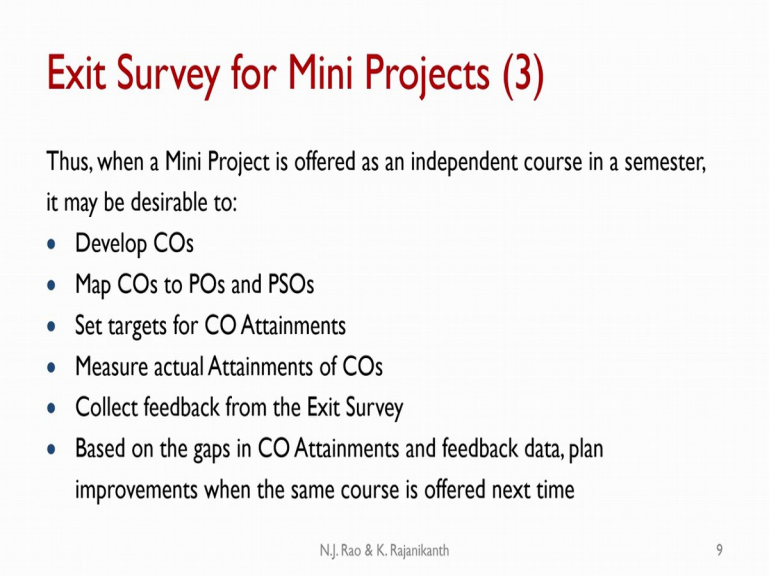

If the mini project is offered as an independent course in a semester, we can treat that as any other course. That is one option. We can also treat it in a fashion that is similar to the main project! That is another option. If you treat this as any other course, then it would be desirable to develop COs, map the COs to the POs and PSOs, set targets for CO attainments, measure actual attainment of COs, collect feedback from the exit survey, based on the gaps in CO attainments and feedback data, plan improvements when the same course is offered next time.

For example, if you offer a course on design thinking in one year, based on this kind of data, we can figure out how to improve this offer next time the same course is offered - next time the mini project is offered again on design thinking.

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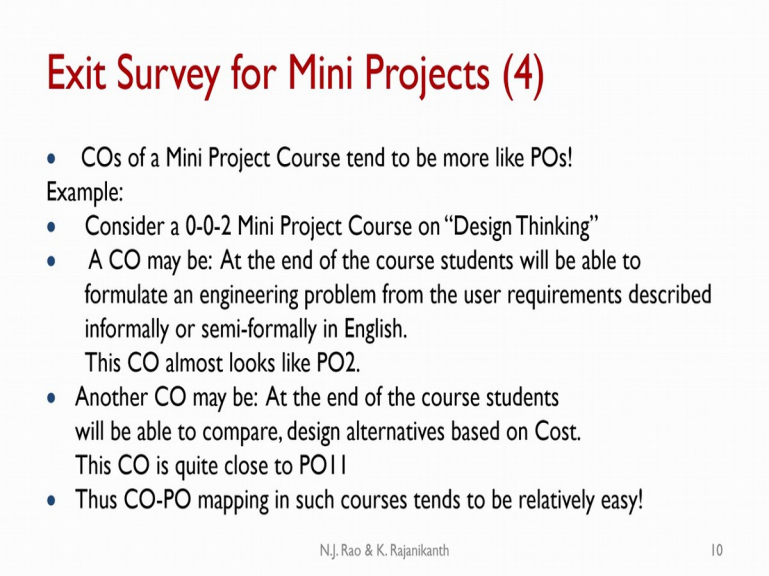

Of course, COs of a mini project tend to be more like POs. Example: Consider a 0:0:2 mini project course on design thinking; 0 theory hours, 0 tutorials and 4 hours of laboratory work devoted to the mini project (two credits). A CO may be: at the end of the course, the students will be able to formulate an engineering problem from the user requirements described informally or semi-formerly in English. So, the way we organize the mini project, probably we start with the specification of the user requirements, but informally or semi-formally in English and as a first step, the students are expected to formulate that as a specific engineering problem - formalize the problem statement. Now, this CO is almost like PO2.

Another CO may be: at the end of the course, students will be able to compare design alternatives based on cost. If the way the mini project is organized, students are expected to work out the cost based on the design, then the students may be asked to provide at least two design alternatives; then compare them based on the cost. So, if one of the COs is: at the end of the course, students will be able to compare design alternatives based on cost, then this CO is quite close to PO11 - project management and finance. Thus, CO-PO mapping in such courses tends to be relatively straightforward, simple and easy because the CO almost looks like a PO.

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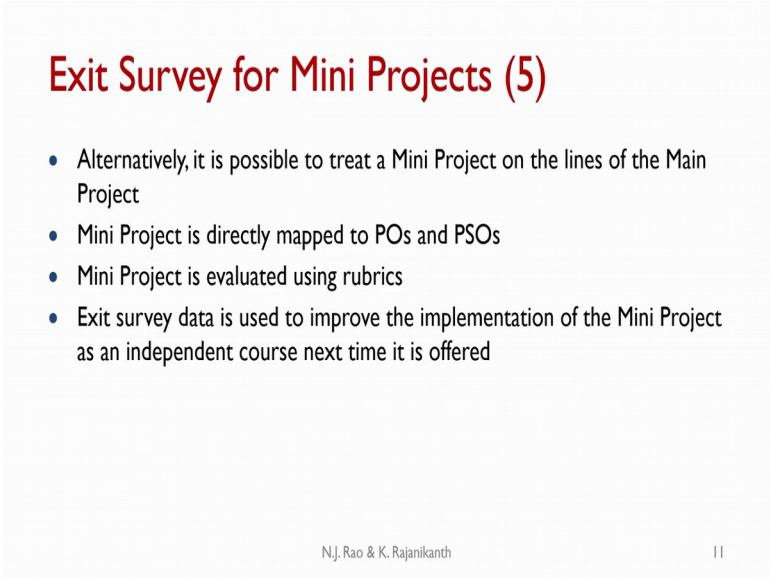

It is also possible to treat a mini project on the lines of the main project; that means that separate COs are not developed. Mini project is directly mapped to POs and PSOs and the mini project is evaluated as the main project - may be a written report, demonstration, a viva and the attainment of POs and PSOs is done using rubrics. The mini project is evaluated using rubrics, which is also possible. Exit survey data is used to improve the implementation of the mini project as an independent course next time it is offered. So, it is possible to consider the mini project in either of these two ways.

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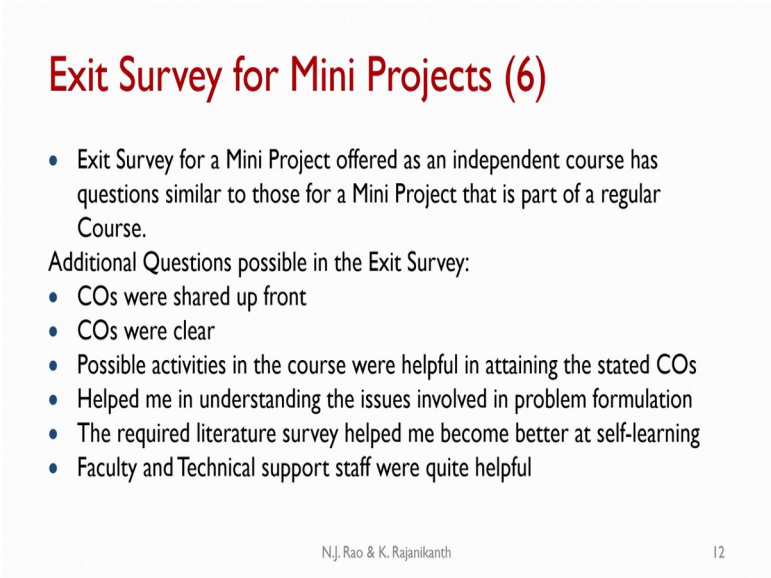

Exit survey for a mini project offered as an independent course has questions similar to those for a mini project that is part of a regular course. But, certain additional questions are possible in the exit survey. “COs were shared up front?”, in case we are writing the COs and measuring them. “COs were clear”; “Possible activities in the course were helpful in attaining the stated COs”; “Helped me in understanding the issues involved in problem formulation” (related to a PO); “The required literature survey helped me become better at self learning” (related to another PO - PO12); “Faculty and technical support staff were quite helpful”. Like this, we can add certain questions in the exit survey for a mini project when it is offered as an independent course.

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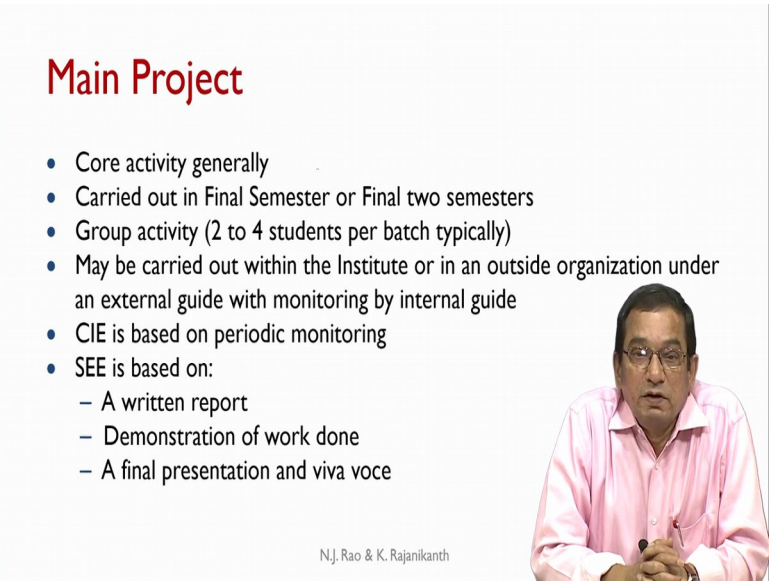

Main project: This is a core activity generally. In most of the institutes, it is a mandatory activity and it is carried out either in final semester or in the final two semesters - 7th and 8th semester. And typically it is a group activity - 2 to 4 students per batch. But it is possible to have a larger batch, though rare. Similarly, in very rare and exceptional situations - a single student may be allowed to do a project, but these are all very rare and exceptional.

Typical is, it is a group activity and it may be carried out within the institute or in an outside organization under an external guide, but with monitoring by an internal guide. That is also allowed in many institutes and the continuous internal evaluation (CIE) is based on periodic monitoring. There are guidelines on how frequently this kind of

monitoring should happen and based on that the CIE is determined. And semester end evaluation is generally based on a written report to be submitted by the team, demonstration of the work done, then a final presentation and viva voce. Typically these are the components of SEE.

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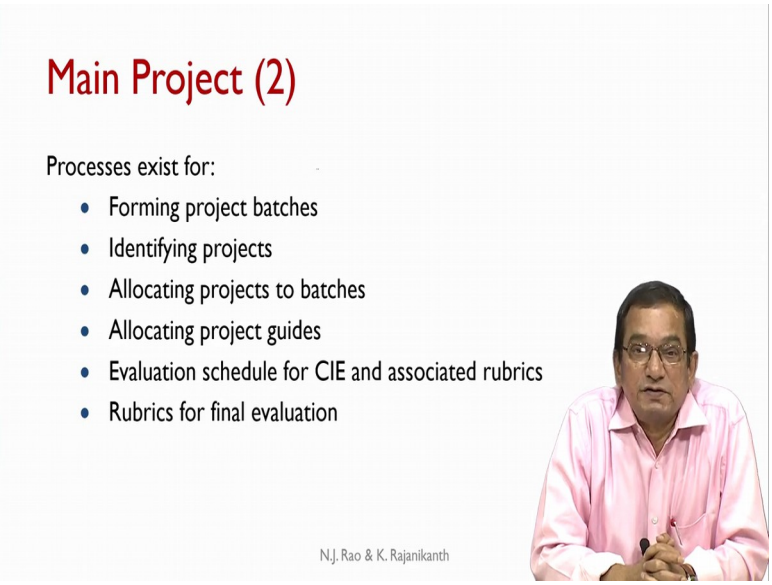

Usually the institutes have several processes for smooth organization and implementation of project activity. There are processes for forming project batches; quite a good number of options are available to the institute. They could be placed simply on the roll numbers i.e., serial numbers; they could be based on the student interests combined with the head of the department perceptions, sometimes some good students may be combined with some relatively weak students. Several options do exist and several institutes practice these in different ways. But it is one of the important activities and the process is defined in the institute on how the project batches are formed.

Identifying the projects: Again here we have choices. Sometimes, the department puts up a list of the projects available. The list is available on the notice board and from that, students give their preferences. Sometimes, students are allowed to present their own ideas and these ideas can be considered at the department level and sometimes, they will form the basis for identifying the projects; again varieties of options are available.

Allocating projects to batches, allocating project guides: Again, this is quite involved. There could be student preferences as well as guide preferences. So, based on that, there is a kind of a process by which the guides are allocated to the projects.

Evaluation schedule for CIE and associated rubrics: These are also specified upfront. How many times the monitoring happens and what exactly takes place in the monitoring; what are the deliverables from the students at these monitoring meetings and what are the rubrics based on which the students are evaluated - these are also part of the process. Then for final evolution also generally we have rubrics. So, we have processes for all these activities related to the projects.

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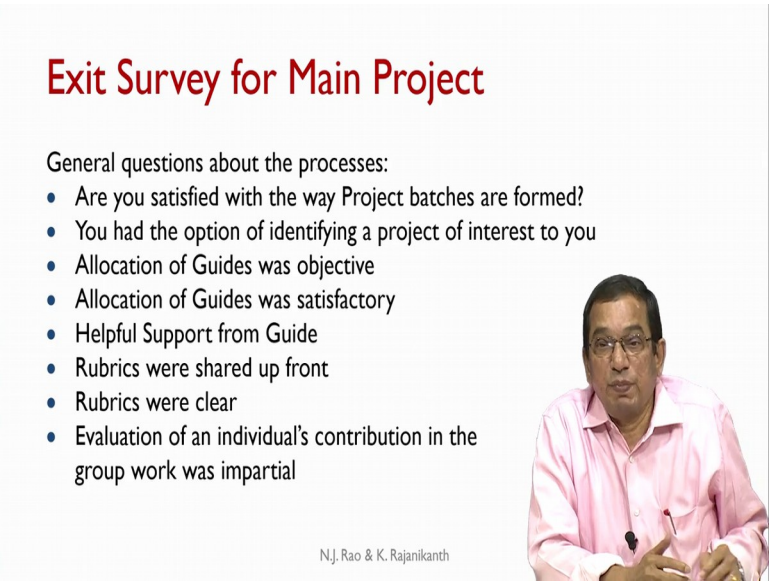

We can have in the exit survey questions related to all these aspects. So, we can have general questions about the processes. “Are you satisfied with the way project batches are formed?” (because that is one important aspect of carrying out the project.); “You had the option of identifying a project of interest to you? Was that option given?”; “Allocation of guides was objective” (based on certain criteria a process was implemented); “Allocation of guides was satisfactory” (even if we had a process, whether it was satisfactory); “Helpful support from guide” (particularly if the project is done in an outside organization what kind of support was provided by the internal guide? So, we could specify the help, support from the guide specifically.); “Rubrics were shared upfront”; “Rubrics were clear”; “Evaluation of an individual’s contribution in the

group was impartial" (It is necessary because it is a group work and during the evaluation of the project, usually the individual's contribution is also assed and certain marks are allocated to that. The evaluation of an individual's contribution in the group work - whether it is impartial in the perception of the students.) Note that again all these are only student perceptions because it is a survey.

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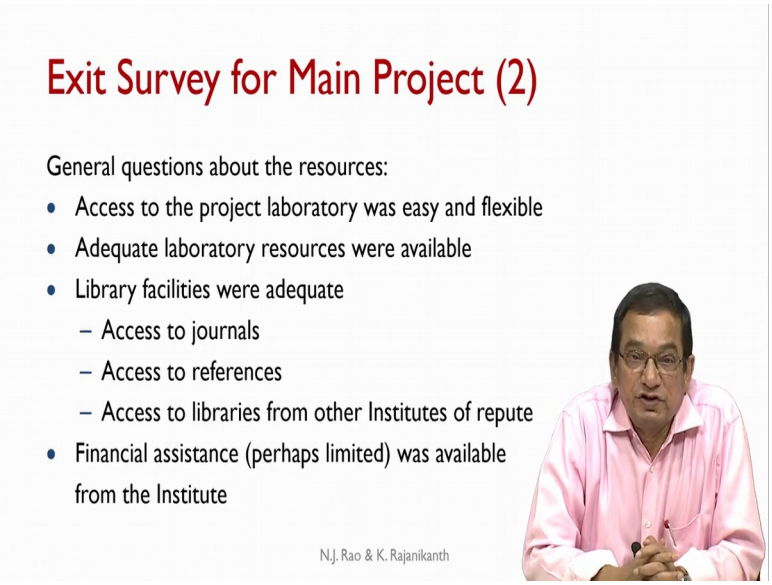

Then general question about resources, we can ask. "Access to the project laboratory was easy and flexible" (Most of the institutes do have a separate dedicated project laboratory whose access is much more flexible in the sense that the controls, the timings for the project laboratory are more flexible compared to the regular liabilities. If such a project laboratory is available - as in fact, it is required by the NBA also - then the students would find it much more helpful to implement their projects in house.) So, "access to the project laboratory was easy and flexible".

"Adequate laboratory resources were available"; "Library facilities were adequate" (Because most of the time the projects are carried out based on recent ideas, access to journals is very important. Access to references, reference books and all that is also very important. And occasionally if it is not available in our library, if there is an agreement of this library with other libraries to share the resources, then it would be helpful. So, we can ask "access to libraries from other institutes of repute - does such a facility exist?")

Then financial assistance; perhaps limited, institutes do have their own limitations. So, the financial assistance maybe limited, but at least in a limited way, "is financial assistance available from the institute?" (Particularly projects which involve the purchase of materials, specialized components and fabrication work - in all such cases, expenses are involved and to what extent the institute provides financial assistance is also an important parameter. We could ask whether financial assistance was available from the institute.)

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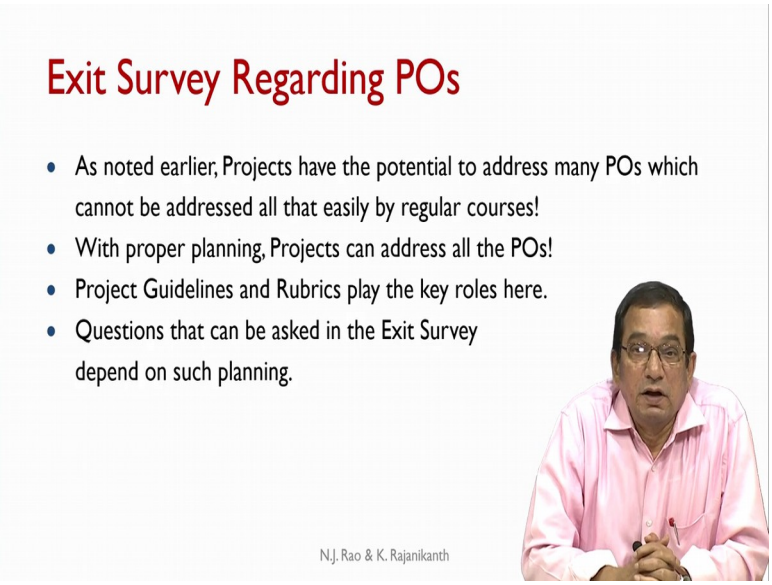

Projects have the potential to address many POs - generally, the POs which cannot be addressed easily by the conventional courses, the regular courses in any engineering curriculum. With proper planning projects can address all these POs.

Project guidelines and rubrics play the key roles here. The guidelines must specifically mention the activities to be carried out in order to address those POs and rubrics must have attributes related to those POs. If this is done, then questions that can be asked in the exit survey can be related to those POs. So, questions that we can include in the exit survey depend on such planning.

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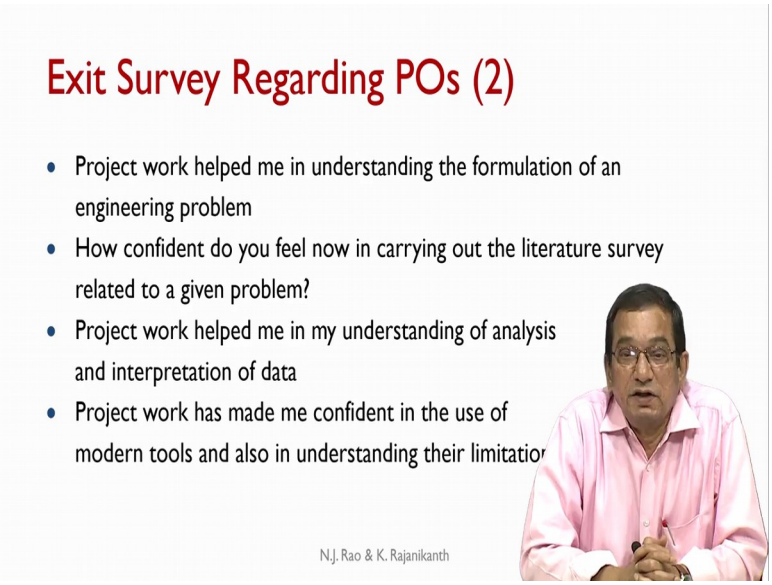

If the guidelines and rubrics are specific with respect to certain POs, then the questions that we can ask (typical questions) can be like this: "Project work helped me in understanding the formulation of an engineering problem"; (From informal or semi-formal description of the problem we specify the engineering problem to be solved. So, problem formulation is an important skill that the students must develop and demonstrate. So, we can ask a question related to that.)

"How confident to do you feel now in carrying out the literature survey related to a given problem?" (Related to self learning.) "Project work helped me in my understanding of analysis and interpretation of data." (Usually the project work has certain open ended nature to it. So, when the data is collected, analysis and interpretation of the data is a crucial aspect. To what extent the project work helped me in my understanding of analysis and interpretation of data?)

"Project work has made me confident in the use of modern tools and also in understanding their limitations." (We can ask this as a single question or we can split into two questions.)

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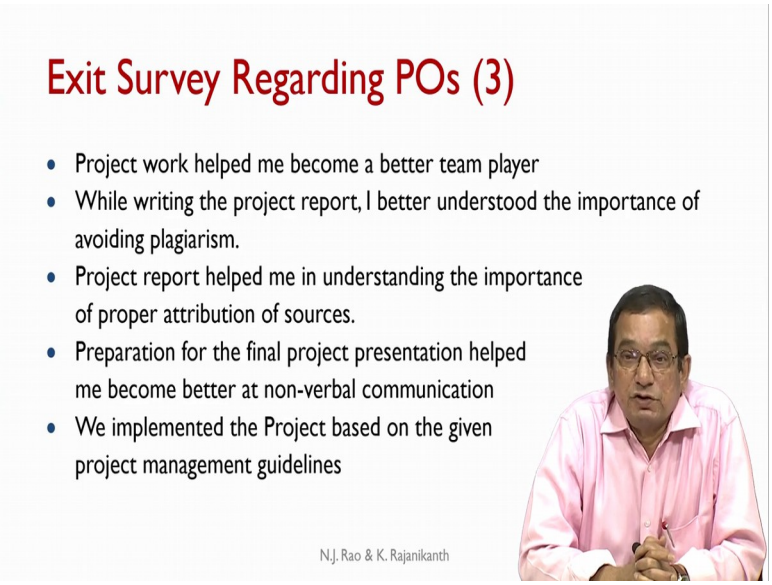

"Project work helped me become a better team player". (Very important outcome of the project work being a team work.) "While writing the project report, I better understood the importance of avoiding plagiarism". (Related to ethics. Again, the project guidelines must explicitly state that plagiarism will not be accepted beyond certain percentage, whatever 10, 15, 20 percent and there must be a tool available to check the plagiarism level and explicit instructions must say that if the plagiarism is above certain percentage then the report would be rejected. The rubrics would include some criteria/some attributes related to the plagiarism aspect.)

"Project report helped me in understanding the importance of proper attribution of sources". (This is also part of the ethics. So, when we pick up the information from some source, it is necessary to give proper reference. Proper attribution of sources is also important and this can also be stated in the guidelines and it can be there in the rubrics.)

"Preparation for the final project presentation helped me become better at non-verbal communication". (As a part of the communication skills. So does it help in becoming better with non-verbal communication?)

"We implemented the project based on the given project management guidelines". (if the department provides certain project management guidelines like time scheduling or a PERT-CPM kind of a tool to be used or cost estimation to be provided, design alternatives to be specified, milestones to be set up, tracking to be done. What are

guidelines that the institute has provided? If the project is to be implemented based on those guidelines then the students will get exposure to project management aspects also which is again another PO.)

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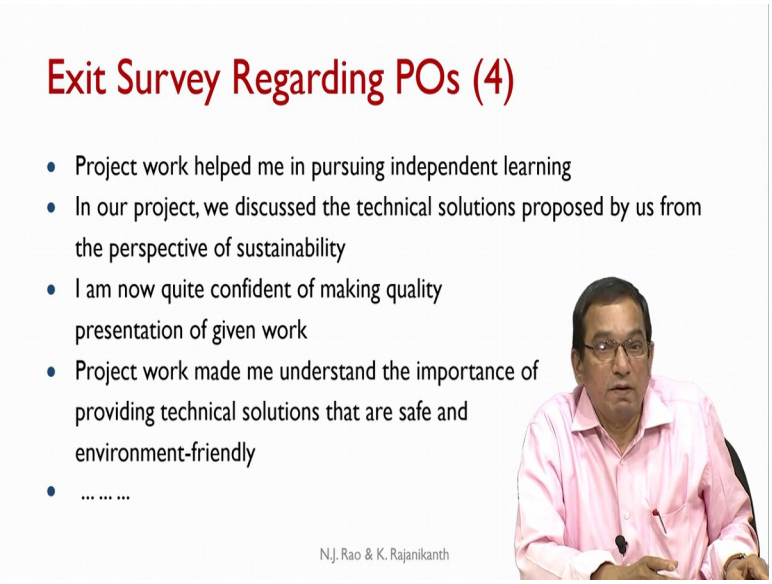

“Project work helped me in pursuing independent learning”. (Quite often the literature related to the project has to be studied by the students and for that sake, they have to either consult the library or internet or any other resources available. To what extent it helped me in pursuing independent learning?)

“In our project, we discuss the technical solutions proposed by us from the perspective of sustainability.” (Again, the guidelines, if they say that there must be a section dealing with the relationship of the technical solution proposed to the sustainability issue and if the students do carry out such an activity, then we can ask a question - to what extent it has helped them to understand the sustainability problem.)

“I am now quite confident of making quality presentation of given work”. (The rubrics which are used to evaluate the presentation can help the students understand the important aspects of presentation. So, I am now confident of making quality presentation of given work related to, again, communication skills.)

“Project work made me understand the importance of providing technical solutions that are safe (safe for the society) and environment friendly”. (This also! If the students are

required to have a section dealing with these aspects then we can ask this question in the exit survey.)

Of course, if there are no guidelines given and if there are no rubrics and the students are not really helped in terms of carrying out their project based on these issues, it is unfair to ask these questions in the exit survey. But, assuming that attention is given to these aspects then we can determine to what extent really the students have benefited from those issues. We can ask questions in the exit survey regarding those specific POs. And this would help us in getting better attainment for these POs because from the courses alone it is very difficult to have attainment of such POs.

If the institutes take care to ensure that these kinds of guidelines are provided, appropriate rubrics are shared up front and then these questions are asked in the exit survey then we can definitely plan for better attainment of such POs.

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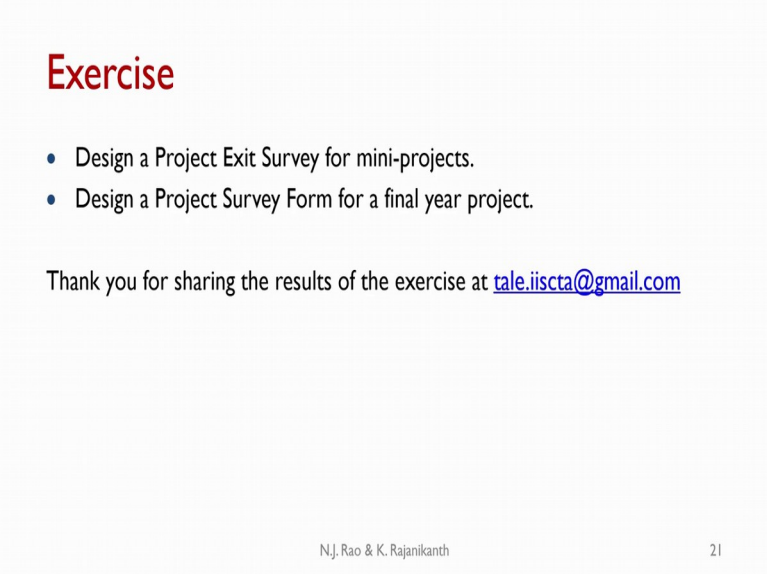

Exercise: Design a project exit survey for mini project. You can choose a mini project that is part of a regular course or a mini project offered as an independent course. Design a project survey form for the final year project.

Thank you for sharing the results of the exercise at tale.iiscta@gmail.com.

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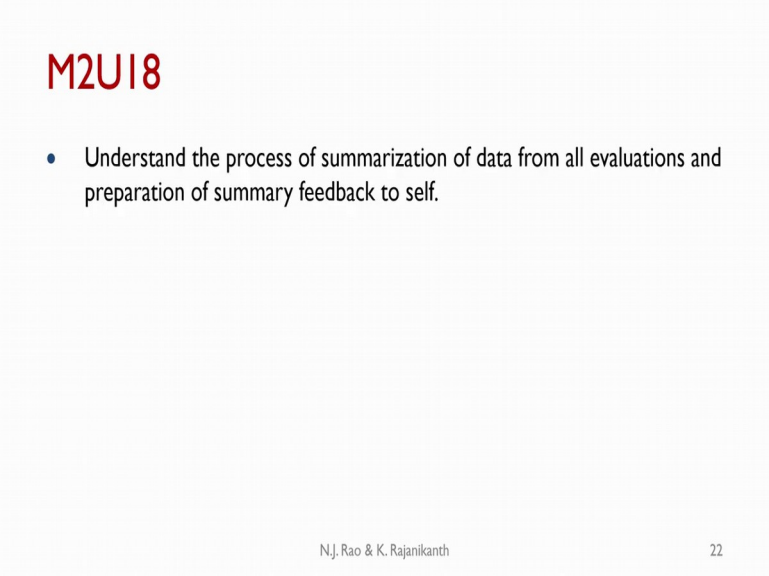

In the next unit we will understand the process of summarization of data from all evaluations and preparation of summary feedback to self.

Thank you.