Teaching and Learning in General Programs (TALG)

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Lecture – 11
Metacognitive Knowledge

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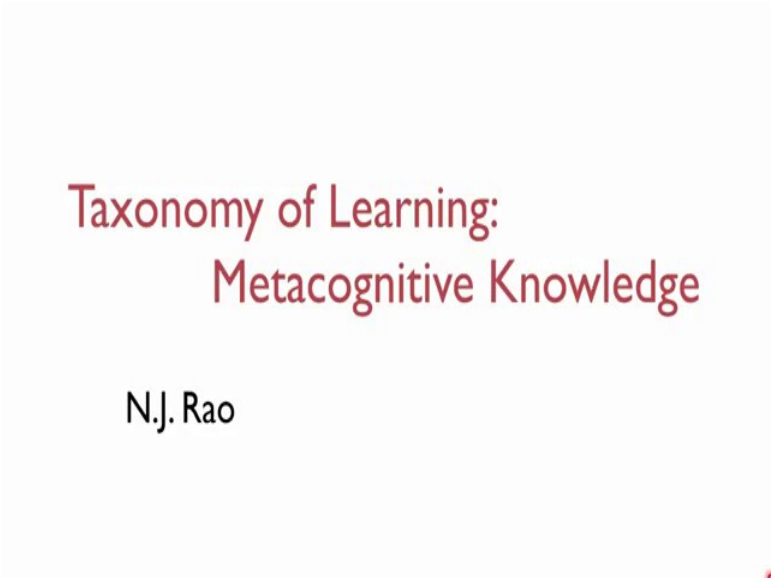

Greetings and welcome to module 1, unit 11 related to some aspect of taxonomy of learning, today we will be looking at Metacognitive Knowledge.

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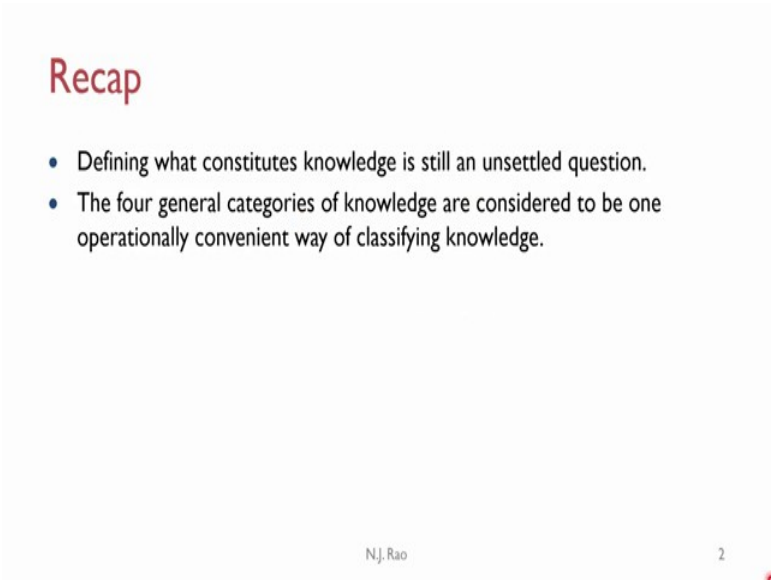

In the earlier unit, we tried to define the categories of knowledge and we also stated that it is very difficult to get any kind of absolute categories of this knowledge simply because anything related to the word knowledge becomes a very hugely unsolvable philosophical question.

So, we tried to give an operational categorization of knowledge. We talked about four general categories of knowledge and they are factual knowledge, conceptual knowledge, procedural knowledge and metacognitive knowledge. So, this is considered to be operationally convenient and if somebody can come with a different category of knowledge it is also ok, but these four categories are being used extensively in the blooms taxonomy.

We mentioned the fourth category namely metacognitive knowledge briefly in the earlier unit, but we will spend more time on metacognitive knowledge simply because that is a teacher is not normally familiar with.

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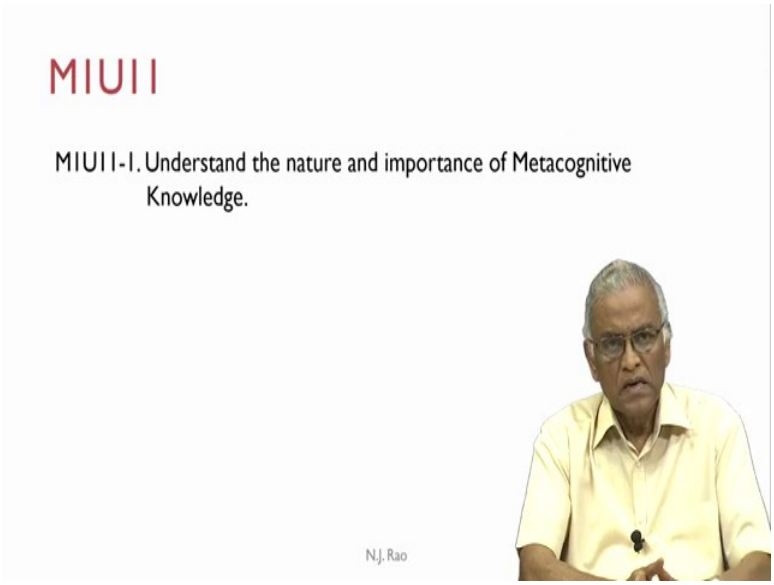

Let us understand the nature and importance of metacognitive knowledge at all levels of education- right from school level to higher education level, though we particularly focus at the higher education level.

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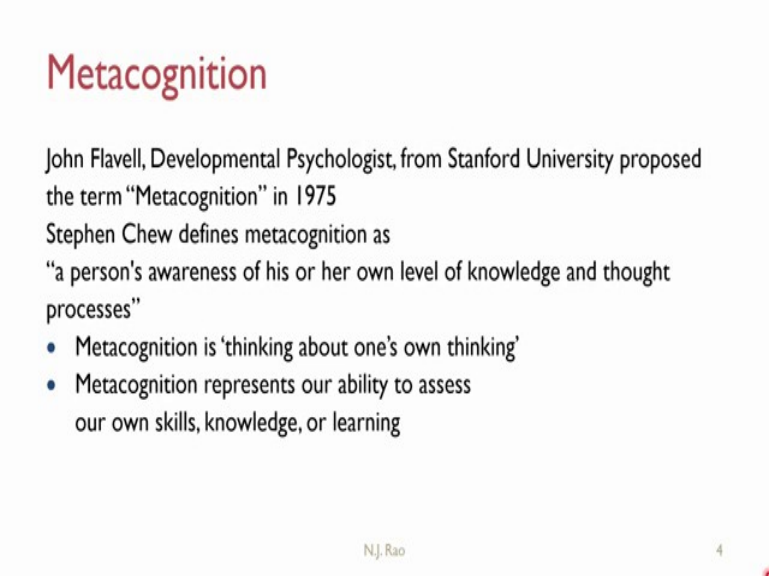

Now, the word metacognition was coined by John Flavell, a developmental psychologist, from Stanford University in 1975. He mentioned the word metacognition and subsequently many people have given definitions for this, one definition has been given by Stephen Chew – "a person's awareness of his or her own level of knowledge and thinking processes", a person's awareness is metacognitive knowledge. As you can see there is a word meta in that, so obviously, it is not exactly cognition. It is cognition about cognition.

Now, another way of putting metacognition is- thinking about one's own thinking. Can we become observers of our own thinking- that is what is metacognition. And metacognition represents our ability to access our own skills, knowledge or learning. Obviously, our own ability to access our knowledge levels or our capabilities is necessary for anyone and everyone.

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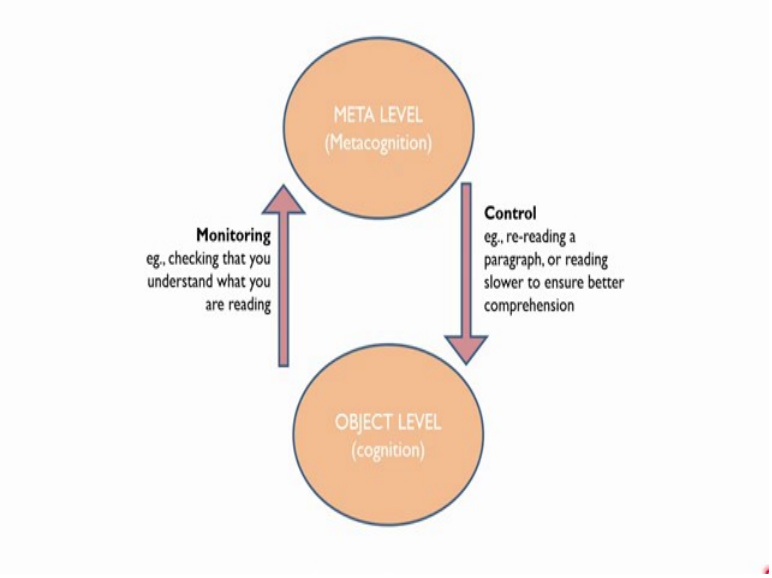

If you do not have that knowledge you can have many issues in life. Let us look at how this can be diagrammatically represented. The objective level - cognition; that means, we are performing cognitive activities; a simple thing - I am solving a problem, I am understanding something, I am performing some cognitive activity - these are all at the objective level. And meta level is the metacognition.

So, let us take a very simple example of reading a book. When you read a book you will obviously, check if you understand what you are reading. Sometimes our attention kind of drifts while we seem to be reading either loudly or inwordily, but I do not seem to be capturing the meaning of that; that means, I am not monitoring my own understanding, my own cognitive activity because the attention has drifted. So, once I realize my attention has drifted I come back and I re-read it or postpone because of too many diversions I may take a decision. So, this is what is called monitoring. So, I check that I understand what I am reading.

Normally, this process may go on naturally but sometimes it has to be consciously monitored. That is what becomes metacognition. When I realize that I seem to have lost attention, then what do I do? I perform some kind of a control or regulation. Now, this can be rereading a paragraph or I read slower to ensure better comprehension or better understanding.

So, there are two activities that are involved- one is monitoring, the other is control and that will be the relationship between the object level and meta level or cognition level or metacognition level. This diagram presents in a very simple way what is metacognition in relation to cognition.

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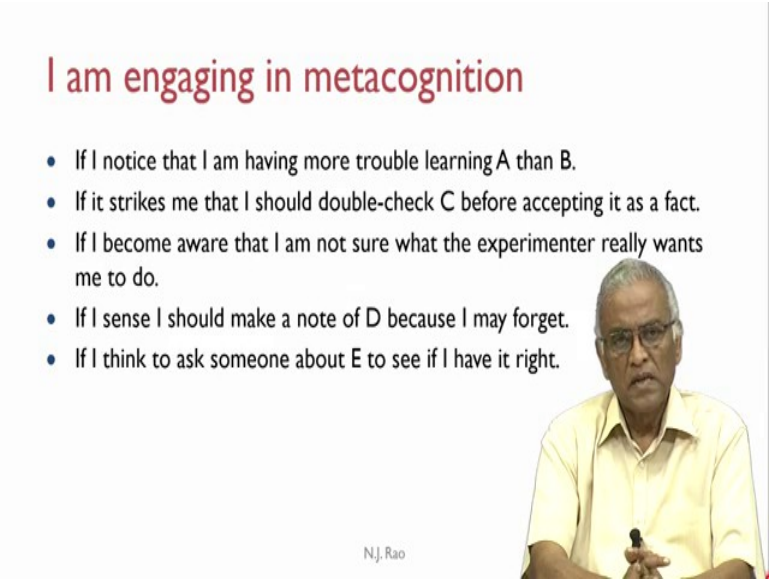

Now, let us give more examples- When am I engage in metacognition? For example, if I notice that I am having more trouble learning A than B some parts of that I find it more difficult. So, when I notice that, I am engaging in metacognition which naturally happens to anyone. If it strikes me that I should double check C, before accepting it as a fact, that is metacognition.

If I become aware that I am not sure what the experimenter really wants me to do? Somebody has given you the processes, now let us say this is how you should do the experiments and I seem to have understood, but when I start doing the experiment then I am not sure. So, what do we do? We do some activity as a consequence of that. If I am not doing anything a consequence of that then I am not performing metacognition.

So, if I sense I should make a note of D because I may forget. Many times when we listen to the lecture we will scribble on the note notebook either a small phrases or sometimes complete sentence. So, I am making note of D because while listening it looks like that I have understood, but also I may feel that I may not remember the same thing after sometime, so I make a note of D. If I think to ask someone about E to see if I

have it right. For example, I think I have understood it, but I am not so very sure, so I will ask somebody else whether I have it right or not. So, when I am engaging in any of these activities or this type of activities I am engaging in metacognition.

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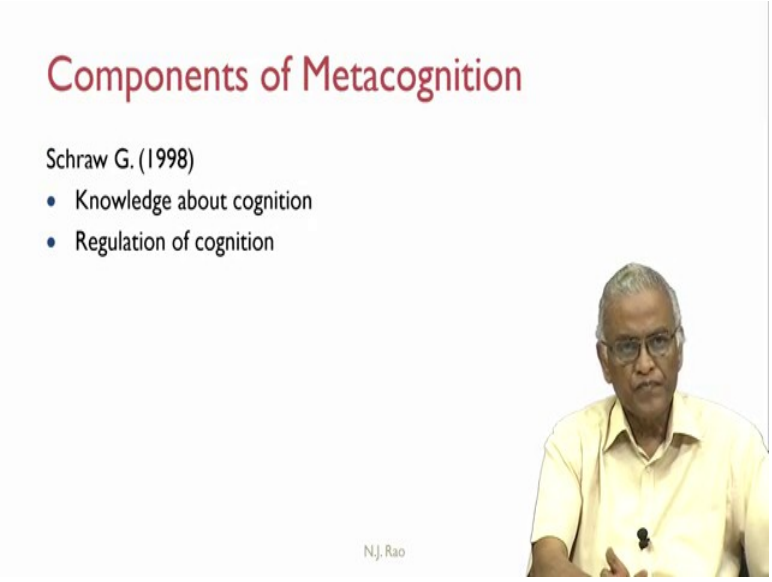

Now, the components of metacognition as per Schraw: there are two elements in that; "knowledge about cognition", "regulation of cognition". These are the two activities. As we said two arrows in the earlier diagram. The knowledge about cognition and regulation of cognition these are the two regulation there we called it control; knowledge about cognition we called it monitoring.

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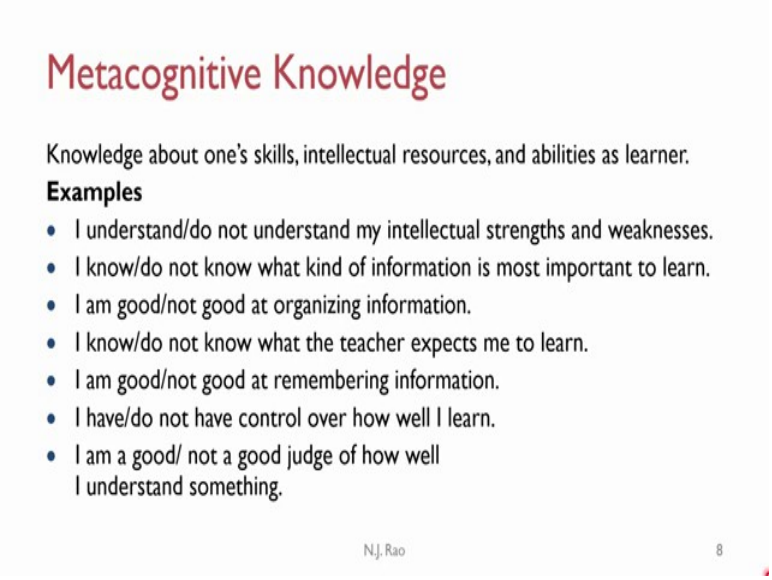

Now, let us look a little more in detail about the first one- knowledge about one's skills intellectual resources and abilities as learner. That is, am I clear about my skill levels, my intellectual resources, my abilities as learner because no two people are the same. Why are we not the same? That is because each one of us have a different genetic makeup. So, there is something that is given to us by nature.

On top of that, each one of us goes through our own combination of experiences. To that extent finally where we are and what we are, no two persons are exactly the same. So, we need to be aware of our own levels of skills, knowledge and abilities, for example, I should be able to understand or answer whether I understand or do not understand my intellectual strengths and weaknesses. That means, as an individual, by looking at something, can I take a position? Do I understand or do I not understand my intellectuals strengths and weaknesses. You can say this is more like metacognitive inventory for one's own self.

I know or do not know what kind of information is most important to learn. I am good/not good at organizing information. I know/do not know what the teacher expects me to learn. For example, may be I was not in the class when the teacher said what is it that I am expected to learn or when he was presenting that, my attention drifted elsewhere. So, I should be able to acknowledge to myself that I do not know what the teacher expects me to learn, then at least it is possible to take corrective action for that.

I am good/not good at remembering information. I have/do not have control over how well I learn. It is not exactly control. All that I have knowledge is I know I do not have control or I have control, but how do I control that is a different issue, we will come to that later. I am a good or not a good judge of how well I understand something. This ability to judge one's own understanding is a very crucial element of metacognitive knowledge and if you do not have that there can be serious consequences as we see.

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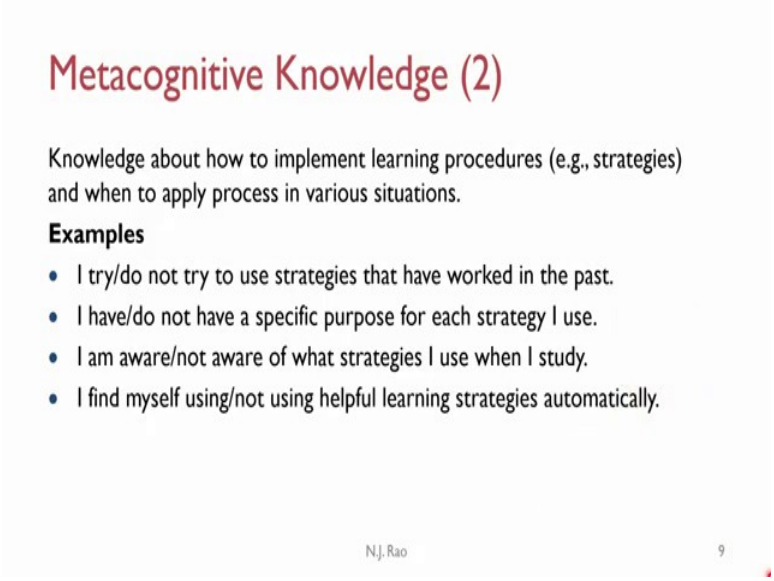

For example the other thing is, in metacognitive knowledge I know some learning procedures and I know how to implement those learning procedures and also I know when to apply a process in various situations.

So, here examples: I try /do not try to use strategies that I have worked out in the past. It is not as if I am not aware of these strategies. I know, I have some strategies with myself and I have tried it out earlier. So, now, what happens is I know it worked for me earlier, now I am working out, I am trying to use those strategies.

So, I should be able to give a clear answer when somebody asks do you try using strategies that I have worked in the past. Can I give a definitive answer to that? If I am able to give a definitive answer, I have metacognitive knowledge of that. I have / do not have a specific purpose for each strategy that I use. I am aware /not aware of what strategies I use when I study. Each one of us develops our own strategies for studying each subject. Some subjects we find them easier, some somewhat difficult. So, we will

work out our own strategies to study an easier subject or a more complex subject. I find myself using / not using helpful learning strategies automatically.

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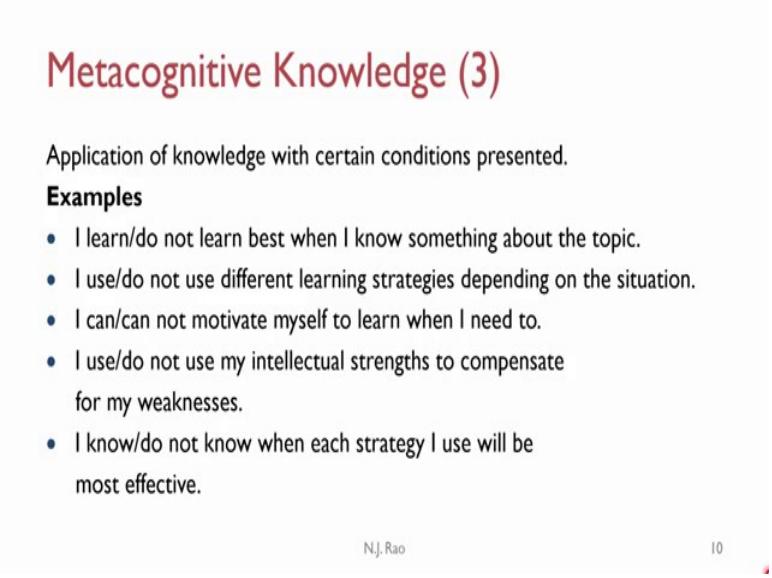

Now, another aspect of this application of knowledge- with certain conditions presented. I learn or do not learn best when I know something about the topic. Now, the condition is when I know something about the topic I seem to be learning best or I do not learn even if something about the topic is known to me, so that I should be able to give at least either or answer.

I use / do not use different learning strategies depending on the situation. I can / cannot motivate myself to learn when I need to. I use / do not use my intellectual strengths to compensate for my weaknesses. I know / do not know any strategy I use will be most effective.

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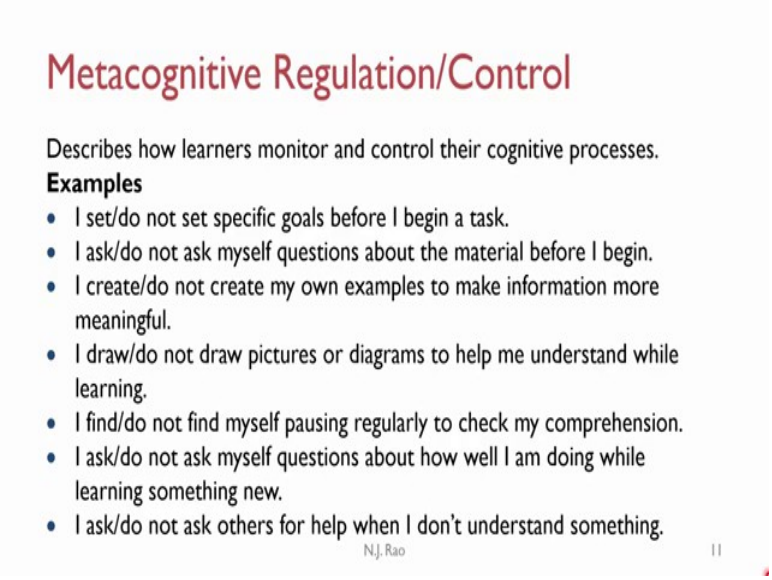

Now, we talk about metacognitive regulation or control. It describes how learners monitor and control their own cognitive processes. The monitoring part is already taken care of, now we talk about controlling their own cognitive processes.

I set or do not set specific goals before I begin a task -that is one way of controlling, I set a task and I work towards that. I ask / do not ask myself questions about the material before I begin. So, before even start you ask what is this about, do I know something about it? If I ask a few questions to myself then possibly I can learn better.

I create / do not create my own examples to make information more meaningful. That is one of the very good strategies that one can use I create my own example, if I am able to create my own example, I think I have understood, but here we are not talking about creating one's own example as process of cognitive process 'understanding'; instantiating is a cognitive process. But, the strategy that I want to follow of creating own examples as a way of better understanding is metacognitive regulation.

I draw or do not draw pictures or diagrams to help me understand while learning. I find / do not find myself pausing regularly to check my comprehension. That is I read a paragraph or a few sentences pause and try to assimilate have I understood. So, pausing itself is a metacognitive regulation. I ask / do not ask myself questions about how well I am doing while learning something new. I ask / do not ask others for help when I do not understand something.

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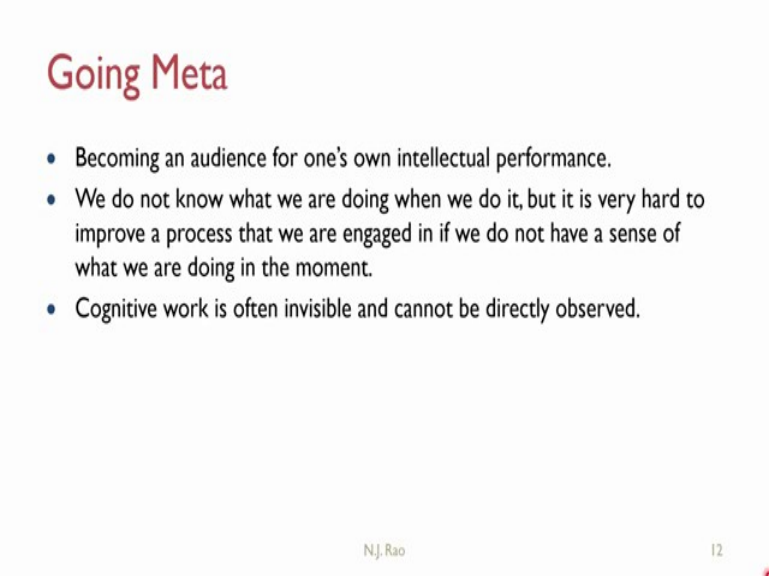

All these things seem to be fairly common for all of us, then why are we talking about that? Let us relook at it. Going meta means becoming an audience of one's own intellectual performance. As a teacher for example, "if I am able to learn to observe myself, then I can become a better teacher. If I do not know how to observe myself like - the way I am speaking, the way I am modulating, the way I am looking at the audience into their eyes or decoding their body language, at what times am I pausing, how am I modulating my voice"- this as a teacher if you are able to observe yourself one I can become a better teacher.

But, if I do not know how to observe myself then I may not be able to improve my method of teaching. We do not know what we are doing when we do it right away, but it is very hard to improve a process that we are engaged in, if we do not have a sense of what we are doing at the moment. For example, if I am not able to learn to observe myself as a teacher, then these days we have tools, I can just put a video camera, record it and watch myself how I am actually performing. Same thing is used in all sports.

So, when you are playing or when you are kicking or throwing a ball or bowling or whatever you do these days, you have excellent tools to record and run it slow, so that one can observe all the little details of the moments and that will greatly help. So, that is going meta.

Cognitive work is often invisible and cannot be directly observed. What exactly is happening in our mind, a teacher observing himself or teacher observing what goes on in the brain of each one of the students is; obviously, invisible you can only indirectly interpret from the let us say in case of class room by the from the body language of the students.

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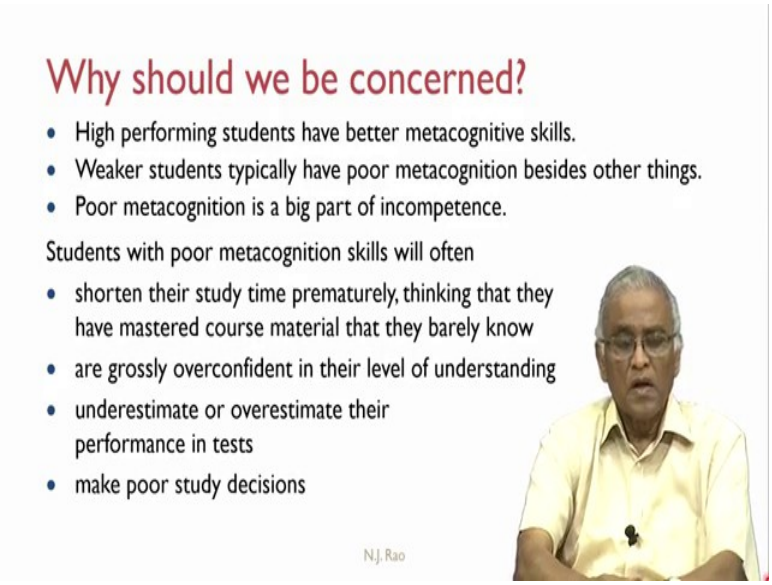

Now, why should we be concerned about metacognition? It has been known, high performing students seem to have innate better metacognitive skills; that means, better performance and better metacognitive skills goes together. So, if we have highly performing students you do not have to worry very much about their metacognitive knowledge and control. Weaker students typically have poor metacognition besides other things. They may have poor cognitive ability as well as poor metacognitive ability. And poor metacognition is a big part of incompetence for anyone around.

Now, why does this become important? Because now we have education policies throughout the world that everyone should be offered opportunities to educate themselves to their potential, you do not have luxury of only selecting the good students. As teachers you have to be prepared with people coming to your class, you belong to an institute; institutes has a selection process for the students and if the students are weak they are weak and you have to work with them and generally weaker students have poor metacognitive ability.

Unless you pay attention to the metacognitive ability and also work towards improving that ability, you cannot achieve the results. Students with poor metacognition skills how do they behave? They shorten their study time prematurely thinking that they have mastered course material that they barely know. You may consider that I can just read for half an hour and I will be able to understand, that is a bad metacognitive decision.

Or grossly overconfident in their level of understanding; they think they have understood without actually understanding or either underestimate or overestimate their performance in tests. That means, the actual marks or grades they receive will be far different from what their estimate is and they make poor study decisions. Study decisions like - I need to only read for about 4-5 days before the final exam, I do not have to look at this material immediately after it was considered in the class room. So, this kind of study decisions are very poor in a students with poor metacognition.

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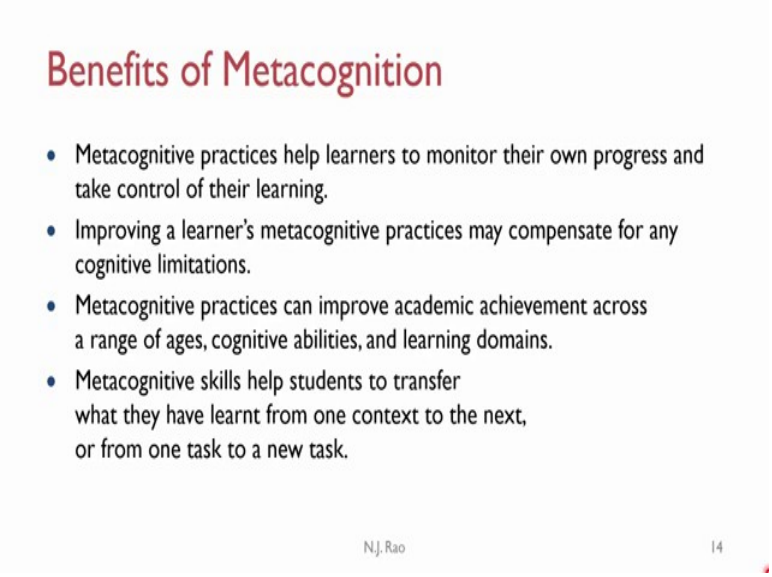

What are benefits of metacognition? If I can learn, it is not that you have it or do not have it, one can improve their metacognition. So, one should put effort to improve one's own metacognition or the teacher should be able to do certain things in the classroom that facilitates improvement of metacognition, but why should we improve metacognition?

Metacognitive practices help learners to monitor their own progress and take control of their own learning. Taking control of their own learning if you remember, is also one of

the requirements of the program outcome called lifelong learning. Lifelong learning can only be achieved if the students can take control of their learning; that means, if they do not have this metacognitive skill they will not be able to attain that particular program outcome.

Improving the learners metacognitive practices may compensate for any cognitive limitations. All students will not have the same cognitive ability. Some people understand very fast, they can come to conclusions very fast that is in some sense is genetic gift. But it does not mean that you have to remain like that, you can compensate for your cognitive limitation through some acquiring certain inhabits.

Metacognitive practices can improve academic achievement across a range of ages, cognitive abilities and learning domains. If once the metacognitive practices improve, it can benefit at any age group of any cognitive ability or under any learning domains. Metacognitive skills help students to transfer what they have learnt from one context to the next or from one task to a new task.

So, a metacognitive skill is more like a generic skill, it is not specific to a particular discipline. So, once you acquire you will be able to apply to any subject that you are dealing with.

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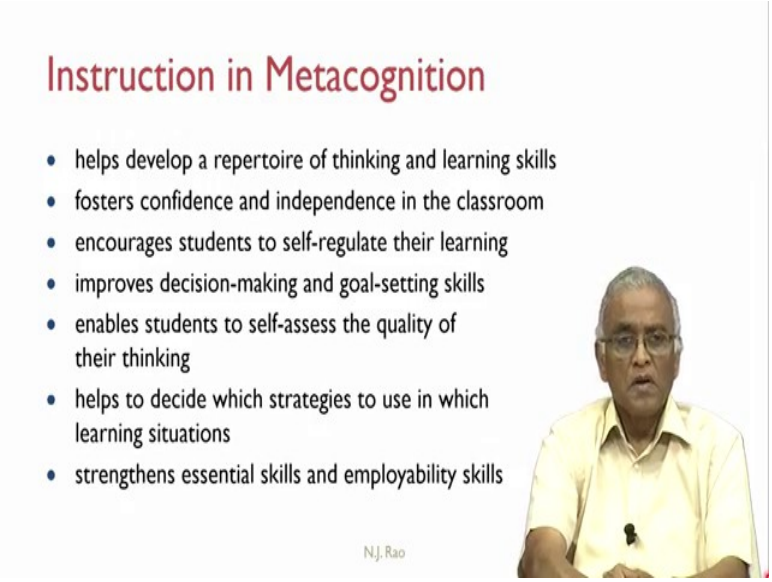

Instruction in metacognition. Now, we are coming to specifically with respect to a teacher and is or her students. Instruction metacognition helps develop a repertoire of thinking and learning skills. Fosters confidence and independence in the class room, encourage a students to self regular their learning, and improves decision making and goal setting skills. We are actually re wording what we have stated earlier, repeating these things in a slightly different way to emphasize the importance of metacognition.

Instruction enable students to self assess the quality of their thinking. Helps to decide which strategy to use in which learning situations. Strengthens essential skills and employability skills, that is the goal of instruction metacognition.

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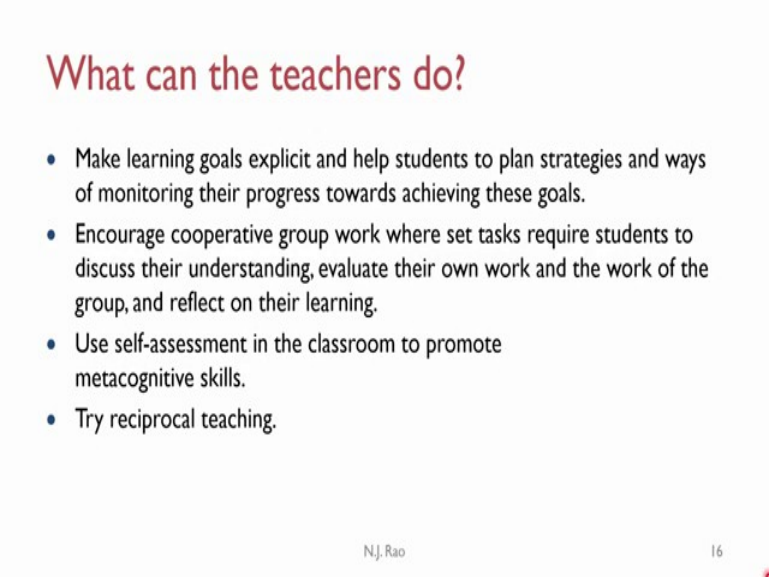

What can the teachers do? Specifically that you can or do in the class room. Make learning goals explicit and help students to plan strategies and ways of monitoring their own progress towards achieving these goals. How do you present the learning goals? Either in verbal form or graphic form or use concept maps- anything that help students to plan strategies will do. Encourage cooperative group works where set tasks require students to discuss their understanding, evaluate their own work and the work of the group and reflect on their learning.

One of the best ways to improve metacognition is encouraging cooperative group work. Either to discuss something, in literature you can take a one particular act in a drama and ask the students to interact with each other as a cooperative group or solve a slightly

more complex problem as a group. The very cooperative group activity will facilitate the student to keep examining his own metacognitive ability.

Use self-assessment in the class room to promote metacognitive skills. Try reciprocal teaching, asking a student to teach to another student; that is a particular instructional method reciprocal teaching.

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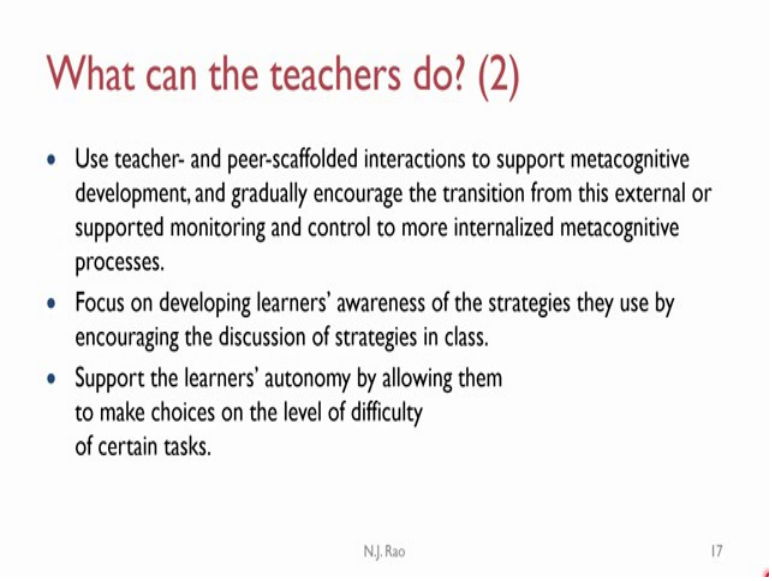

And, use teacher and peer-scaffolded interactions to support metacognitive development and gradually encourage the transition from this external or supported monitoring and control to more internalized metacognitive processes; that is, if the students in your perception whose metacognitive cognition levels are very poor, then you work with scaffolded interactions. That means, you start with some simple thing and after you resolve that, then go to higher level and you gradually encourage the transition from the supported and try to make them more and more independent, that is in case of very very poor metacognitive skills.

Focus on developing learner's awareness of the strategies they use by encouraging the discussion of strategies in class. So, you can ask the students to pen down what strategy are they following and share it with others, discuss those strategies in class. By doing that, the students now start becoming aware of the strategies and if they feel somebody else strategy may workout for him he may try that.

Support the learner's autonomy by allowing them to make choices on the level of difficulty of certain task. This is how teacher can follow any of these methods to improve and also some strategies work in some context, some do not work in other context and some take more time, some take less time. So, the teacher becomes the best judge to what combination of these strategies that he would like to use to improve the metacognition of students.

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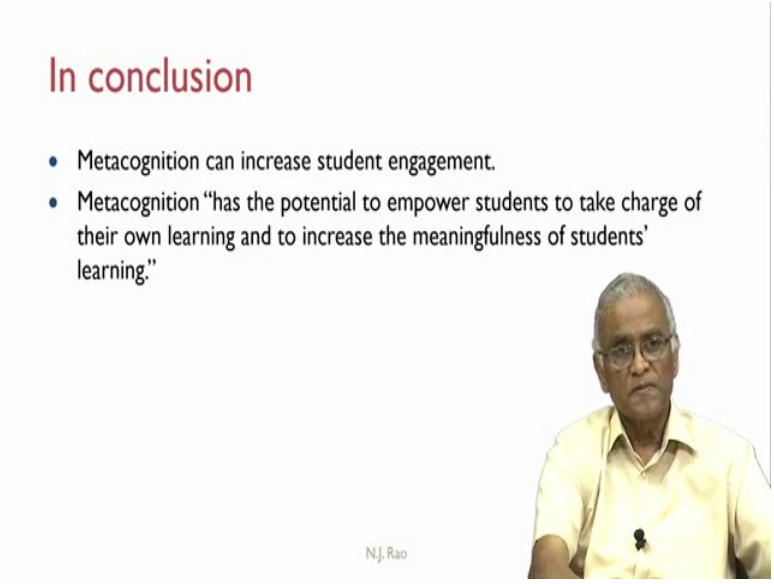

So, in conclusion metacognition can increase student engagement certainly, because he is consciously getting engaged with what he studying. And, metacognition has a potential to empower students to take charge of their own learning and to increase the meaningfulness of students' learning.

So, to that extent teacher should make conscious effort to focus on metacognition, metacognitive activities of the students, that is one of the best ways to make the students engage with the knowledge that is being imparted.

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These are some of the resources, one can log in and get a little more information.

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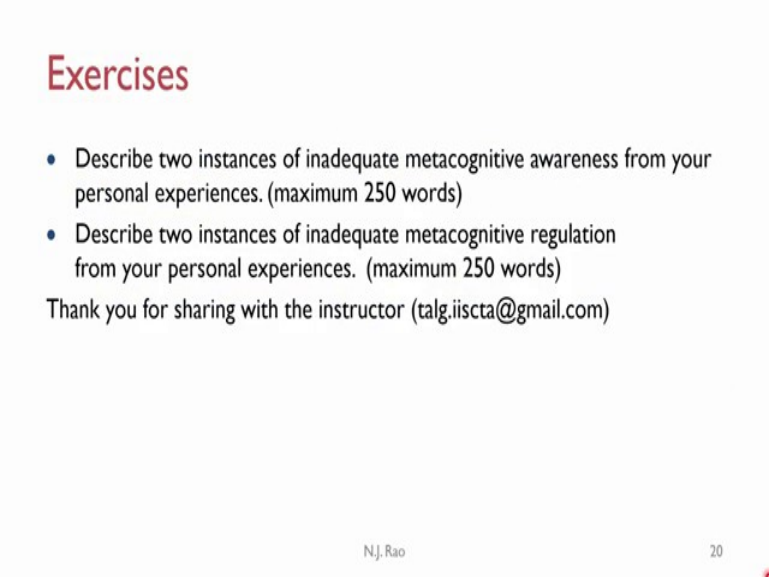

And, here for the exercises: describe two instances of inadequate metacognitive awareness from your personal experiences; your own or in the class room. One is metacognitive awareness and similarly, give two instances of inadequate metacognitive regulation from your personal experiences.

Actually, it is very simple. Many students merely give very small number of hours or very small number of days before they exam to study. I am sure all teachers would have

experienced that situation. But, instead of that obvious ones if you can give some instances of inadequate metacognitive regulation it will be nice. Thank you for sharing with the instructor. They will work as excellent examples for us.

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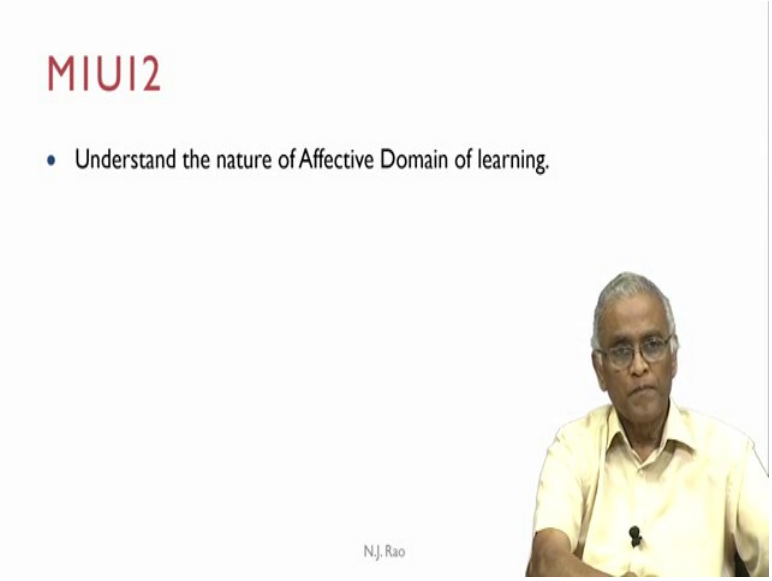

And, in the next unit we will try to understand the nature of affective domain of learning. We talked about three domains; cognitive domain, affective domain and psychomotive domain and we spent all this time with the cognitive processes, knowledge categories to address the cognitive domain. In the next unit we will look at the affective domain of learning.

Thank you very much.