Designing learner-centric e-learning in STEM disciplines
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Lecture - 22
Effective Integration of Technology

Hi, in our last LED we discussed on how instructional designer should understand the unique features and affordances of technology tool and how it can be used to enhance the learnings in a specific content domain for learners.

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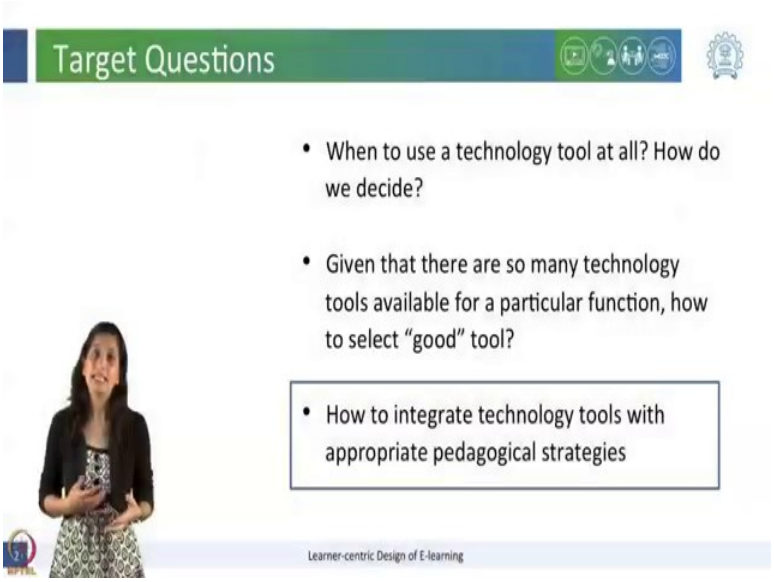

In this LED we will talk further on the integration of technology in e-content in an effective manner.

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Before we learn more on that let us do a reflection spot. An instructional designer created an e-learning content with 5 concept videos of around 45 minutes each provided additional reading material, assimilation and a quiz for learners. He used highly sophisticated and appropriate technology tools to create this content which is accessible to all learners. Now is this enough to be called effective integration of technology.

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Now, some of you would have said yes because the instructional designer seemed to have conducted the analysis of the technology tool affordances, as it is written that he used appropriate technology tools, the instructional designer also used various different components of learning such as videos, reading material, simulation, a quiz and in addition the content is also accessible to all learners.

However, if you have said no I would agree more to that since the video seem too long which may disengage the learners, there is no mention about indisposed activities within the videos, there is no mention about other activities which involved active learning. Active learning based online or blended learning often involves the use of videos, reading material, where learners should be made to do something rather than mere watching of videos or reading of content; many of these pedagogical strategies have being discussed explained in the week 2 and week 3 content. However, here we are going to briefly reiterate the integration of technology with pedagogy in an effective manner.

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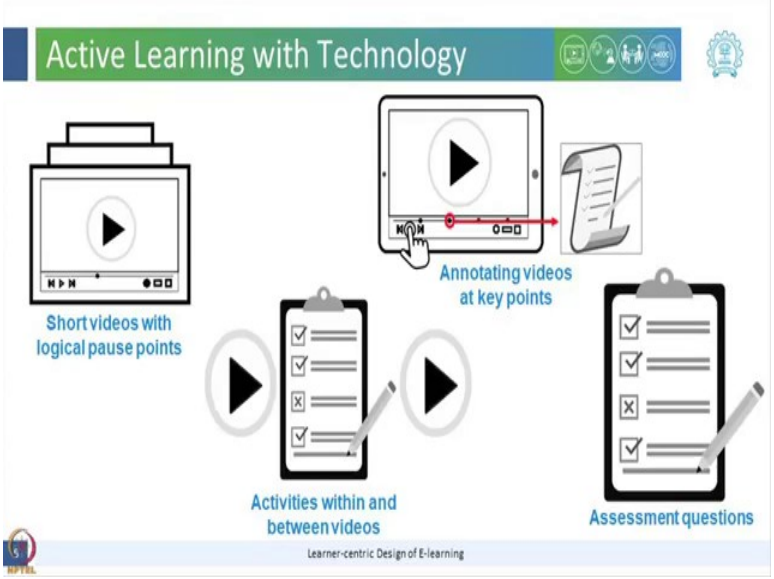

Technology can support active learning where the learner actively participates and interacts with the content. E-content comprising videos should not include long videos, but short videos after identifying logical breakpoints. Videos can be annotated at key points so, that a jump between sections of the videos as possible for learners. Activities should be interspersed to within and

between videos with constructive feedback for learners. Designers should incorporate formative and summative questions in between different videos and activities again with constructive feedback.

The addition of these small elements ensures that technology affordances support the learners to go beyond mere, watching of videos or reading of content and allows them to actively interact with the content.

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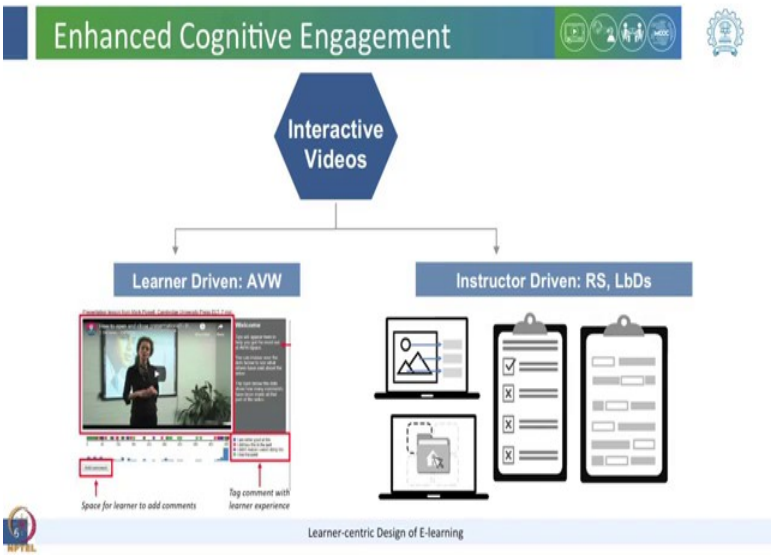

As discussed previously these interactive videos can be instructor driven including different kinds of reflection spots or LEDs such as annotating an image, drag and drop, multiple choice questions or filling the blanks. Reflection spots can be incorporated using different technology tools such as h 5 p as we have done for our course where the video is paused. For the learner to answer the question and the video resumes after the learner has answered to the reflection spot.

However, you should make sure that the appropriate feedback is provided in the videos following the reflection spot which addresses common expected answers for the reflection spot. These interactive videos can also be learner driven that is the active video watching which we discussed last week where learners are made to add comments, share their learning experiences with the comment; this also leads to enhanced cognitive engagement with the content.

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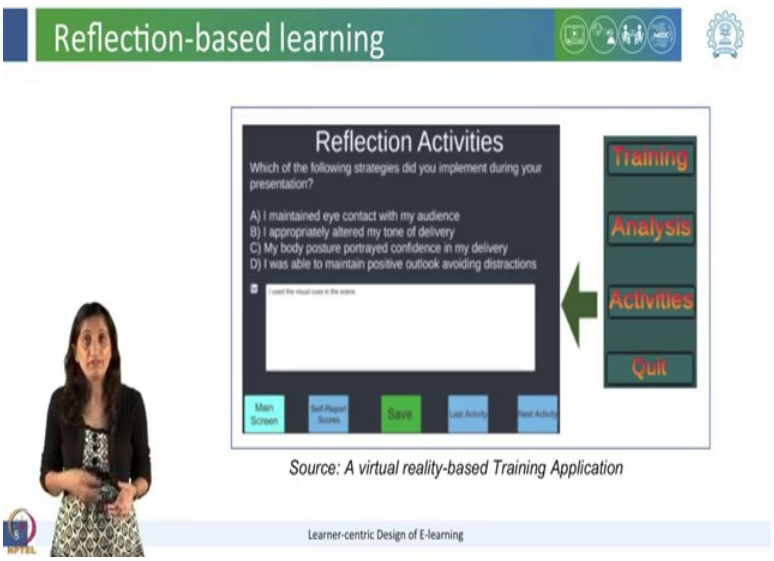

We have discussed about reflection and articulation as pedagogical strategies in e-learning. Reflection can also be targeted by incorporating open ended activities to be performed in an e-content. Here is one example of a reflection activity provided to learners in an e-content that entailed a virtual reality based application designed to improve learners oral presentation skills. This reflection activity asks the learners to list down some of the strategies that they implemented during their presentation. Such activities motivate the learners to reflect on their own knowledge structure and how they can build on what they know.

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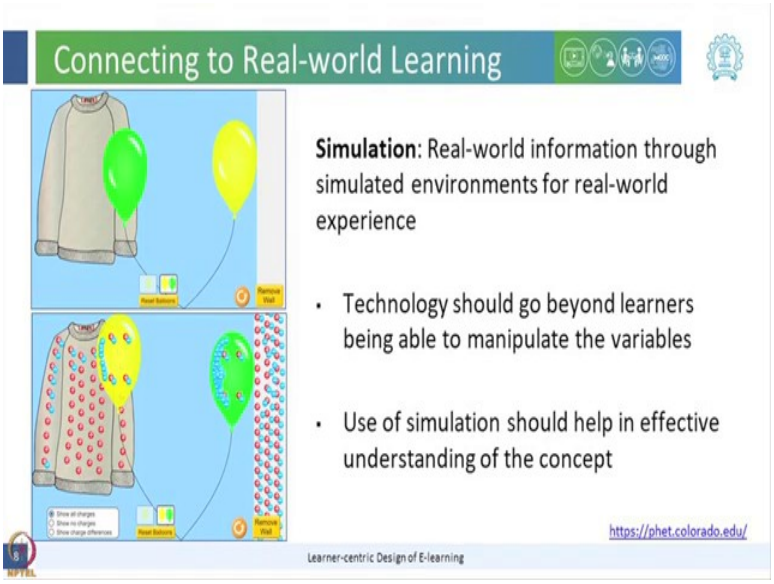

Providing rich real world information of complex environments for real world experience through visualizations is one of the technological implications of the constructivist approach. Incorporation of simulation is one of the examples of achieving this goal; however, in order for effective integration of technology one thing that needs to be mean sure is that the technology support should go beyond learners being able to manipulate the variables and that the use of simulation should help in effective understanding of the concept.

In the example shown here, the image on the top allows the learner to play with the variables move the two balls around have the wall or remove the wall. However, the underlying concept of static electricity only become more evident once the charges in play are shown as seen in the bottom image. This is one example which shows how effective design and integration of technology is critical.

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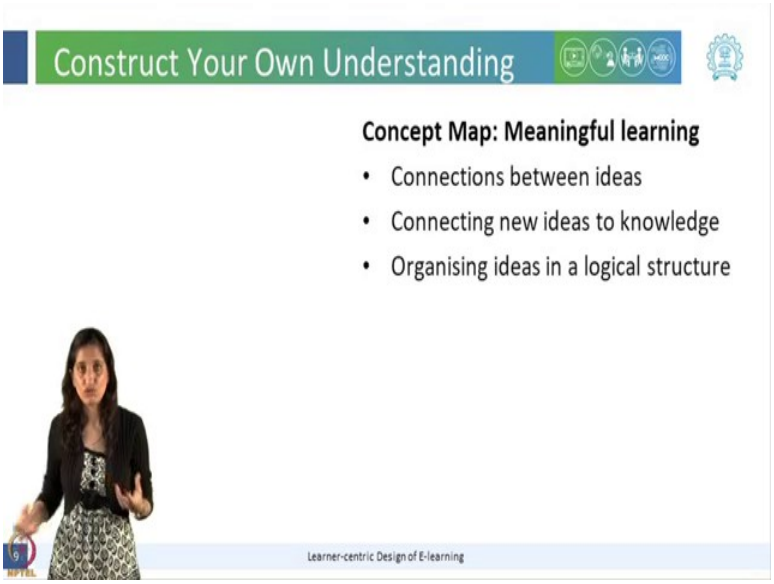

If you use a visual representation tool such as a concept map this will help learners in seeing connections between the idea that they already have. Connecting new ideas to knowledge, organizing ideas into a logical structure all of which will lead to meaningful learning.

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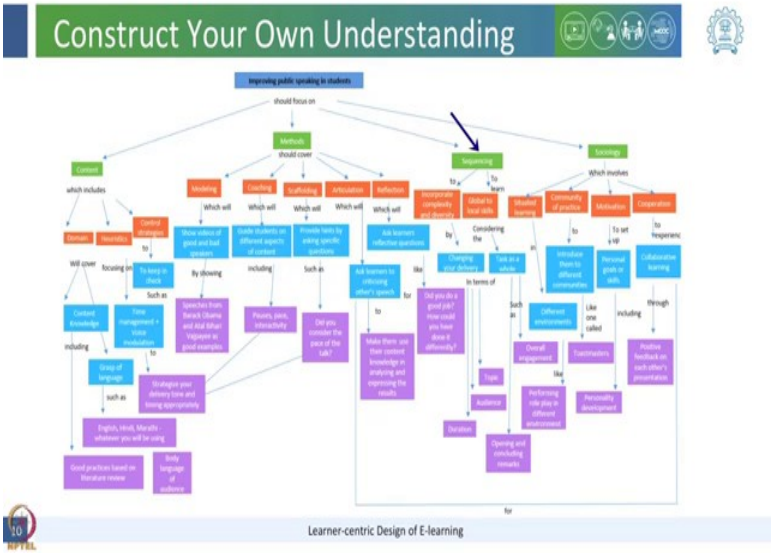

Here is an example of a concept map which describes the different aspects to be focused on in order to improve public speaking skills and students. It elaborates on each of the aspects like content, methods, sequencing, sociology which are involved in public speaking.

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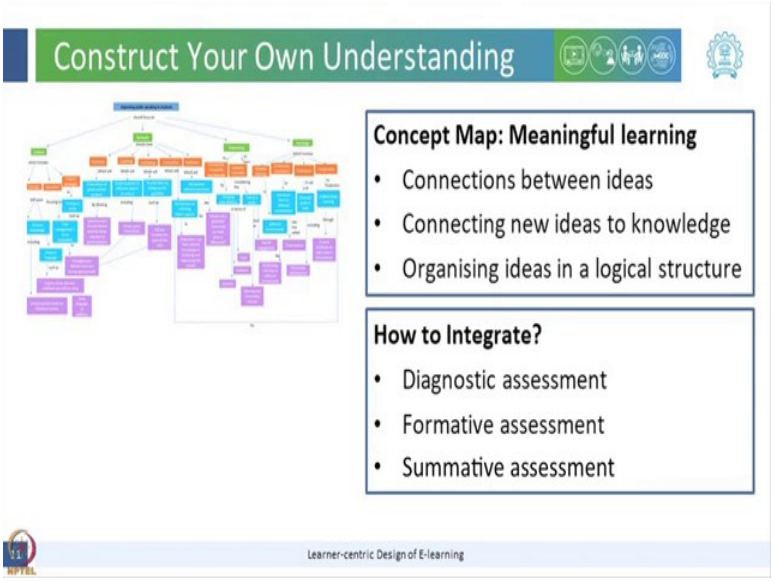

Now, such a concept map can be integrated into learning content with different learning goals. You may start with the topic by asking the learners to construct an initial concept map which provides diagnostic assessment as well as leads the learners to think over the content. A partially constructed concept map can be provided as formative assessment after some content has been covered to understand learners understanding, misconceptions also learners can be asked to create a contact map on the entire topic as a summative assessment task.

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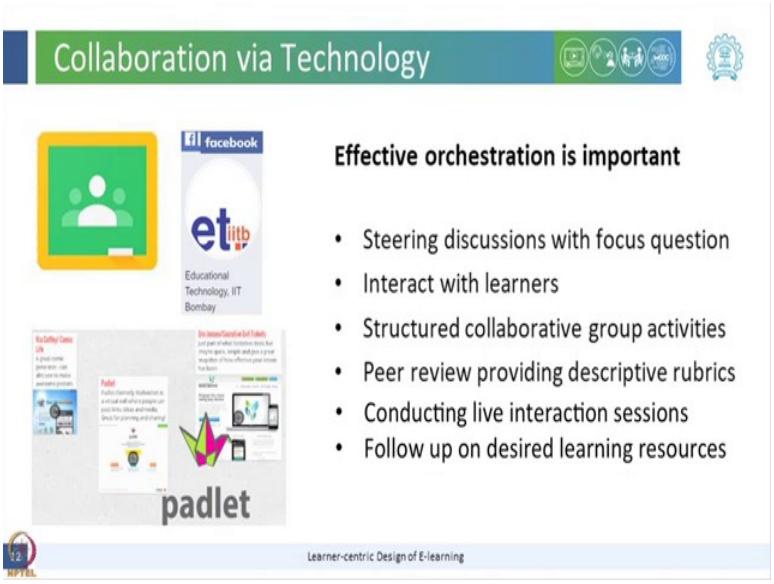

As discussed earlier there are several technology tools performing online communities, performing collaborative activities such as Google classroom, discussion forum, Facebook accounts, padlet etcetera. However, the important thing to remember is that effective orchestration of the same should be focused. One such strategy which is followed in this course involves steering of discussion with the focus question and providing clear instructions to the learners to interact with their peers interact with the learners frequently during online discussions.

Design collaborative group activities for learners and ask them to conduct peer review by providing them descriptive rubrics. Conducting live sessions for learners where all learners can come together or at one time point view each other's comments, queries and learn from their peers. At the same time the instructor should also follow up and provide them with the desired learning resources.

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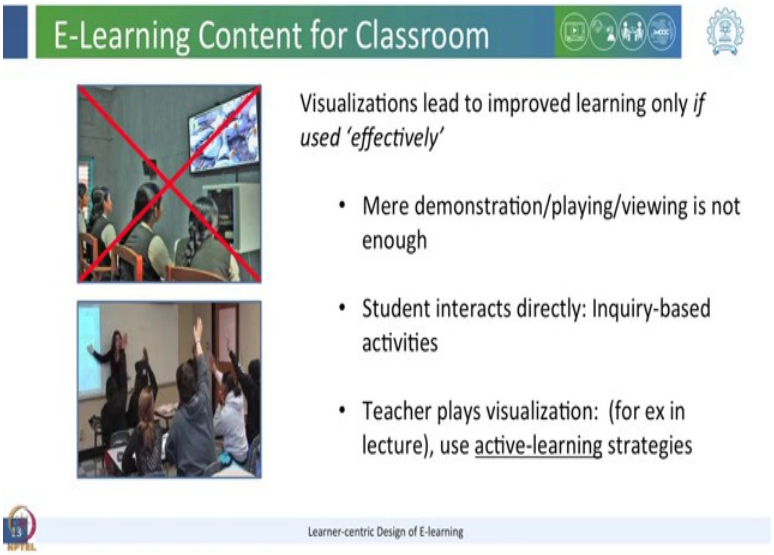

For using e-learning in classroom it is essential to remember that visualization is going to lead to improved learning only if used effectively. Mere demonstration playing viewing of the visualizations is not enough. If the students are directly interacting with the visualization such as homework or lab work then teachers should integrate it with inquiry based activities. However, if the teacher is playing the visualization in the class or a lecture then active learning strategies should be incorporated.

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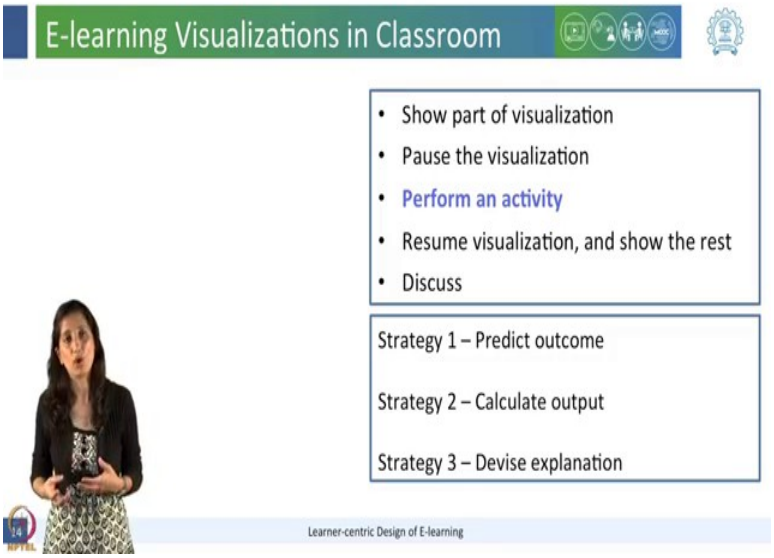

The steps for one such pedagogical approach have been listed here which involves showing a part of the visualization by the instructor, pausing the visualization, asking the learners to perform some activity and then resume the visualization and show the rest and discuss about the phenomenon with the students. Three different strategies which can follow these steps have been mentioned here. This involves strategy 1 which is predict outcome where during the activity phase the students predict the outcome of a phenomenon which was shown to them in the visualization.

Strategy 2 which is calculate output where during the activity phase the students are asked to calculate the output or next step of the process which is shown to them in the visualization. Or strategy 3 which is device explanation where, during the activity phase the students device and explanation for a given process or phenomenon which was shown to them through visualization. One such strategy should be chosen based on the pedagogical purpose and the learning outcome. Coming back to learning with the ICT; how learn ICT team in 2012 proposed 5 dimensions that characterized how ICT could support meaningful learning.

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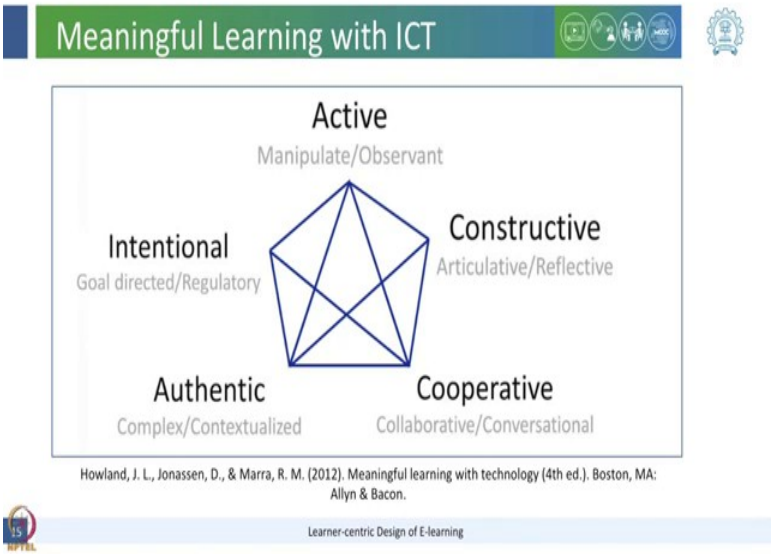

These 5 dimensions of meaningful learning included active learning where learners actively engaged with ICT content, working with the objects and information and observing results. Constructive learning well learners construct their own knowledge through self reflection and articulation.

Cooperative learning where learners work with their peers to learn. Authentic learning where learners engaged in the solving of real world problems and goal oriented learning where learners set their learning goals and planned their learning pathways. In our course we have covered most aspects of these 5 dimensions of meaningful learning with ICT.

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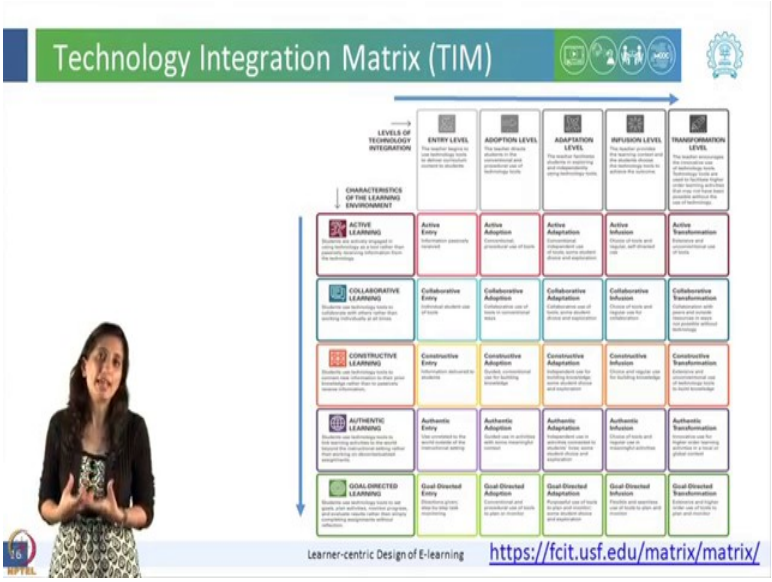

Based on this theory of meaningful learning with ICT a framework named technology integration matrix has been developed to measure the 5 levels of technology integration. This technology integration matrix incorporates 5 interdependent characteristics of meaningful learning environments and associated them with 5 levels of technology integration that is entry adoption adaption infusion and transformation. Together the 5 characteristics of meaningful learning environments and the 5 levels of technology integration creates this matrix of 25 cells to assess technology integration.

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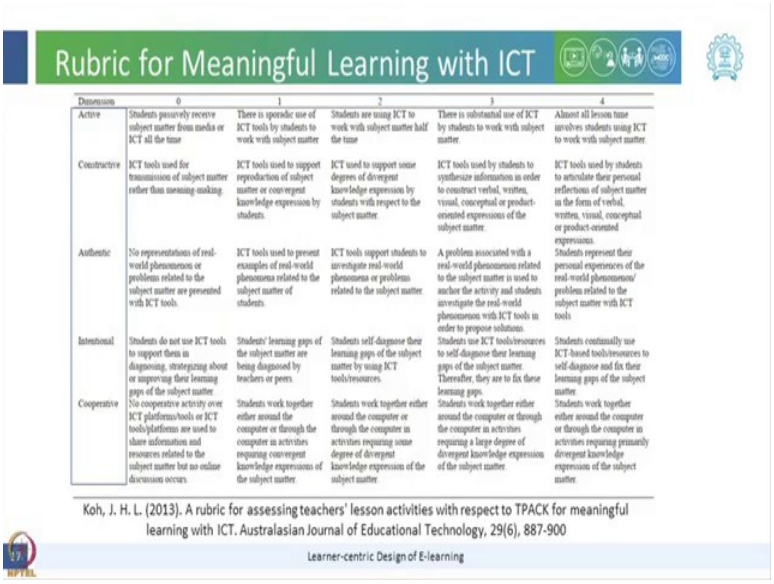

Here is another rubric based on the theory of meaningful learning with ICT that contributes towards a design of e-learning content. Such rubrics can act as design scaffolds to incorporate effective integration of technology into the e-learning design which can lead to meaningful learning. We hope that you have gained a fair understanding on how to select a technology based on its unique features and affordances and how to focus on effective integration of technology considering the interaction between technology content, pedagogy and the learners.

Thank you.