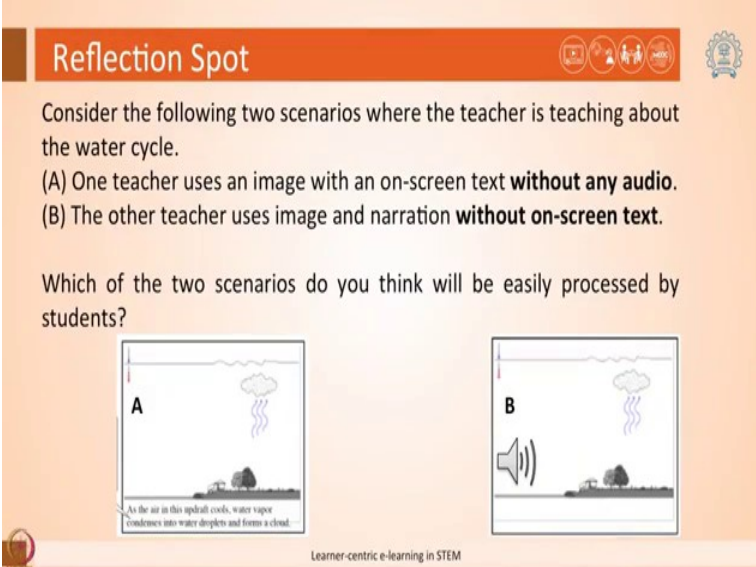


Designing learner-centric e-learning in STEM disciplines
Prof. Sahana Murthy
Prof. Anurag Deep
Interdisciplinary Programme in Educational Technology
Indian Institute of Technology, Bombay

Lecture - 24
Modality Principle and Redundancy Principle

We know that there are a set of principles called multimedia principles which provide guidelines to integrate multimedia in e-learning content effectively. While literature points to several multimedia principle in this LED, we will be discussing about the modality and redundancy principle. Before proceeding further here is the reflection spot.

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Reflection Spot

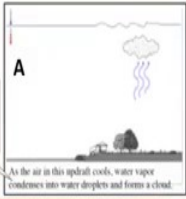
Consider the following two scenarios where the teacher is teaching about the water cycle.

(A) One teacher uses an image with an on-screen text **without any audio**.

(B) The other teacher uses image and narration **without on-screen text**.

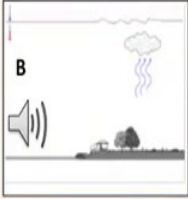
Which of the two scenarios do you think will be easily processed by students?

A



As the air in this updraft cools, water vapor condenses into water droplets and forms a cloud.

B



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Consider the following two scenarios where the teacher is teaching about the water cycle; one teacher uses an image with an on screen text without any audio, the other teacher uses image and narration without on screen text. Which of the two scenarios to your think will be easily processed by the students?

(Refer Slide Time: 00:56)

Discussion of reflection spot

Possible responses:

- Image and on-screen text would be sufficient for learners.
- Audio narration is more useful than on-screen text.

Let us see what the modality principle tells us.

✗

Words as On-Screen Text

✓


Words as Narration

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Some of you may have felt that image and on screen text would be sufficient for learners, others may have thought that audio narration is more useful than on screen text. Let us see what the modality principle tells us.

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Modality Principle




+




=

✓



+



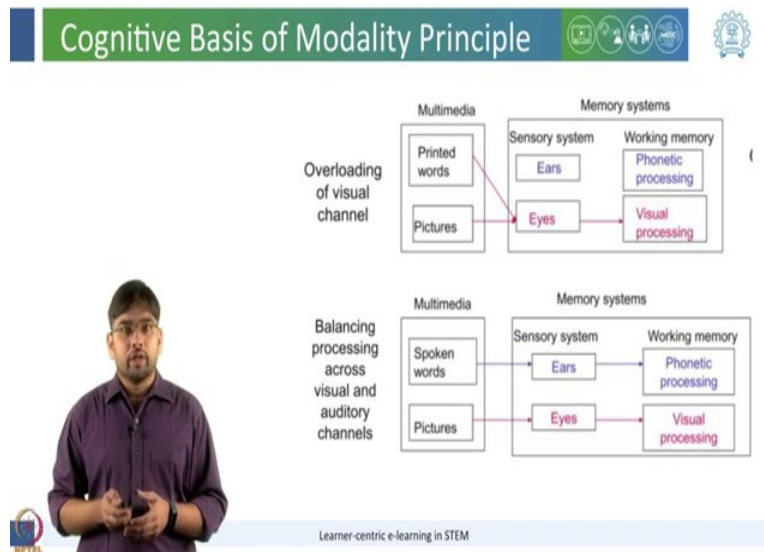
=

✗

Modality principle recommends the use of audio to explain visuals instead of on-screen text

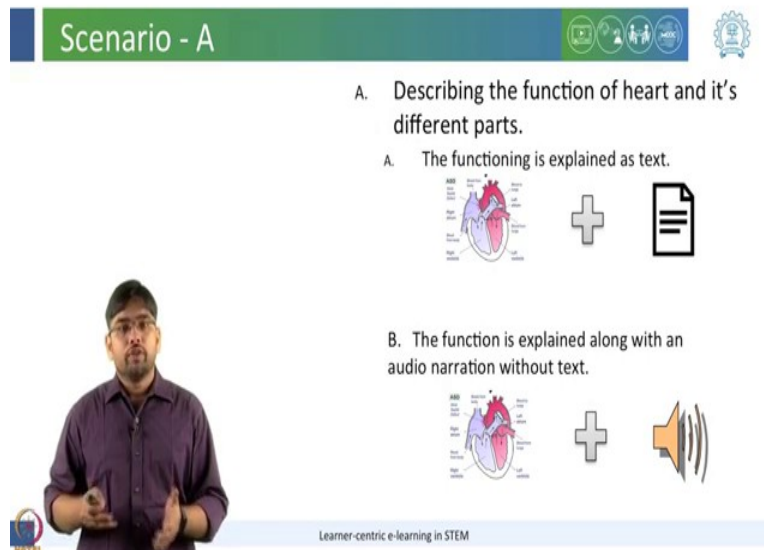
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Modality principle recommends the use of audio to explain visuals instead of on screen text, from the cognitive theory we know that if both text and pictures are to be understood then there is an overload of the visual channel. While well narration is used along with an image there is a balance in processing across the visual and the auditory channel, this prevents the visual channel from being overloaded.

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At this point let us see some of the situations where modality principle is recommended. Consider the following example in which a teacher is describing the function of a heart and its different parts. In the first case the functioning is explained as a text while in the second case it is explained along with an audio narration without a text.



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Scenario – A contd..




It is desirable to follow modality principle while explaining graphics.

X

✓





  

Student will be able to easily process the content when there is an audio narration explaining the functioning of the heart as compared to reading a description about it. From this example we see that it is desirable to follow the modality principle while explaining graphics.

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Scenario – B contd...

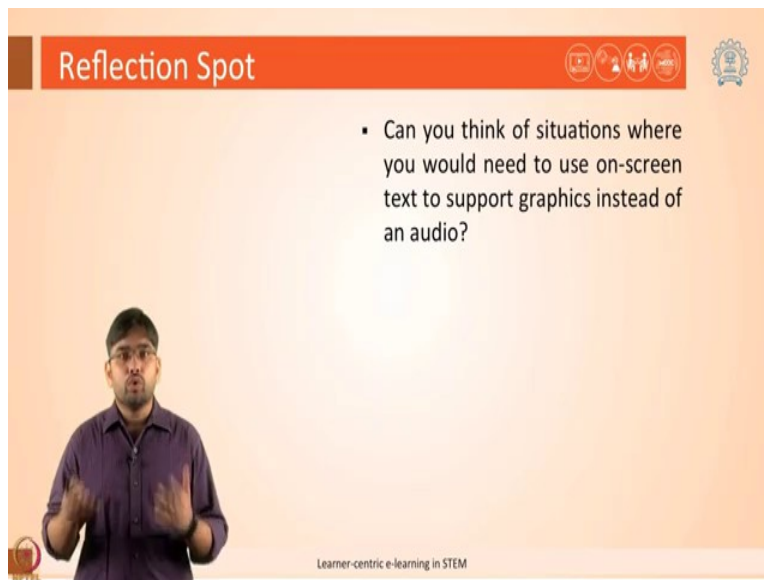
- Explaining a complex material which includes both text and images.
 - It is desirable to follow modality principle while explaining a complex material.



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Another instance where following modality principle is recommended is when we are explaining a complex material which includes both text and images. In such case attention will be divided between text and images because both use same modality of vision using narrative; however, divides the load between audio and vision channel which is recommended. Till now we have seen different scenarios where it is recommended to use audio with image instead of on screen text.

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The slide features a red header bar with the text "Reflection Spot" on the left and four circular icons on the right. The main content area has a light orange background with a question in black text. A presenter in a purple shirt is visible in the bottom left corner. The footer includes a small logo and the text "Learner-centric e-learning in STEM".

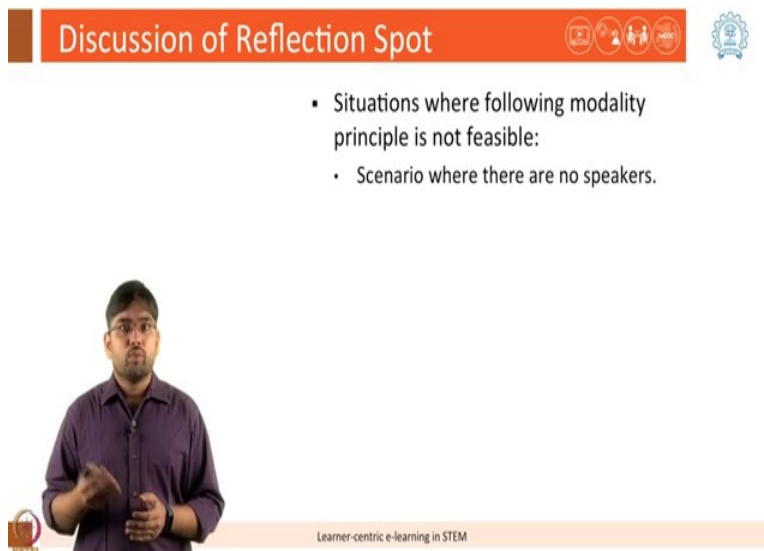
Reflection Spot

- Can you think of situations where you would need to use on-screen text to support graphics instead of an audio?

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At this point let us pause at a reflection spot. Can you think of situations where you would need to use on screen text to support graphics instead of an audio?

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The slide features a red header bar with the text "Discussion of Reflection Spot" on the left and four circular icons on the right. The main content area has a light orange background with a discussion point in black text. A presenter in a purple shirt is visible in the bottom left corner. The footer includes a small logo and the text "Learner-centric e-learning in STEM".

Discussion of Reflection Spot

- Situations where following modality principle is not feasible:
 - Scenario where there are no speakers.

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You may have thought of situations like what if audio is not available, all this scenario where there are no speakers, in such cases following modality principle will not be possible.


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Discussion of Reflection Spot

- Examples where following modality principle is not feasible:
 - Scenario where there are no speakers.
 - Non-native speakers find difficulty in processing spoken words.
 - Audience may have people with hearing impairment.

In all such scenarios use of on-screen text is recommended.







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Yet another scenario could be audience who are non-native speaker and find difficulty in processing the spoken words and also there could be people in the audience who may have hearing impairment. In all such scenarios use of on screen text is recommended.


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Redundancy Principle

The redundancy principle recommends explaining visuals with narrated audio OR on-screen text, **but not both**.

 +  OR  = 

 +  +  = 

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At this point let us now look at another principle which is the redundancy principle. The redundancy principle recommends explaining visuals with narrated audio or on screen text, but not both.


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Redundancy Principle: Scenario

Suppose if


- **Teacher A** explains the concept using animation, narration and on-screen text.


Animation and Narration



- While **Teacher B** explains the concepts with animation and narration without on-screen text.

Animation, Narration, and On-Screen Text





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Correlating with the example which we saw earlier while explaining the concept of water cycle: suppose, if teacher A explains the concepts using animation, narration and on screen text while teacher B explains the concept with animation and narration without on screen text.

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Redundancy Principle: Scenario

According to the redundancy principle use of animation and narration is recommended.

✓ Animation and Narration

✗ Animation, Narration, and On-Screen Text

On-screen text: In the air is the optical code, when you combine with your display and make a final

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According to the redundancy principle use of animation and narration is recommended.

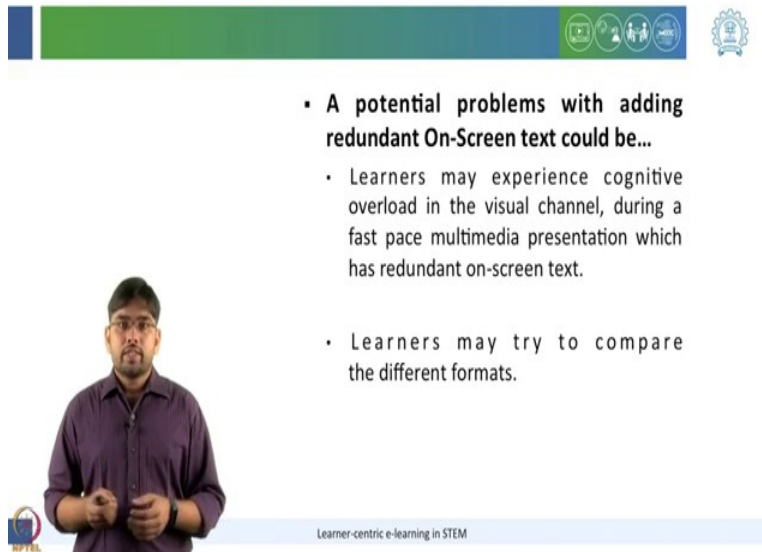
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- As an e-content designers you may think that why not use both text and narration?

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There is a common belief that use of a spoken words and printed forms during presentation is better for learners. And, learner can choose their format depending upon their learning preference. As an e-content designer you may think that why not use both text and narration?

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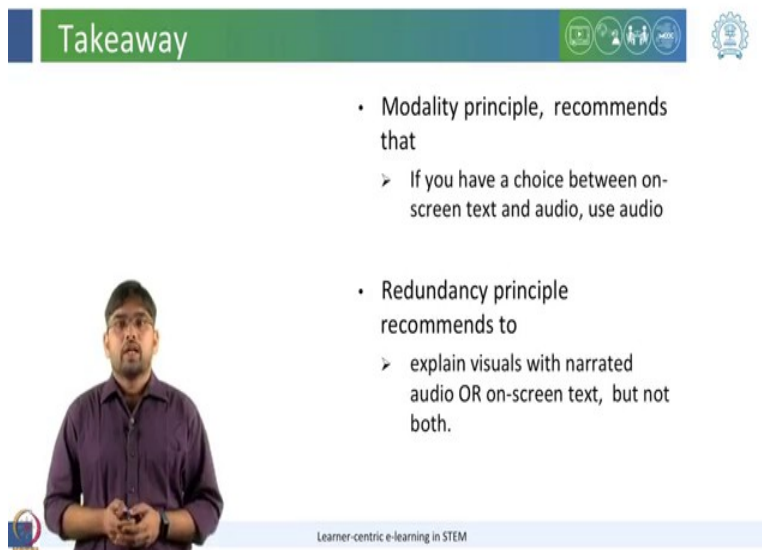
The slide features a green header bar with icons for video, audio, and text. A presenter in a purple shirt is visible on the left. The main content area contains a bulleted list of potential problems with adding redundant on-screen text.

- **A potential problems with adding redundant On-Screen text could be...**
 - Learners may experience cognitive overload in the visual channel, during a fast pace multimedia presentation which has redundant on-screen text.
 - Learners may try to compare the different formats.

NPTEL logo is in the bottom left corner, and the text 'Learner-centric e-learning in STEM' is in the bottom right corner.

A potential problem with adding a redundant on screen text could be that learner may experience cognitive overload in their visual channel, during a fast pace multimedia presentation which has redundant on screen text. Another possible problem which may arise is that learner may try to compare the different formats.

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The slide features a green header bar with the title 'Takeaway' and icons for video, audio, and text. A presenter in a purple shirt is visible on the left. The main content area contains a bulleted list of principles for multimedia design.

Takeaway

- Modality principle, recommends that
 - If you have a choice between on-screen text and audio, use audio
- Redundancy principle recommends to
 - explain visuals with narrated audio OR on-screen text, but not both.

NPTEL logo is in the bottom left corner, and the text 'Learner-centric e-learning in STEM' is in the bottom right corner.

At this point let us summarize what we have learned till now. Modality principle recommends that if you have a choice between on screen text and audio, use audio. The redundancy principle recommends explaining the visuals with narrated audio or screen text, but not both.

Thank you.