Debating the Evidence

Science impacts upon all our lives and a better understanding of the opportunities and limitations of the scientific process is becoming increasingly important for all citizens. The goal of Debating the Evidence is to create a safe environment that encourages students to critically evaluate and discuss scientific evidence in scenarios where social consequences are high and when the evidence is sometimes incomplete or conflicting.

Team
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Technology
Web-based

Outline

The Debating the Evidence software will encourage students to confront the uncertainties that can underlie the creation and testing of scientific theories. Through shared decision-making, students will collaborate in assessing when they have sufficient evidence to produce findings and make recommendations with an appropriate degree of confidence. This will impact on their understanding of how to work together and of the relationship between science and citizenship.

The prototype will be designed for 11-14 year-olds (Key Stage 3) and will be used in a classroom environment on personal computers. There will be one machine between two students but they will have dual key control, ie both will interact with the scenario.

The students work initially on systematically 'well-behaved' evidence about low-risk uncontroversial scenarios with minimal need for value-based judgments. In this 'virtual laboratory', scenarios are causally-based, ie team-members must determine what is causing a particular effect. Determination of causation depends on identifying variables that most convincingly covary with outcomes - but the teacher can set the number of possible and actual causes. Teams must produce their own hypotheses, test their predictions and gather data from the trials. Thus, overall task complexity can be fitted to the abilities and individual needs of pupils.

Having become experts with systematic, well-behaved, low-risk and uncontroversial scenarios, the pairs of learners encounter more difficult contexts with higher human risks. These could include the damage and loss of animal and human life. These generate evidence whose interpretation is less straightforward. Different contexts allow the costs of collecting evidence and the need for ultimate confidence to vary, thus encouraging discussion about the interface between scientific inquiry and social values at different levels of potential consequence.

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Learning and Research Objectives

Debating the Evidence is designed to support collaboration and scaffold thinking when analysing information. The underlying algorithm has already been developed but has not been incorporated into such software. We are therefore interested in investigating:

1 How the proposed framework supports the development of collaboration.

2 Whether the type of collaboration supported by the proposed framework transforms the student's understanding of scientific thinking and uncertainty.

3 What the effect of feedback presented in different modes has on motivating and engaging students.

Research and Development Process

The underlying algorithm within Debating the Evidence has already been explored through funded research. Now Futurelab is working with the partners, teachers and students to create appropriate scenarios into which the algorithm can be integrated. The goal is to create meaningful tasks to investigate the relationship between data and certainty. These groups will also work together to identify appropriate forms of feedback for both teachers and students. Debating the Evidence can provide synthesised data about the players' performance to provide dynamic assessment about their performance as collaborators and problem-solvers. This could provide valuable insights to the teacher and children about how evidence is being assessed, including diagnostic information about the strengths and weaknesses in systematic thinking skills, and the extent and manner in which team members are working together.

Contacts

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