


NBA Accreditation and Teaching – Learning in Engineering (NATE)
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Lecture 37- M2 U16: Instructional Situations

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Recap


- Understood the constructs of instruction.



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M2 U16 Outcomes

- Understand the elements of Instructional Situations.



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Greetings and welcome to NATE, Module 2, Unit 16 on Instructional Situations. We have looked at in the previous unit, the constructs of instruction and one of the construct is instructional situation. In this unit, we will try to understand the elements of instructional situations.

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Instructional Situation (Context)

- An instructional context refers to the instructional setting and environment (e.g., student demographics, social milieu, fiscal conditions, and organizational relationships) within which the instruction occurs.
- It consists of all the factors external to the learners that influence and define **what, when, where, how, why, and with whom** individual learners learn from instruction.
- Collectively all the factors together are called **“Instructional Situation”**.

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Now we have already mentioned earlier what instructional situation is, now we will be elaborating in this. An instructional context refers to the instructional setting and the environment in which instruction is actually occurs. And this context will include students' demographics, social milieu, fiscal conditions and organizational relationships, this is all the context, All of them have very significant influence on the, the quality of learning and the teachers' challenge is with widely varying the context, how do I manage my instruction.


And it also consists of all the factors external to the learners that influence and define what, when, where, how, why, and with whom, individual learners learn from instruction. So you are talking of certain context and the other one is that it consists of a number of factors external to the learner, all of them collectively, we call them call it as instructional situation.

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Constructs of Instructional Situation

Constructs (elements) of Instructional Situation can be seen under two broad classifications

- **Values:** Elements of instruction deemed to be important by stakeholders. An alignment of values about instruction across all stakeholders is helpful.
- **Conditions:** All factors related to context other than 'values' that have influence on the choice and use of **Instruction Methods**.



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The constructs as we have already mentioned, consists of two. They are classified broadly into two; values and conditions, values are elements of instruction deemed to be important by stakeholders. And an alignment of values about instruction across all stakeholders is helpful. And this is where the problem really occurs. In the sense, who are the stakeholders starting with the management, faculty, the students and let us say the accreditation requirement and the industry or organizations that are likely to employ.


And as of now, there is a tremendous amount of misalignment of the values about instruction across the stakeholders. And these every position that is taken by a stakeholder is justifiable all right, from a particular point of view. But together, the instructional situation becomes actually, in some sense, unmanageable or the consequence of that is, it is very poor, instruction leading to poor learning. That is what it is. And the other construct is conditions, all factors related to the context other than values that I have influence on the choice and use of instructional methods.

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Values

Refer to


- Learning Goals
- Priorities
- Methods
- Who has the Power



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Learning Goals

- In the context of Outcome Based Education, Learning Goals are expressed as Outcomes (POs, PSOs and COs).
- These outcomes need to be written following a well-defined process.
- One Course Outcome becomes the focus of instruction at any given time.
- Instruction needs to be planned for that CO taking the POs and PSOs addressed by that CO into account .



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Values as we mentioned in the previous unit, refer to learning goals, priorities, methods and who has the power. Let us look at each one of them. Learning goals, in the context of outcome based education learning goals are expressed as outcomes. Because now we have to be clear and these are given in today's context, especially NBA accreditation process as outcomes are stated as POs, PSOs and COs. And how do we write that? We have gone through that extensively. And we assume that both teachers and students are familiar with these outcomes. And these outcomes to be should be written following a well-defined process.

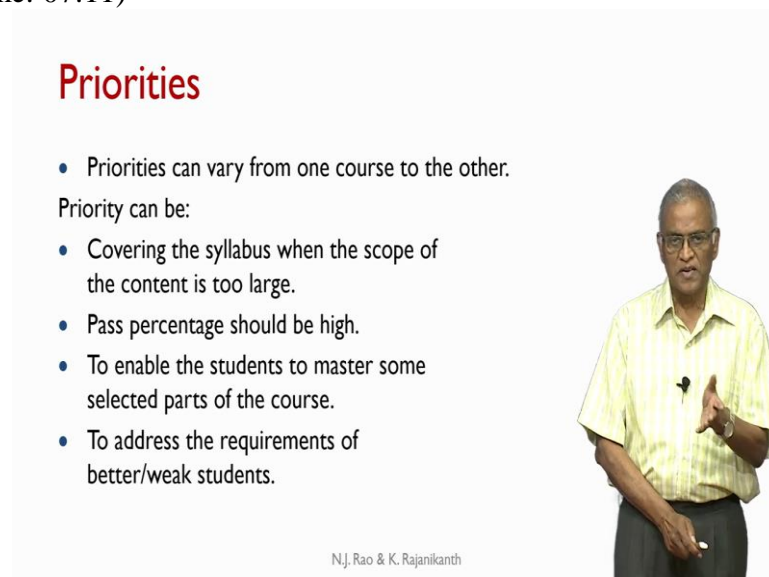
It is not just completely left to one individual. POs are given by National Board of Accreditation itself, PSOs are written by the faculty of the department. And finally, it should

get, it should be approved by the Board of Studies of that particular college or university, and COs are written by the teacher, but they also possibly written as a group and they have to be finally approved by the Boards of Studies.

Now, when it comes to instruction, one course outcome becomes the focus of instruction at any given time. One course outcome or a competency becomes the focus, let us say as we said, a one instructional unit which addresses one outcome or one competency may go for over one to five, or sometimes even more number of classroom sessions. When I am dealing with one of those outcomes, the instruction that I want to use is specific to the, that particular outcome. When I go to another instructional unit, I may want to use entirely different instruction method. So, what happens is, the instruction needs to be planned for one CO or each time for one CO taking the POs and PSOs addressed by that CO into account, because we also stated every CO addresses a subset of POs and PSOs.

So now, whenever I plan my instruction, I have to write together the CO and the identified POs and PSOs next to that, and then, I need to plan my instruction. So learning goal becomes how do I facilitate my students attain a particular CO, which addresses a subset of POs and PSOs, that is the way you have to write your learning goal.

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Priorities

- Priorities can vary from one course to the other.

Priority can be:

- Covering the syllabus when the scope of the content is too large.
- Pass percentage should be high.
- To enable the students to master some selected parts of the course.
- To address the requirements of better/weak students.

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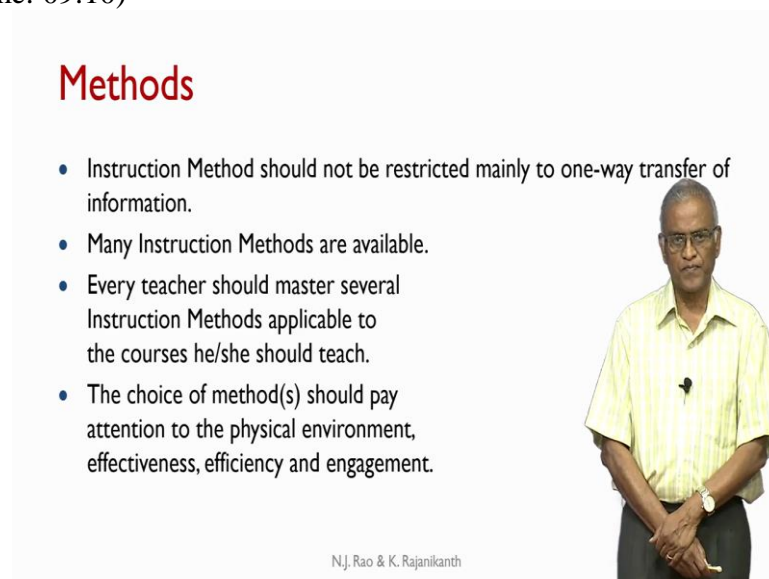
Now, we come to priorities, again priorities can vary from one course to the other. Priority can be covering the syllabus when the scope of the content is too large for some reason, the course is overloaded, the curriculum is overloaded for that particular course, then the priority becomes how do I cover the entire syllabus or I may get an instruction from the management

through HOD that past percentage should be high, that becomes the priority. In fact, that seems to be happening in many of the private institutions.

And the whole instruction since, or the entire system somehow seems to get itself adjusted to only attain this, but and we reach a situation where you have a high past percentages and the quality of learning continues to remain poor. So, that is where the situation, we have addressed this issue through when we talked about the assessment. And sometimes the priority can be to enable the students to master some selected parts of the course. It is because the choice of the teacher, teacher considers a certain topics in that priority.

And now, I want my students to master a selected parts of the course, then my instruction will correspondingly be different or my priority needs to be that how do I address the requirements of better students or weak students. So priorities can be different from one course to the other, from one instruction from one in a college depending on the students and teachers that you have priorities can get altered.

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Methods

- Instruction Method should not be restricted mainly to one-way transfer of information.
- Many Instruction Methods are available.
- Every teacher should master several Instruction Methods applicable to the courses he/she should teach.
- The choice of method(s) should pay attention to the physical environment, effectiveness, efficiency and engagement.

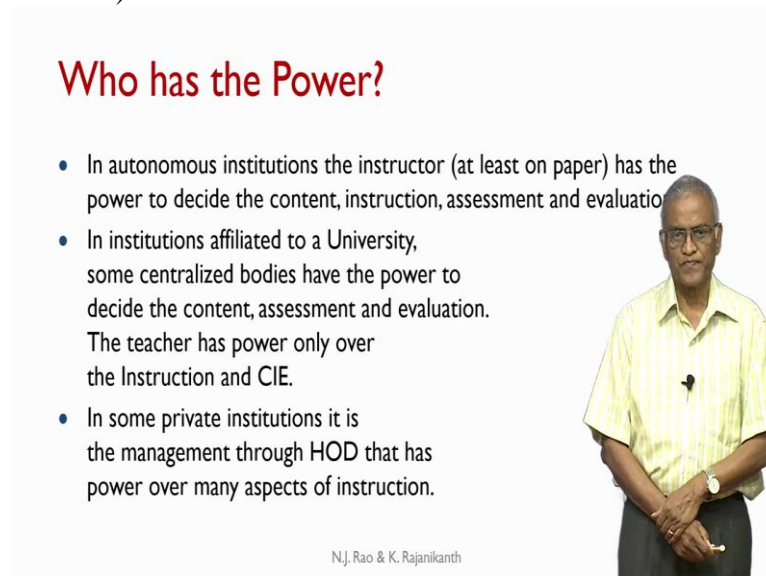
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Now, we come to the methods, this is where we will further elaborate later. Instructional method should not be restricted by one way transfer of information. First thing is, that should not be the only method of instruction namely, one way transfer of information. And teacher should acknowledge that there are many instructional methods are available and every teacher should master not one, not all of them, but several instructional methods applicable to the courses he or she teaches.

There is somebody can identify which are all the possible instructional methods that can have relevance to the type of subjects that you deal with, and the teacher should get trained in using those instruction methods. And any choice of instruction method should pay attention to the physical environment effectiveness, efficiency and engagement. That is what we state.


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Who has the Power?

- In autonomous institutions the instructor (at least on paper) has the power to decide the content, instruction, assessment and evaluation
- In institutions affiliated to a University, some centralized bodies have the power to decide the content, assessment and evaluation. The teacher has power only over the Instruction and CIE.
- In some private institutions it is the management through HOD that has power over many aspects of instruction.

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Now who has the power? In an autonomous institution, the instructor, at least on paper has the power to decide the content, instruction, assessment and evaluation. If you take NITs, IITs or such institutions, they have that. In institutions affiliated to a university some centralized bodies have the power to decide the content, assessment and evaluation. The teacher doesn't have, the teacher has power only over the instruction and CIE that is continuous internal evaluation.


On in some private institutions, it is a management through HOD that has power over many aspects of instruction. There are known cases when you deviate from any of these, the teacher comes under fire.

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Conditions

Refer to


- Content
- Communication
- Learners
- Learning Environment
- Development Constraints



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Content

- All courses are not similar in nature.
- Courses can be descriptive, mathematical, conceptual, engineering science, engineering or design oriented.
- For example, it is very difficult to maintain motivation and interest in a descriptive course like material science. Instruction in these courses can be challenging.
- Similarly teaching a course that is mathematical and has several abstract concepts can also be challenging.
- All courses are to be described in terms of Course Outcomes.



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Now, we come to the conditions. Conditions refer to content, communication, learners, learning environment and development constraints. So, let us look at each one of them now. Content, first of all, you must, as we all know, all courses are not similar in nature. Courses can be descriptive, mathematical, conceptual, engineering science or engineering or design oriented, all the, all these courses cannot be handled in the same way.

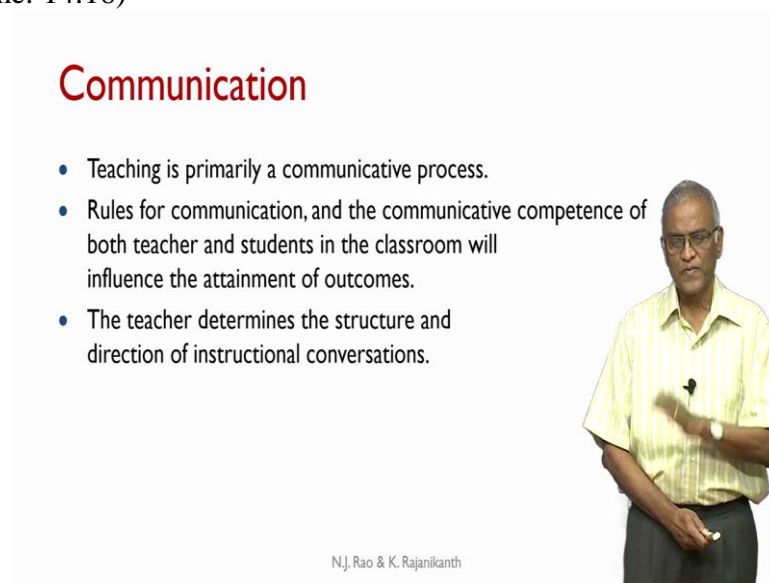
For example, take some very descriptive course. Like one example that I am familiar with is material science. It is descriptive and people try to make it very abstract then also it is not motivating. When it is descriptive, you are transferring lot of information. And it is a challenge to maintain the motivation of the students in such a subject. So instruction in these courses can be challenging. There are some courses, again of different nature. Like you have

electromagnetic theory, or material science, or sometimes even a subject like network theory that you teach. They are all very difficult to maintain the motivation for that.

Motivation does not come because sometimes by the nature of the course, sometimes they do not see, the students do not feel that there is any value in learning that, they do not know why they are learning. So, in such case it is very difficult to maintain the motivation and that becomes a particularly challenge to the teacher, how to go about doing it. For example, even teaching a course in that is highly mathematical and has several abstract concepts can also be challenge.

I can state one way communication, I can almost kind of repeat the material that I read in the textbook, but it is not necessarily motivating to the students. And here content wise, all courses are to be described in terms of course outcomes, that is one thing we need to accept in the context of NBA accreditation. So that is why we whenever we talk about any course, or any aspect of education in higher education level, we keep talking about course outcomes.

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Communication

- Teaching is primarily a communicative process.
- Rules for communication, and the communicative competence of both teacher and students in the classroom will influence the attainment of outcomes.
- The teacher determines the structure and direction of instructional conversations.

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The slide features a photograph of a man with glasses, wearing a yellow and white striped short-sleeved shirt and dark trousers, standing and gesturing with his hands. The background of the slide is white with a thin vertical line on the right side.

Now communication, as we have stated in the case of our course design, we mentioned, communication becomes very very crucial because teaching is primarily a communication process. And if the communication is flawed, obviously, learning does not take place. But the rules for communication and the communicative competency of the both the teacher and the students in the classroom will influence the attainment of outcomes. So, you have two things, or three things, rules for communication, the teacher and the students they all decide the quality of communication.

Teacher determines the structure and direction of instructional conversations, as we call them. That is, there are several instructional conversations. It could be just one way (communicate) presentation by the teacher or teacher can ask a question and students respond to that or teacher asks students to do something, and the students do that and again pass it back to the teacher. So there are always instructional conversations like this taking place. And the teacher determines the structural direction of this in these instructional conversations.

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Language of Communication

- All learning resources are available in **English**.
- Instruction, assessment and student responses are required to be in **English**.
- English not being the native language of most Indians, students as well as teachers are not necessarily fluent communicating in **English**.
- Errors in communicating by the teacher can occur if the teacher is not adequately fluent in **English**.
- Errors in understanding by students can occur if the student is not adequately competent in **English** and/or if the teacher is not adequately fluent in **English**.
- Language errors in what is written on the board and presented in the slides can have multiplier effects.

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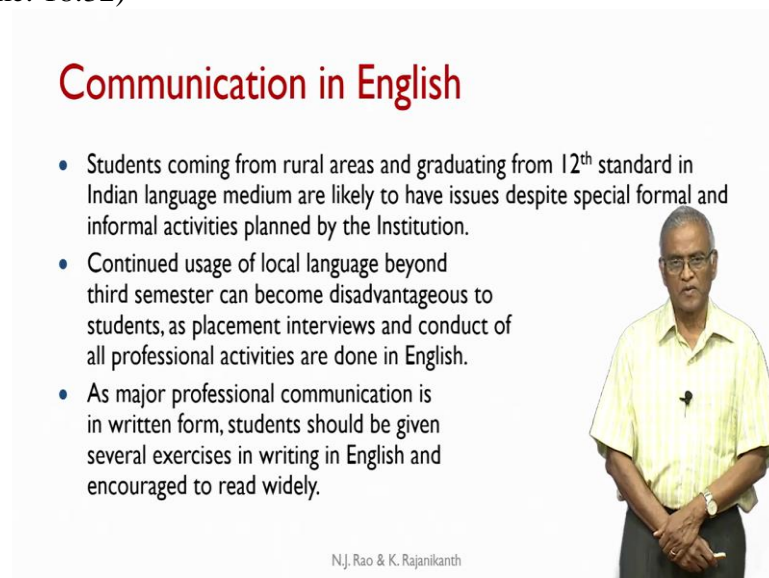
As we stated, the quality of communication in the classroom is, has a crucial role to play and quality of communication will also depend on the language of communication. And in Indian context, we have all learning resources are available in English, textbooks or Internet material and especially, related to all the technical subjects, engineering subjects, it is available in English and instruction assessment and student responses are required to be in English. There may be few exceptions, but it has to be in English.

And English not being a native language of most Indians, students as well as teachers are not necessarily fluent communicating in English. And if the teacher is not fluent in English, then there can be errors in communication. How does the, what is a communication? Either the way the teacher speaks in the class or writes on the board, there can be errors in communication. And similarly, if the students are not adequately fluent in English, errors in understanding by students can occur and also either and or if the teacher is also not adequately fluent in English, the errors accumulate.

So, you can identify situations where teachers are not adequately fluent in English and the students are also not adequately fluent in understanding in English. So, you have errors creeping in and once these errors creep in, it is very difficult to kind of, there is no process by which these can be corrected and they can be corrected provided you follow a systematic process, course design process and you also plan your instruction well.

And language errors in what is written on the board or presented in the slides can have multiplier effects. If I make a mistake in a slide while presenting, maybe a large number of students will carry with that say, almost accepting it as correct and then further transmit to others. So, the language of communication plays a very important role, especially in India.


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Communication in English

- Students coming from rural areas and graduating from 12th standard in Indian language medium are likely to have issues despite special formal and informal activities planned by the Institution.
- Continued usage of local language beyond third semester can become disadvantageous to students, as placement interviews and conduct of all professional activities are done in English.
- As major professional communication is in written form, students should be given several exercises in writing in English and encouraged to read widely.

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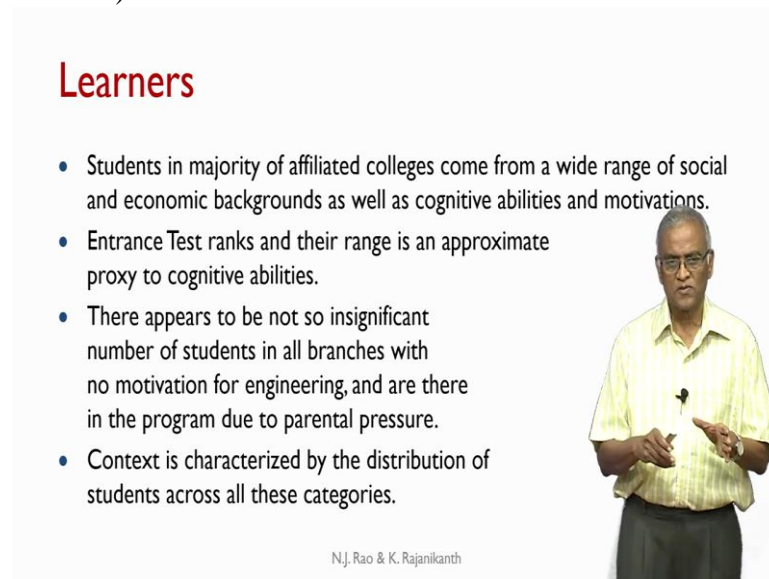


For example, other issues in communication in English for example, students coming from rural areas and graduating from 12th standard in Indian language medium are likely to have issues despite special formal and informal activities planned by the institution. Coming suddenly from a local language medium to completely English is going to a major, what do you call, step change as far as the students are concerned.

To that extent, sometimes teacher adopt to this particular situation by trying to speak in local language and interspersed with English words, it works up to a point okay, but anything beyond third semester will have disadvantages, it will become disadvantages to the students as placement interviews and conduct of all professional activities are done in English. While you can use local language to a limited extent up to the third semester, it is not desirable to do so beyond third semester.

Another one, a major professional communication is generally in the written form. For example, when the student answers a question, he is writing in English or when he is making a presentation or giving a seminar, it is going to be in English and to the extent student should be given several exercises in writing in English and encourage to read generally widely. When a student reads widely in English, automatically the language will improve over a period of time.

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Learners

- Students in majority of affiliated colleges come from a wide range of social and economic backgrounds as well as cognitive abilities and motivations.
- Entrance Test ranks and their range is an approximate proxy to cognitive abilities.
- There appears to be not so insignificant number of students in all branches with no motivation for engineering, and are there in the program due to parental pressure.
- Context is characterized by the distribution of students across all these categories.

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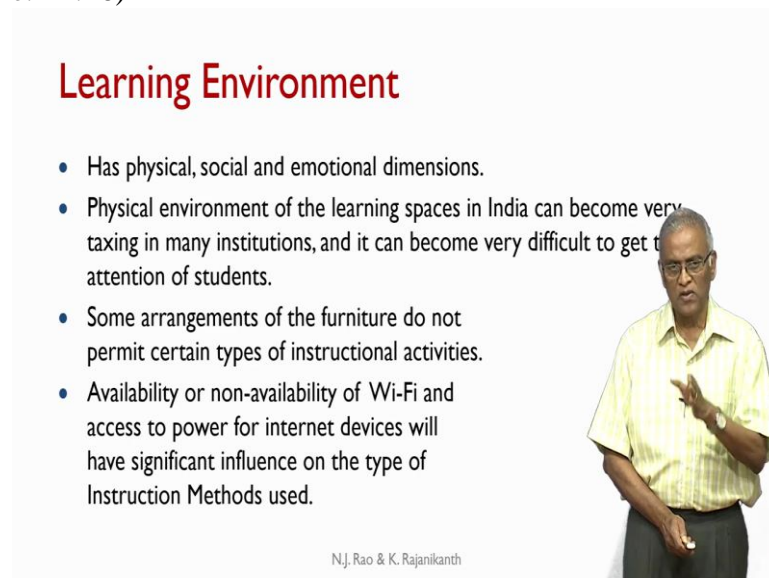
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Now coming to the learners, students in majority of the affiliated colleges come from a wide range of social and economic backgrounds as well as cognitive abilities and motivations. And how do I conduct a kind of a survey or some kind of test to find out their cognitive abilities and motivations, it is possible to do so. There are methods available, so when the students join, you can conduct a kind of a survey during very brief period, make them fill out a wide variety of forms. And from that you can get some kind of a data that can be used.

The other one is the entrance test ranks, and their range is an approximate proxy to cognitive abilities. If my students are confined to 30,000 to 35,000 entrance ranks, then I have one quality, one type of quality of students with me. And they are very different when you are talking about let us say less than 1,000 CET rank. And they appears to be till now, maybe that situation is changing slowly, not so insignificant number of students in all branches with no motivation for engineering and they are there because due to parental pressure, parents demand that they study engineering and they come and they have no motivation.

So, what happens, teachers will have to deal with such students. So, the context is characterized by the distribution of students across all these categories. For other reasons, you may get a few small number of very bright students coming into a classroom where majority are, what we call, in terms of cognitive abilities and motivations are way below and it can be very difficult both to the teacher and these students to plan learning for such a mixed group.

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Learning Environment

- Has physical, social and emotional dimensions.
- Physical environment of the learning spaces in India can become very taxing in many institutions, and it can become very difficult to get the attention of students.
- Some arrangements of the furniture do not permit certain types of instructional activities.
- Availability or non-availability of Wi-Fi and access to power for internet devices will have significant influence on the type of Instruction Methods used.

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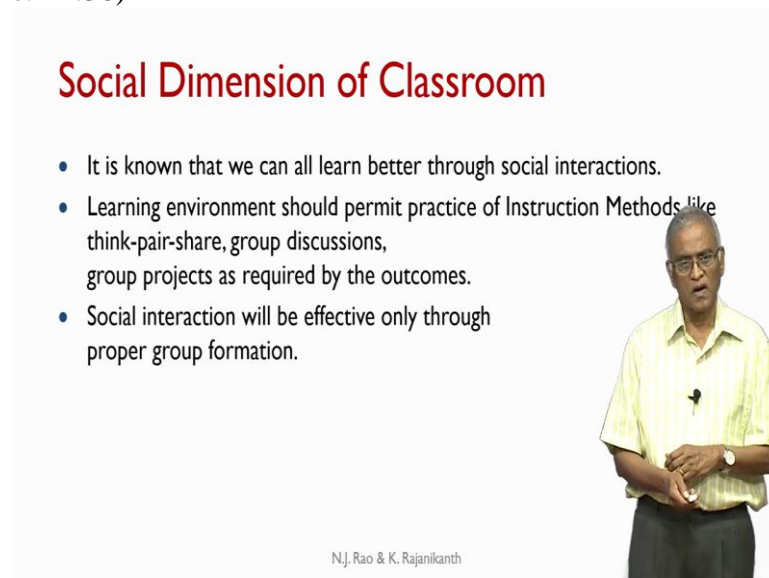
And now comes the learning environment. So, has physical, social and emotional dimensions, learning environment has all the three dimensions. Physical environment of the learning spaces in India can become very taxing in some institutions, but off late, the quality of classrooms has been increasing. They are made comfortable in many places in spite of the weather being inhospitable and when it is not comfortable physically, you cannot get the attention of the students.

All the time you are worried about your sweating, high temperatures, you have background noise or the fans and so on. It is very difficult to get the attention of all the students. And if you have a gallery type, the arrangement of the furniture do not permit certain, types of instructional activities. If you want cooperative learning, two or three people sit together and address a particular problem, that instructional activity cannot be planned if you have a particular type of furniture.

And also these days availability or non-availability of Wi-Fi and access to power for Internet devices will have significant influence on the type of instruction methods used. For example, a college may for other reasons, say a cell phones are not allowed in the classroom. Then

what happens, you have an issue where while they have reasons for it, but you cannot bring in certain type of instructional methods into the class. So, the learning environment will, physical learning environment will have all these issues.

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Social Dimension of Classroom

- It is known that we can all learn better through social interactions.
- Learning environment should permit practice of Instruction Methods like think-pair-share, group discussions, group projects as required by the outcomes.
- Social interaction will be effective only through proper group formation.

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The slide features a photograph of a man with glasses, wearing a yellow and white striped short-sleeved shirt and dark trousers, standing with his hands clasped in front of him. The background of the slide is white with a light blue border.


And then you have a social dimension to the classroom as well. We all know that we can learn better through social interactions, but that social interaction should be permitted in the classroom. How do you do it? You normally use certain methods like think-pair-share, group discussions, group projects, they can be used as instructional, instructional methods and such social interaction will be effective only through proper group formation. Even this group formation will have many other dimensions depending on what social background the students are coming from, is it possible to make the appropriate group.

Again, there are a lot of tools available from psychology or social sciences, how do we form groups taken certain information about the student, if that kind of information can be collected, it is it becomes easier to form groups.

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Emotional Support

- Learning environment as decided or created by the instructor should provide an emotionally supportive environment.
- Students from rural/disadvantaged backgrounds, though reasonably competent, may lack confidence and special attention must be paid to support them.
- Students should not be discouraged to raise question/s.
- Students should not be ridiculed if they make mistake/s.
- Presence of many unmotivated students in the classroom is always a challenge to the teacher.



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Now, another aspect of learning is emotional support that is provided in the classroom. The learning environment is decided or created by the instructor should provide an emotionally supportive environment. What do we mean by emotionally supportive environment? For example, students from rural or disadvantaged backgrounds though reasonably competent, may lack confidence and special attention must be paid to support them. They do not want to open their mouth. They are diffident about that. But they have the technical subject competency, but they lack confidence.


Actually, there are several programs right now in practice, where to prepare the students from such backgrounds to come into an engineering program so that some of these issues are resolved even before they enter the program, but not all students will have access to these initiatives. For example, student should not be discouraged to raise questions. And many times it happens the teacher does not discourage, does not encourage students to raise any question. And also sometimes when a student makes a mistake, he is ridiculed.

A teacher should never never ridicule if a student made a mistake, should not become angry, shout at him and ridicule him in any way. And if you have ridiculed once you possibly have lost the student, sometimes even permanently, ever wanting to respond to anything. And also, presence of many unmotivated students in the classroom is also is a challenge to the teacher. So the main thing about instructional situation is while there are several people who have control over it, given the limited control the teacher has, how do I plan my instructional situation or take care of the instructional situation, and accordingly choose my instructional method? It is a challenge.

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Development Constraints

- These refer to time available to a teacher to design and conduct a new course.
- While there will be no dearth of learning resources on the internet, monetary constraints can become an issue with respect to some courses.



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And you may also have development constraints. As we already mentioned, it can refer to the time available to a teacher to design and conduct a new course. And while there is, there will be no dearth of learning resources on the Internet, monetary constraints can become an issue with respect to some courses. If I want some physical materials, products to be bought and demonstrated in the classroom, obviously, there can be, what we call, monetary constraints on that.

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Exercise

- Identify the **Instructional Situation** (context) of a course you taught in terms of its **values** and **conditions**.

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



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M2 UI7 Outcomes

- Understand how brains learn.



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So, as you can see, instructional situation as of today in India is very widely varied. And you have such a challenge to teachers that to manage the instruction in a, what we call, with the kind of instructional situation they have. So, here we request you to kind of identify the instructional situation of a course that you taught in terms of its values and conditions. That is you capture your instructional situation in the, as we classify in terms of values and conditions, and you can share with us, share it with us, it can be even anonymously, it will be of great value to us in terms of learning, our own learning.

And in the next unit, we will try to understand how brains learn. Thank you very much.