Control and interactivity when learning collaboratively from an animation

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Understanding system dynamics

Lowe, 2003
Control over animation pace

When downdrafts strike the ground, they spread out in all directions, producing the gusts of cool wind people feel just before the start of the rain.

Mayer & Chandler, 2001

Collaboration

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Animation and collaboration

Interactive animation > Static display
For detail questions only

Interactive animation < Static display
For both detail and understanding questions

Schnozt, Boeckeler and Gzronziel (1999)

Control: exploration varies

(\text{F}(1;36) = 6.40; p < .05)
Learning material

Method

- 78 participants, novices
- Interactivity level
  - Animation
  - Simulation
- Learning setting
  - Individual
  - Collaborative
- Measures:
  - Time to study the material
  - Comprehension test (16 MCQ, visual elements)
  - Subjective scales
**Procedure**

1. Consent form → Pre-test
2. Pairs move to the same computer → Learning phase
3. Pairs are separated again → Subjective evaluation → Post-test questionnaire → End

**Hypotheses**

- Positive effect of the interactive condition
  - simulation > animation
- Split interaction effect
  - Individual: simulation > animation
  - Collaborative: simulation < animation
Results (1): comprehension

Post-test score

Interactivity
\[ F(1, 74) = 2.18; ns \]

Learning setting
\[ F(1, 74) = 0.32; ns \]

Results (2): Learning time

Learning time

Interactivity:
\[ F(1, 74) = 6.41, p < 0.05; \]
\[ d = 3.54 \]
Results(3): Subjective scales

Level of activity
Interactivity
$F(1,74) = 27.94; p < .01$
Interactivity x learning setting
$F(1, 74) = 4.97; p < .05$

Level of involvement
Interactivity x learning
$F(1, 74) = 4.19; p < .05$

Use of controls/interactivity

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Discussion (1/2)

- No effect of our factors on comprehension
- Effect on learning time
  - Interactive simulation decreased learning time
- Collaboration lowers the effect of control on perceived activity and stimulation
- Large variabilities in the use of interactivity and control

Discussion (2/2)

- Interactivity and collaboration have potential benefits that depend on learners
- Effect of current mental model on exploration
  - Exploration affects the way information is processed
Thank you

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