Engineering Students' Kinds of Mental Representations in Kinematics





- interviews
- kinds of mental representations

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Research Question

What are the categories of mental representations engineering students construct when handling different representational task formats?

Profiles of Cognitive Constructs in Kinematics

Propositional Representation

Formulate explanation. For the function, calculus additionally applied in a mechanical manner.

Use equations / calculus. No recognition of graphical method although there is awareness of concepts depicted by graphs.

Equations directly manipulated with pattern matching of information.

Formulate explanation. For the function, calculus additionally applied in a mechanical manner.

For function, use equations / calculus. Generate expression using graphical method but use equations to solve the problem.

Either diagrams are included but not related to equations or no diagram is generated as situation is visualized mentally.

Conclusion

 Sample displays poor comprehension of concepts: propositional representation predominates (11 in 19); minority (8 in 19) of students construct mental image; none of the students identified with mental model.

• Present an alternative way for exploring and analyzing students' understanding of

References

1. P. Johnson-Laird, Mental Models, Cambridge: Harvard University Press, 1983.

2. B. Ibrahim, A. Buffler and F. Lubben, Journal of Research in Science Teaching, 46,





Mental Image