Designing learner-centric e-learning in STEM disciplines
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Lecture - 23
Multiple Principle and Contiguity Principle

With the extensive availability of variety of media available for creation of e learning content, the designers face a variety of questions such as what to use, how much to use and when to use?

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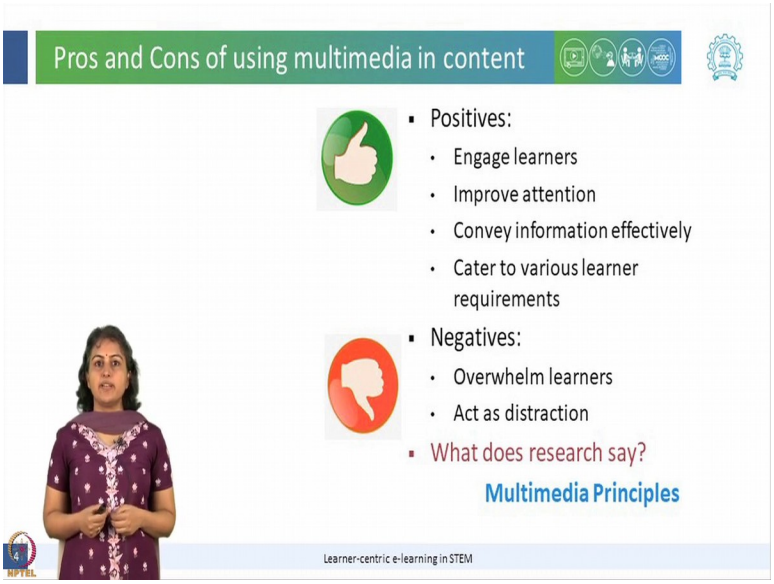

It is taught that multimedia engages learners, captures their attention, conveys information effectively and also caters to different learners needs. At the same time we have to ensure that the students do not get overwhelmed with the excessive use of media. So, how do we decide what is the optimum usage of media? Is there any research based guidelines available for this? There are a set of principles called multimedia principles which provide guidelines on how to effectively integrate media with e-learning content. While literature points to several multimedia principles we will be covering a few of them this week.

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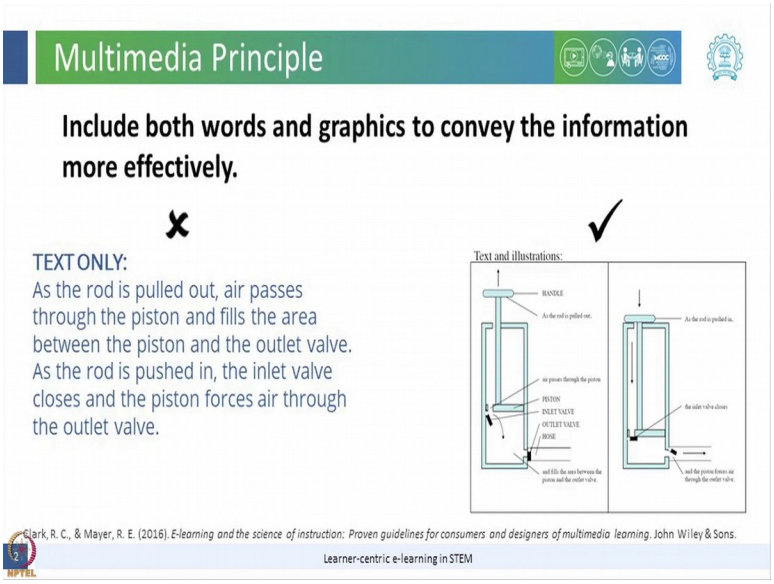

The first principle that we will discuss is the multimedia principle. This principle says that to effectively convey e-learning content, we should use both words as well as graphics.

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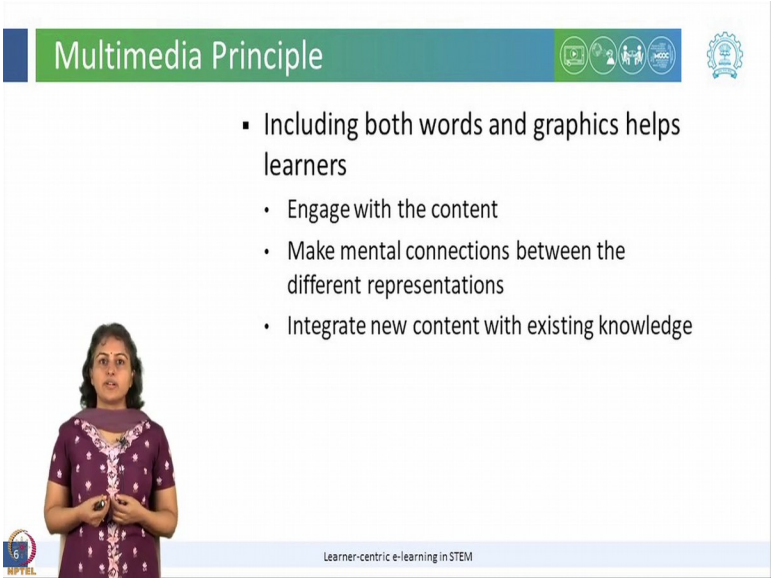

Including both words and graphics helps learners engage with the content make connections with the different representations as well as integrate it with their prior knowledge. This may be

evident, but there are certain recommendations on what kind of graphics to be used to convey what kind of information; let us look at a few of them.

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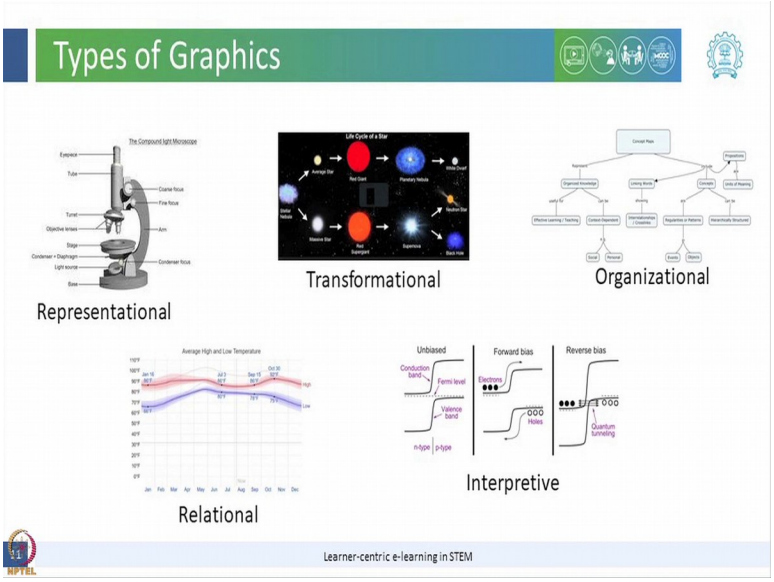

For example representational graphics may comprise of just an image with a caption such images may be used to convey facts or concepts. Relational graphics on the other hand can be used to convey quantitative relationship among different parameters this can be used to represent processes. Transformational graphics on the other hand convey information about changes during space and time. They can be used to represent again processes and procedure.

Another kind of graphics is the interpretive graphics, these graphics can be used to make the intangible or invisible concepts more tangible and concrete. They can be used to convey concepts, processes or principles. Organizational graphics can make quantitative information between different entities such graphics can be used once again to represent facts and concepts.

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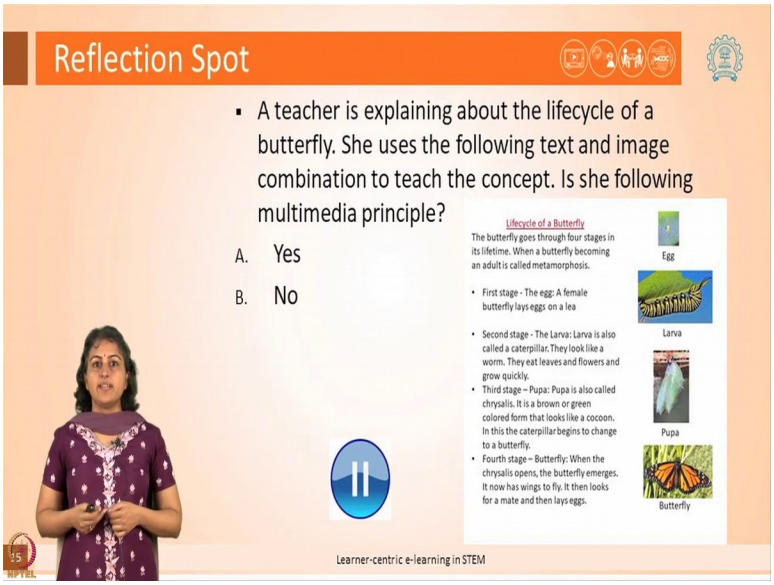

Before proceeding further here is a reflection spot. A teacher wants to teach about the life cycle of a butterfly to her students. She prepares and e learning content with the following combination of words and pictures. Do you think that this content follows the multimedia principle? Think carefully choose your options and then you can proceed.

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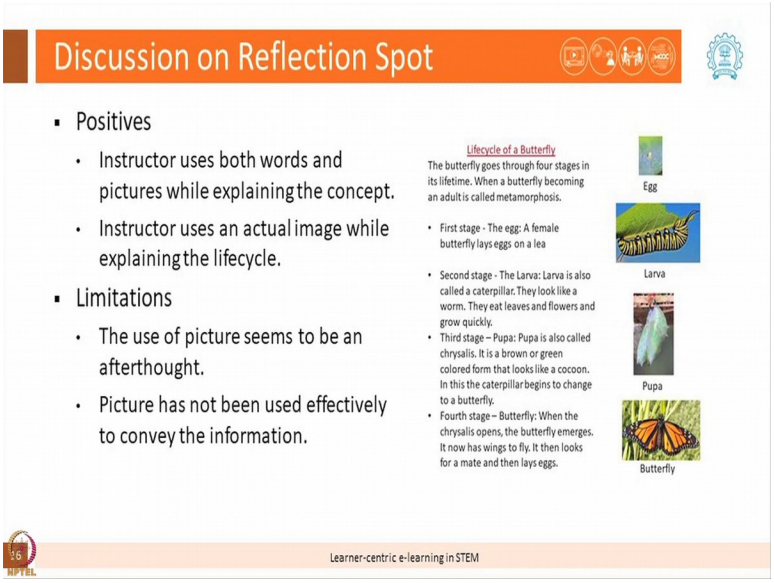

Many of you might have appreciated the fact that, the teacher used both words as well as graphics while creating her e-learning content. You might also have observed that she has used actual images of the butterfly in its different forms in her content; however, there is definitely scope for improvement. It seems as if the teacher used the images as an afterthought, the graphics have has not been used effectively to convey the information to the students.

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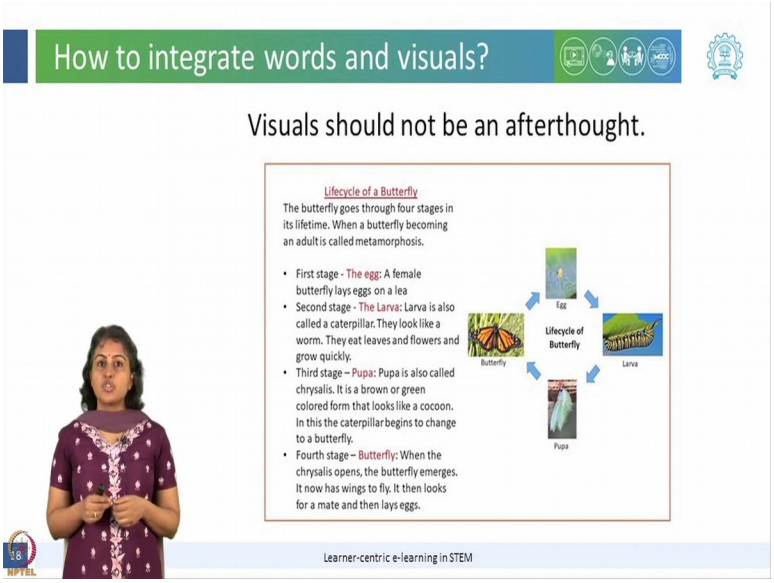

A more effective usage of graphics would have been to use the graphics to indicate the life cycle progression of the butterfly within the image itself. This brings us to an important point. Visuals must not be an afterthought. The usage of visuals must supplement the e-learning content so, as to maximize learning for the learners. As we can see in the image the visuals emphasize the temporal aspect of the life cycle of butterfly and the text addresses this in greater detail. So, the word text combination is more effective for the learners.

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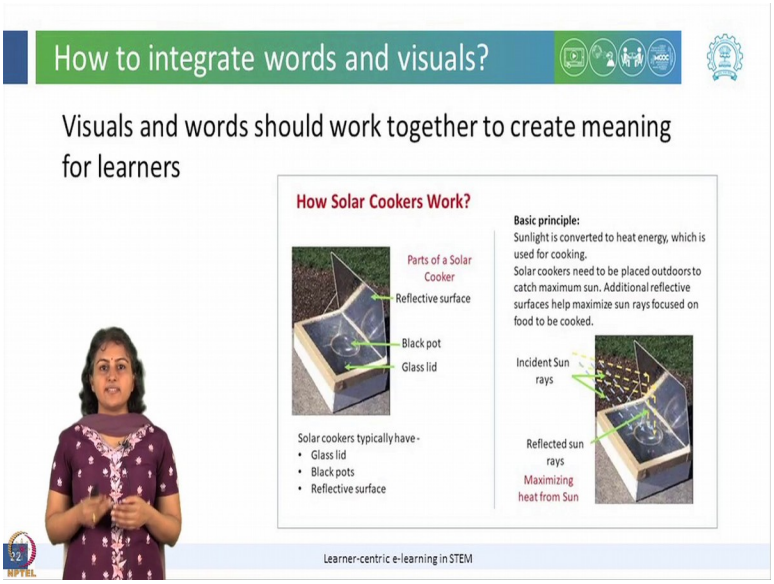

Here is another example of how visuals and words can work together to create meaning for the learners. We can see that the concept of solar cooker has been effectively captured in this image. The image not only shows a different parts of solar cooker, it also shows how the sunrays are captured the incident and the reflected rise are captured to help in the cooking.

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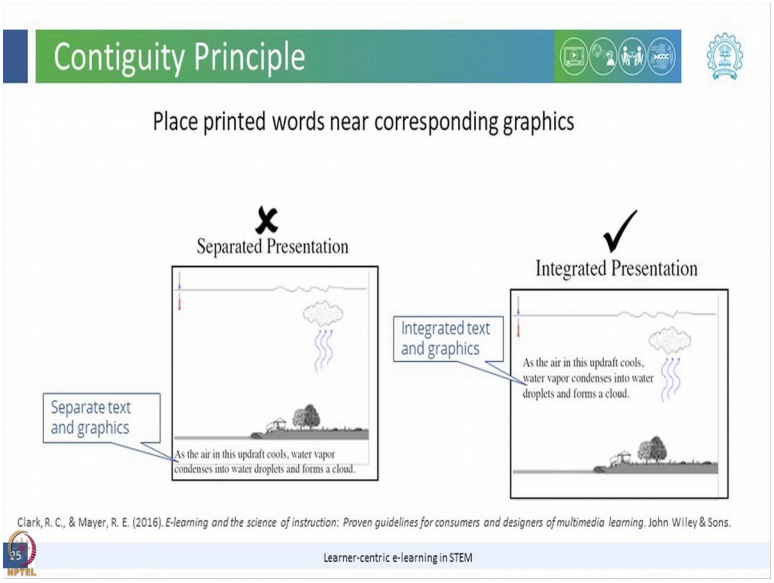

We now, come to the next multimedia principle which is the contiguity principle. Contiguity principle has two parts to it; one place printed words next to the corresponding graphics and two synchronized spoken words with graphics. By integrating text and graphics, we can ensure that the learner doesnt have to search which part of the graphics correspond to which words in the content. This enables learners to devote their cognitive resources to better understanding of the content.

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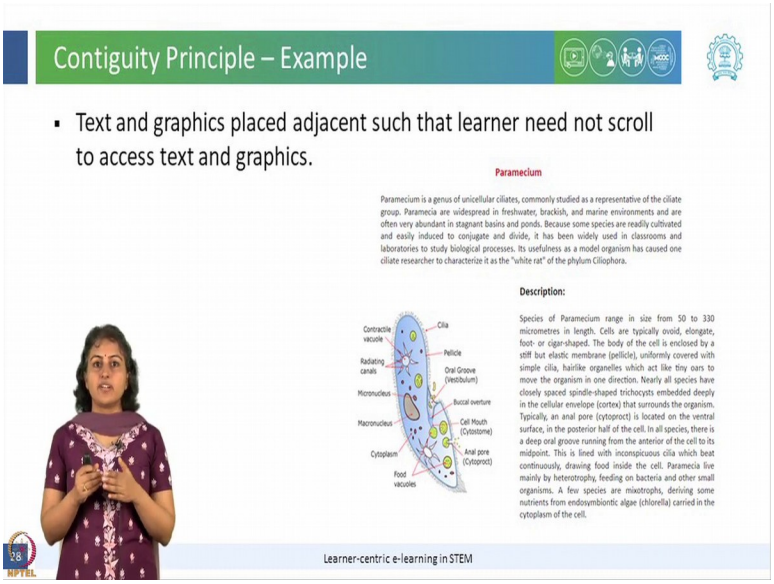

Here is another example where the text and graphics have been separated in the content, this forces the learner to either scroll across the through the content in order to access different parts of the content or you could also see that the learner has to move their eyes repeatedly to access different parts of the content. Contiguity principle recommends that keeping both graphics and the related words close together and not separating them is one way to mitigate this problem.

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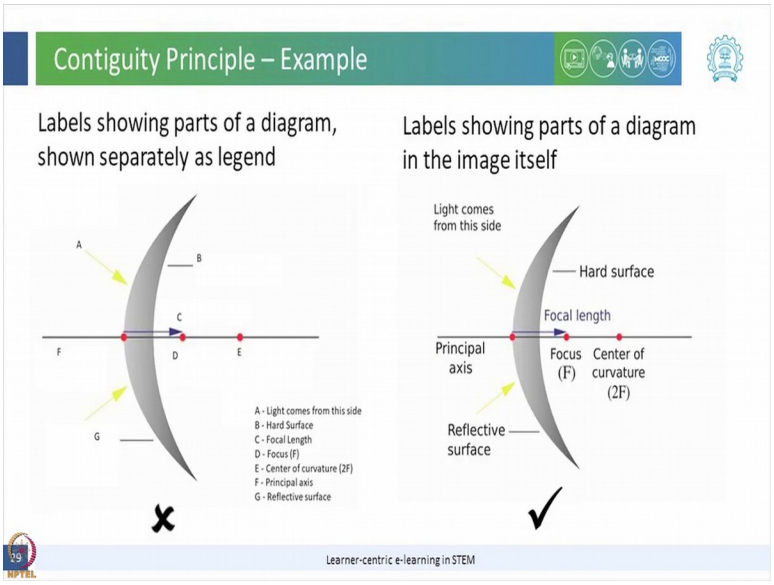

Let us look at another example, which we frequently encounter in stem disciplines. We often use images with labels to represent facts and concepts. In such cases contiguity principle recommends that the labels be placed close to the image rather than at the end or the bottom or the side of the image in the form of legend.

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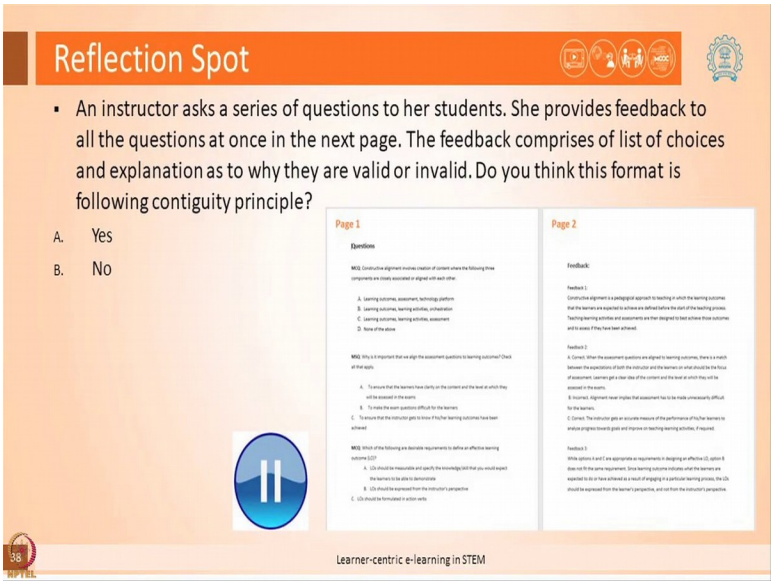

Before we continue further here is another reflection spot. And instructor asks a series of questions to her students and she later provides feedback, but at the end of all the questions and in the next page. The feedback comprises only of the list of choices which were available and an explanation of why the choices were valid or invalid. Do you think that this format follows contiguity principle think carefully choose your answer and then we can proceed.

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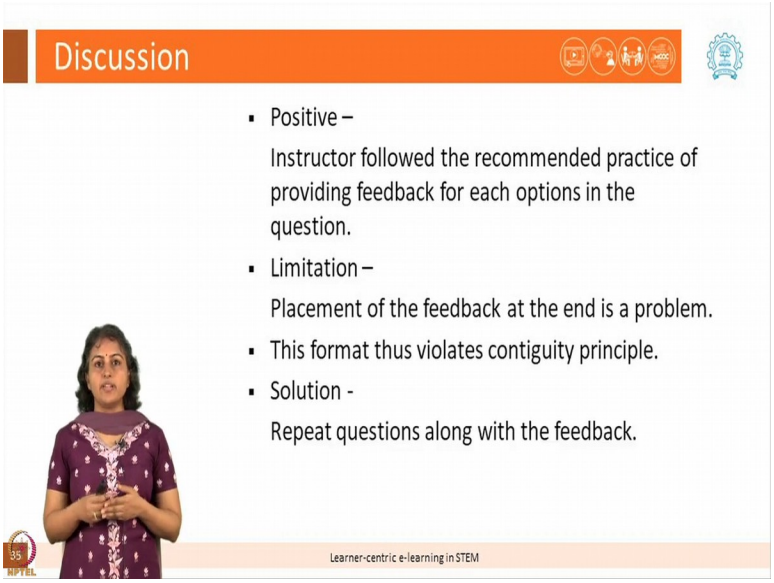

Many of you must have noticed that the teacher followed the recommended practice of giving feedback for each of the options in the question. However, the placement of the feedback is a problem. The feedback comes at the end of a series of questions. The student very likely does not remember the question completely or probably remembers only parts of the question.

In the format that the teacher follows, the question is not repeated its only the choices and why the choices are valid and invalid. This may prove difficult for learners to connect what is being explained about the choices to the question. This format therefore, violates contiguity principle a simple fix would be to repeat the question before giving the feedback.

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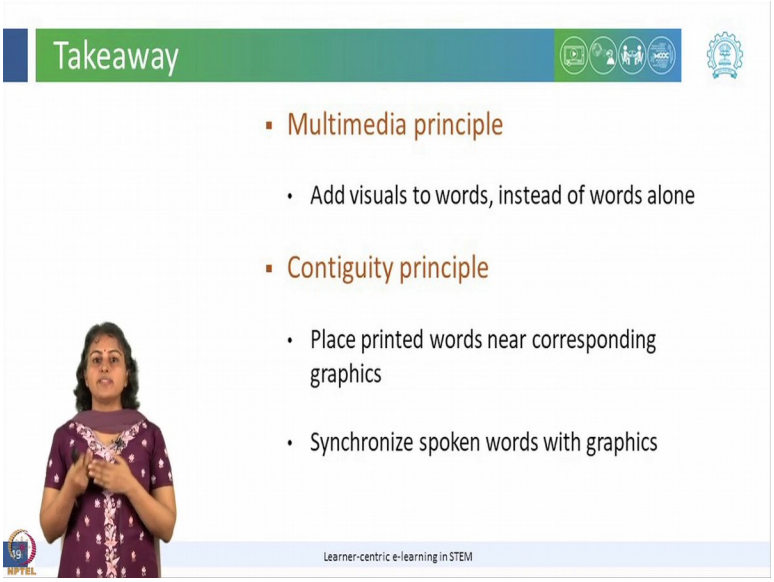

Before we wrap up let us have a quick look at the multimedia principle and contiguity principle. Multimedia principle says that add visuals and words instead of using words alone. Contiguity principle says that one place printed words near corresponding graphics; two synchronize the audio along with the graphics.

Thank you.