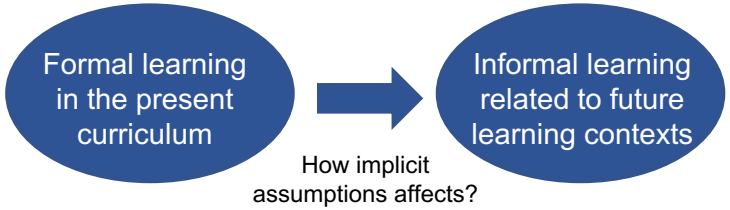
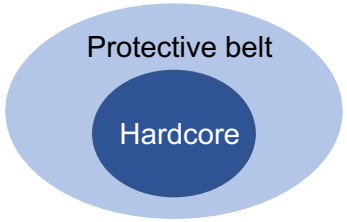
How can students' implicit assumptions, formed during present learning, lead to the construction of alternative conceptions of concepts to be learned in the future?

INTRODUCTION



- This study investigates how students' implicit assumptions, formed during the learning of mole-volume reasoning under individual gas conditions, lead to alternative conceptions for a concept they will learn in the future (i.e., mole-volume reasoning under mixed gas conditions).

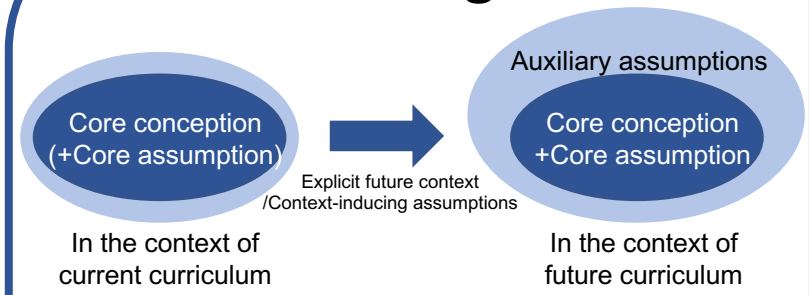
METHODS



Lakatosian theory

- We conducted interviews with high school students and analyzed the data based on Lakatosian theory.
- We categorized three types of implicit assumptions: Core assumption, auxiliary assumption, and context-inducing assumption

Findings



- In the current learning context, the incorrect core assumption is not often revealed, so the mental model seems correct on the surface.
- When a future learning context is introduced (or is induced by context-inducing assumptions), the core assumption can be combined with the scientific conception to lead to an alternative conception for a concept to be learned in the future.
- Auxiliary assumptions may be constructed to support the alternative conception.

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