Introduction to Learning Analytics
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Lecture - 07
Data Collection: TELE

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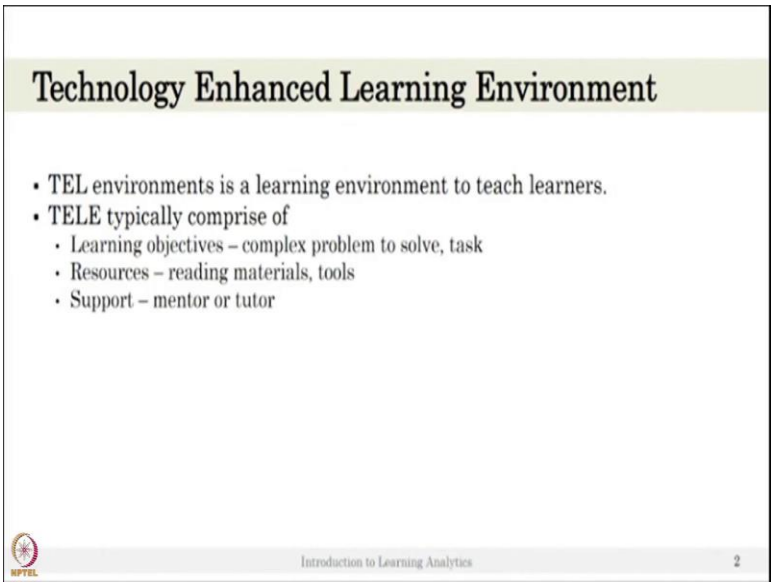

In this learning dialogue, we will see what data has to be collected in technology enhanced learning environment. TELE or Technology Enhanced Learning Environment it is a learning environment to teach a specific domain or specific task or specific problem or specific skill to the learners. TELE is like other learning environments it contains learning objective, the learning objective can be a student has to learn this task or student has to solve a complex problem so that he will learn some skills or set of question answers to be answered and it has a resources like reading materials, tools. So, the student can use these things to answer the complex problem or to answer the questions.

Sometimes TELE might have a support like a mentor or tutor or a guide, hint, feedback something like that.

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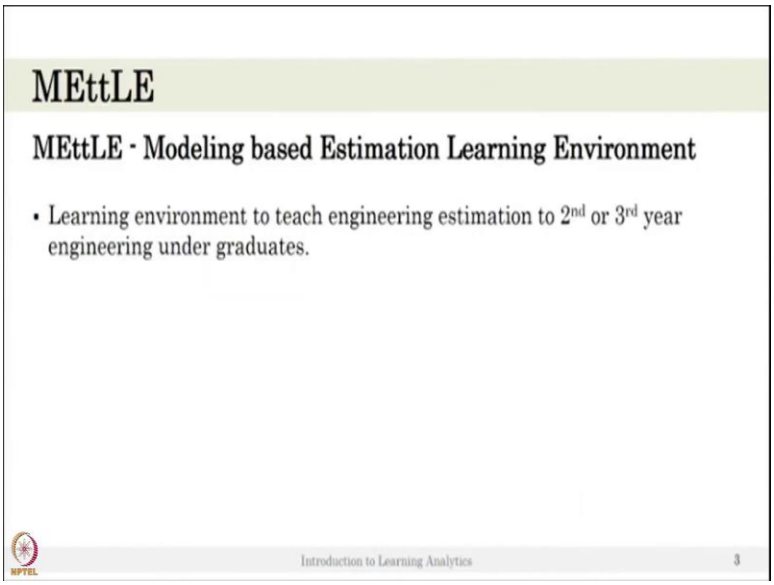

We will discuss about one such kind of TELE environment that is called MEttLE modeling based estimation learning environment. MEttLE is a learning environment created to teach engineering estimation skills to second and third year undergraduate engineering students specifically for mechanical engineering and electrical engineering students. MEttLE is created by IIT Bombay education technology department.

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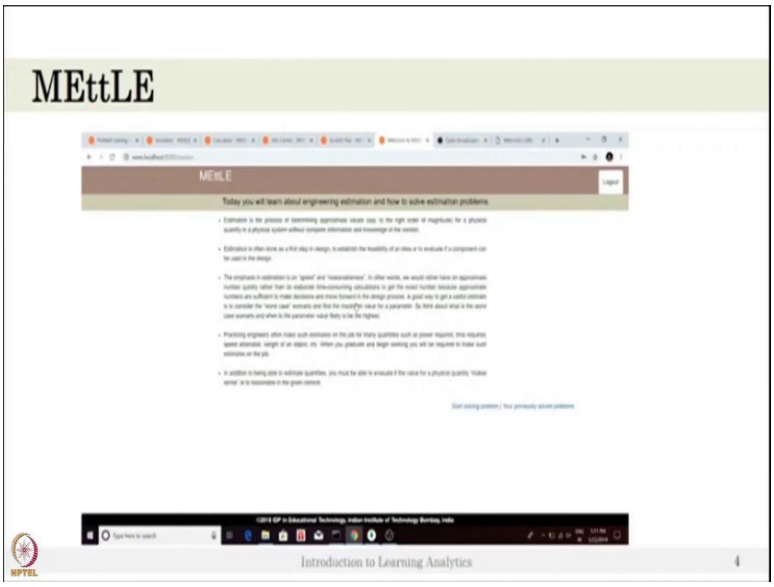

Here is a short video to show what MEttLE is, please observe carefully what are the tools in MEttLE, what are the action student can do think of that angle then let us move on to activity.

When the student logged in we will get the instructions, then you will move on to the problem.

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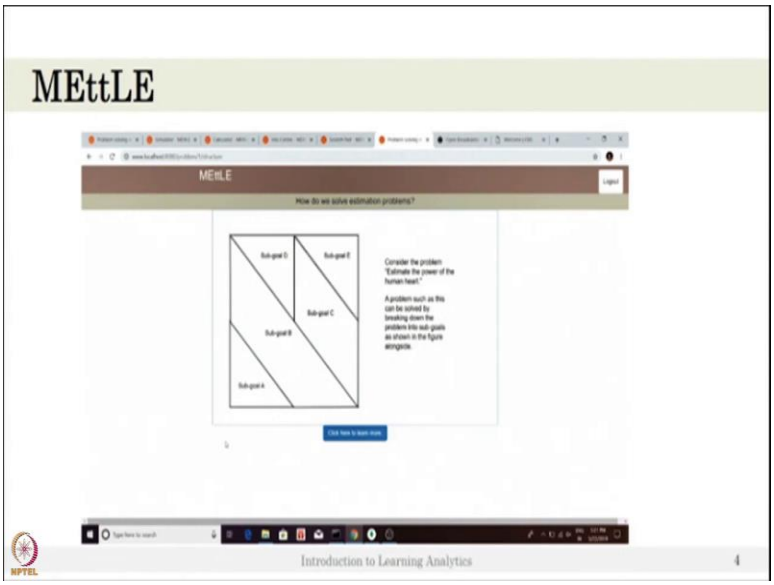

The introduction video will show there is a complex problem which can be broken down into smaller sub problems. So, the student can create solution for sub problems and combine solutions to solve the bigger problem.

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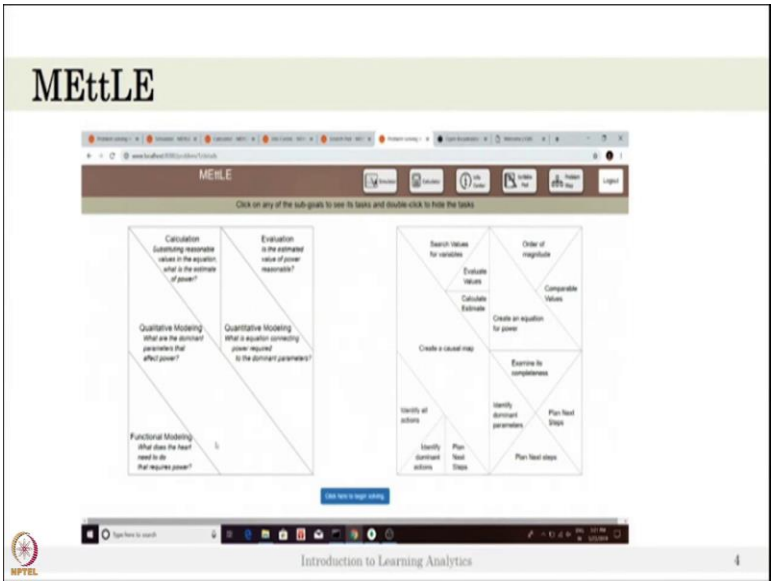

Here MEttLE gives the sub problems for engineering estimation. Like quantitative modeling, qualitative modeling, calculation, estimation, evaluation all these sub problems are needed in order to understand the engineering estimation skill. These each sub problem is further broken down into a task, you can see that in the right side of the screen. This is called problem map.

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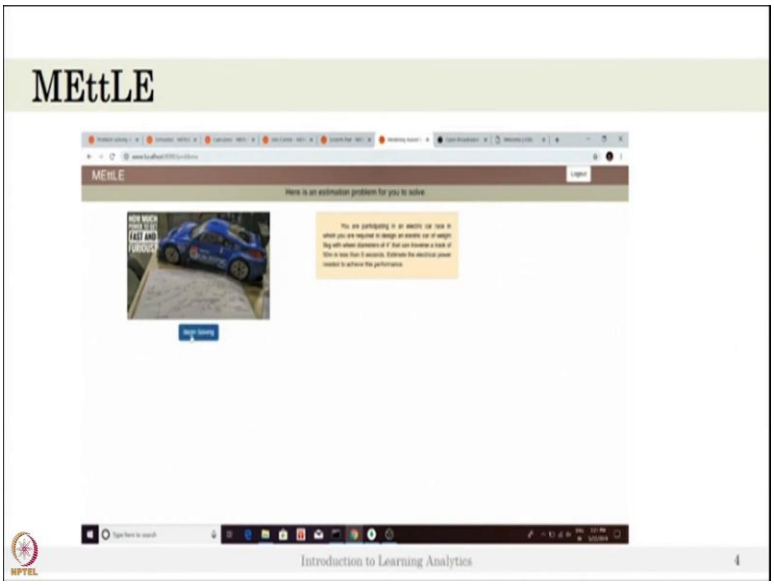

After solving the problem map, the student has given the real time problem. So, students solve start solving the problem. So, student solving problem map and selects one particular subtopic.

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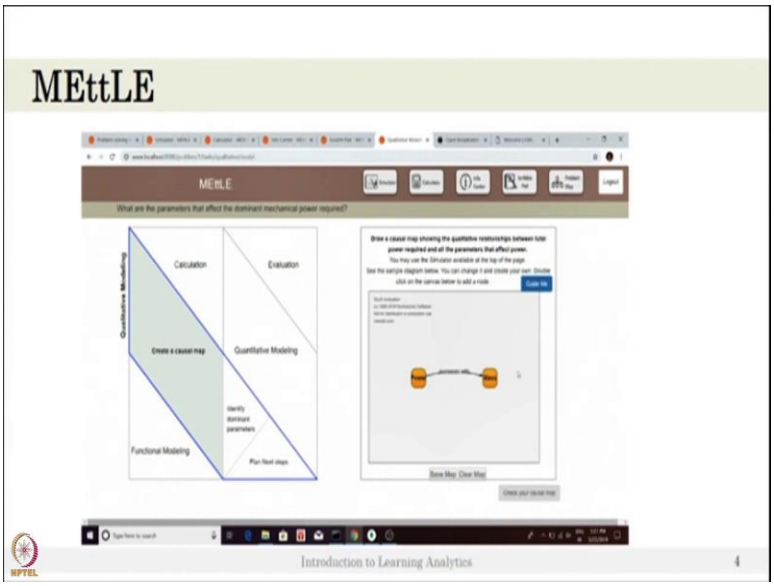

When you select a subtopic, you will be provided with a set of questions and answers to answer and also you can ask a guide me to understand how to interact with the system.

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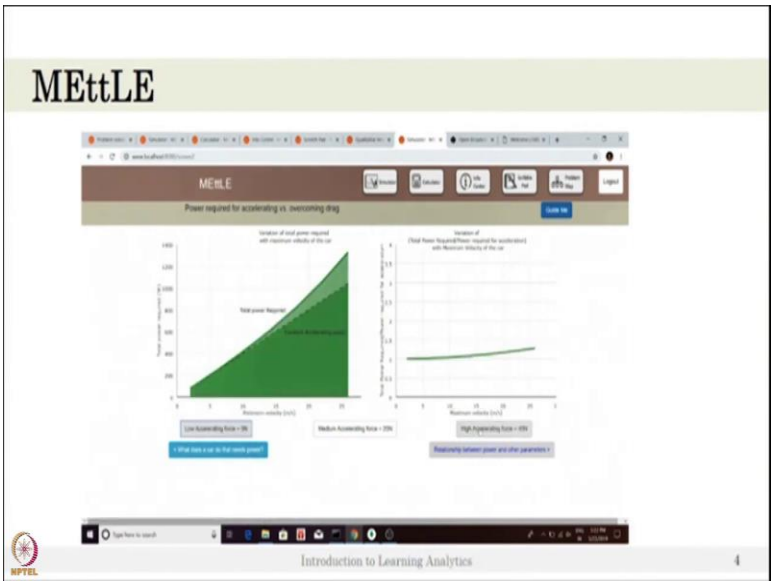

Or there is a other tools like a simulator, where student can play the simulator video and try to understand what is going on and also there is a graph to interact with and this graphs are interactive.

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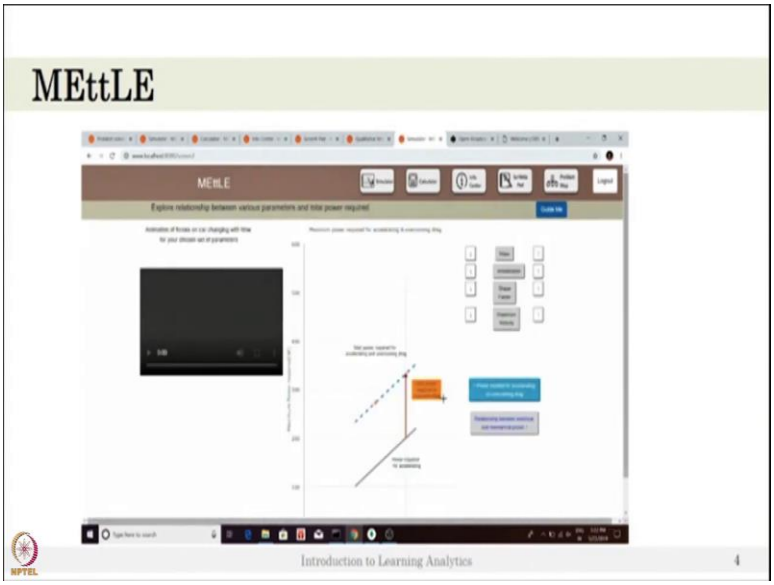

Like simulator we have some other tools say calculator and scribble pad. In simulator, there are two pages you see the second page now where the learner can change the value of the variables it is a calculator screen.

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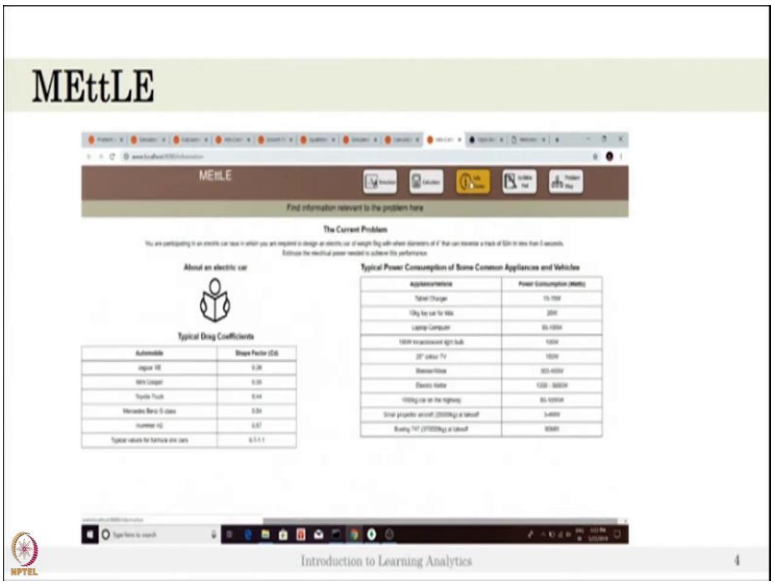

And there is the information about different values parameter values.

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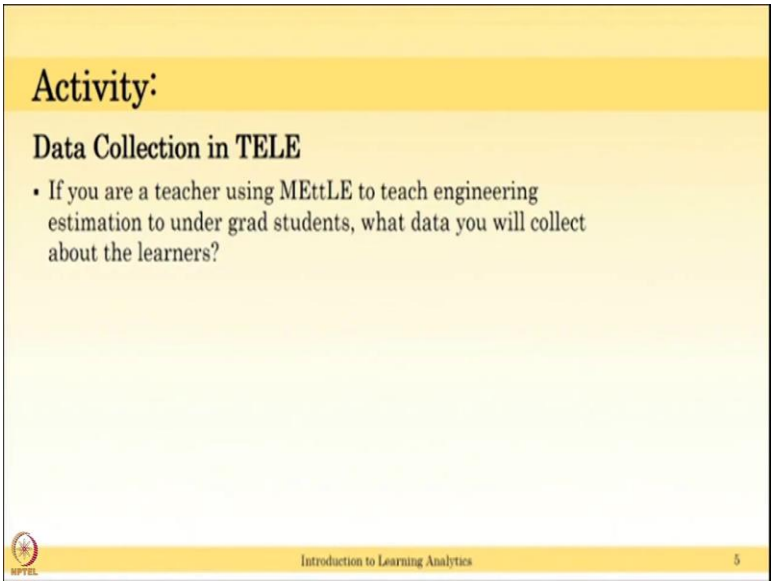

Now, you have seen MEttLE. MEttLE is the TELE environment to teach engineering estimation skills to grad students. And you saw other various kind of interaction student can do like they can interact with the simulator or they can use calculator, they choose sub problems on their own there is one big problem given that is engineering estimation in that there are lot of sub problems is there. Student can choose sub problem on their own in any order. So, you have all this information there. Consider you are a teacher; you like to use MEttLE to teach engineering estimation skill to a class under grad students class.

What data will you collect about the learners? What data you would like to record from the MEttLE learning environment? Please think your answer you can pause this video and write

down what data will I have to collect in MEttLE after completing this activity you can resume the video to continue.

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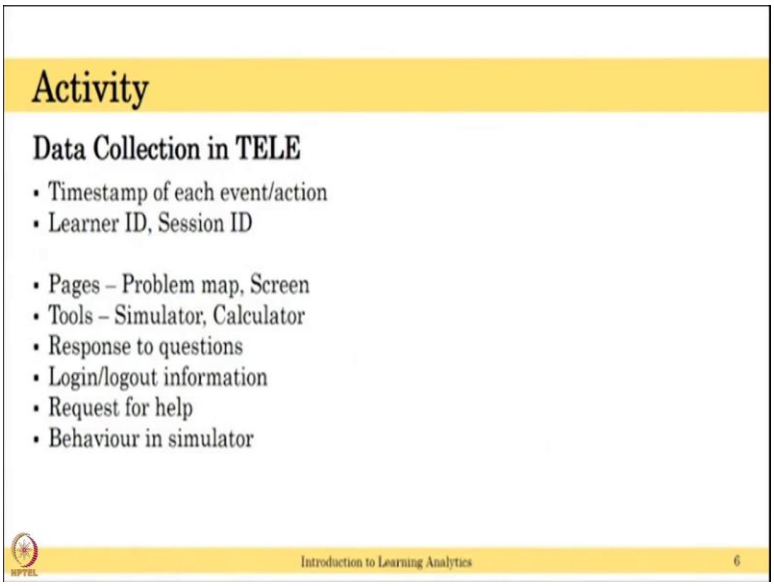

So, as we discussed in the MOOC environment data collection, there are some common parameters that is timestamp of each event or action, learner ID, session ID. In TELE we do not have the IP address because TELE runs in the local system and we can collect each individual students ID and session ID. Apart from these common parameters in TELE environments we will like to collect all the tools the environment has like a simulator, calculator and all the behaviors in this tools like a simulator has a lot of behavior they are changing the graph, they are changing the value of the variables so, all this information the behavior student does in the tools has to be captured.

Similarly student can navigate to multiple pages like problem maps, screen, ask for the guide all this information. which page the student just navigating should be captured. And response to the questions when in each sub problem there is set of questions to be asked to students and students is responding to it what is those response. When the student's log in, when the student is logout with a timestamp. These information should be captured in TELE environments.

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It's a two example to show the raw data in the MEttLE week store. MEttLE is implemented using node dot js and the log data the student's behaviour is stored in a MongoDB. You can see the MongoDB we already had a structure like ID, ID is student ID, session ID is there and the page ID is exactly which page student is in. Is he in the problem tasks qualitative model the student has selected the qualitative sub task in the problem map and the student is asking for hint that is a log data timestamp is there. In the second example the student is in the simulator page the student choose qualitative model from there he went to simulator page.

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In another two examples, the student is in simulator page, but he moved to screen 2 in the simulator page that is simulator has a two pages.

And in our next example, the student changing the accuracy value in a screen 2 low accuracy a high accuracy values. So, if you arrange this log data in a time sequential manner and look at the log data, we can recreate the scenario the student gone through that is a student was in quantitative model he was asking hint, then he went to simulator he went to second screen in simulator after going to the second screen, he went into the low accuracy he changed something there.

And we even identify how much time he spent on each action. So, we need to note down this much rich data in a finer grained level, we need to note down the level of in each second student's interaction with the system. Instead of an each second we record a data based on the events.