How Does it Happen?  
A Moment-By-Moment Examination of Knowledge Revision  

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THE PROBLEM

Common MythConceptions  
World's most contagious falsehoods


- Encoding
- Passive activation
- Co-activation
- Integration
- Competing activation

Kendeou, van Boekel, & Quillien (2015)

Refutation texts resulted in the co-activation and integration of the correct and the incorrect conceptions (as indicated by cognitive conflict and comprehension monitoring processes). To the extent that the correct outcome sentence got integrated in the mental representation (as indicated by text-based and elaborate inferences), the revision process was facilitated.

Kendeou et al (2014)

More processing time (and likely attention) to the causal explanation during first pass but also during second pass reading.

This increased processing reflects the construction of a highly interconnected causal network that facilitates the processing (and integration) of the correct outcome sentence.

IMPLICATIONS - APPLICATIONS

- Design of Effective Texts - Messages
- Design of Technology-Based Learning Environments
- STEM Learning
- Teacher PD - Beliefs

EVIDENCE

Convergence between online (reading times, think-alouds, eye-tracking) and offline methodologies (post-tests, recalls).

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Introduction

Tom loved all of his classes this year but science was still his favorite subject. His teacher Mrs. James enjoyed having Tom in class because he was very enthusiastic. Tom had many ideas for science experiments and was always excited to conduct his own. One day Mrs. James gave Tom the opportunity to conduct an experiment during class.

Tom's Experiment

Tom's experiment was about the effects of gravity on objects of different masses. He wanted to see which one of the two balls would fall faster. He had two balls that were exactly the same size and shape but one weighed twice as much as the other. He planned to drop both balls from the roof of his house at the same time. He wanted to see which one of the two balls would fall faster.

Refutation

Tom had initially believed that if two objects were the exact same shape and size but one was heavier, the heavier object would fall faster. His teacher explained that this idea was incorrect.

Explanation

He explained to Tom that when you drop two identically shaped objects that have different masses, the two objects will experience the same acceleration due to gravity. This is because gravity acts on all objects in exactly the same manner and this occurs regardless of their mass. It does not make a difference if one of the objects weighs more than the other object. That is to say, gravity will exert the same pull on both of them. Therefore the balls will fall at exactly the same rate. Tom's experiment was going to show that this is true.

Tom's Teacher's Explanation

Tom's teacher explained to Tom that when you drop two identically shaped objects that have different masses, the two objects will experience the same acceleration due to gravity. This is because gravity acts on all objects in exactly the same manner and this occurs regardless of their mass. It does not make a difference if one of the objects weighs more than the other object. That is to say, gravity will exert the same pull on both of them. Therefore the balls will fall at exactly the same rate. Tom's experiment was going to show that this is true.

Refutation Control

The balls hit the ground at the same time.

Sufficient Sentence

Tom was ready to conduct the experiment.

Closing

He was excited to tell his teacher about it the next day in school. He hoped she would be impressed and suggest other experiments that he could do at home.