3A Refutation Texts are Effective at Overcoming Students' Misconceptions about Science

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Acquiring new knowledge often involves conceptual change, in which the learner must over-write existing but incorrect knowledge with the new. This is of particular importance when learning about science, as scientific knowledge is frequently updated and superseded.

The present research assessed the effectiveness of using a refutation text style, in which a common misconception is overtly negated, to support conceptual change by undergraduate students when acquiring scientific knowledge. A multiple-choice questionnaire (MCQ) was used to assess participants' science knowledge before and after reading 12 text passages (half in traditional expository text style and half using a refutation text style, counterbalanced across two participant groups). In addition, half the participants received instructions that set an overt learning goal (to learn information for a forthcoming test) and half did not. A comparison of performance on the MCQ test before and after the reading task showed that refutation texts produced significantly more conceptual change than expository texts, with no mediating effect of instruction type.

The findings demonstrate the effectiveness of a refutation text style in overcoming students' misconceptions when acquiring scientific knowledge and showed that this can benefit conceptual change even in the absence of an overt learning goal. We consider the implications of these findings for pedagogical design and the teaching and learning of science in higher education.