Exploring Higher Agency Roles for Learning with Educational Technology and Multimedia

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Background
Effective learning with educational technologies and multimedia requires **cognitive engagement**
- selection, organization, integration
- self-regulated learning

Students can enact their learner role passively
- e.g., gaming the system
- boredom, frustration, apathy

**Hypothesis:** changing students’ role to increase agency may deepen cognitive engagement without requiring redevelopment of the software
- agency entails making decisions and taking actions that have meaning and impact

Higher Agency Roles

![Learner Role](image)
**Learner Role (n = 18)**
- read, watch, study
- learn what is given
- familiar to students
- lower agency

![Teacher Role](image)
**Teacher Role (n = 16)**
- plan, organize, present
- accountability to others
- learning by teaching
- higher agency

![Designer Role](image)
**Designer Role (n = 17)**
- critique, judge, create
- participatory design
- design thinking
- higher agency

Method

Participants
- college undergraduates (n = 51)
- M_age = 21.3 (SD = 4.0); 25.5% female
- 45% Caucasian, 17.6% Hispanic, 13.7% Asian

Learning Materials
- multimedia lessons on cohesion in writing
- obtained via Writing Pal tutoring system

Knowledge Assessment (pretest/posttest format)
- definition, impact on quality, strategies
- coded idea units (e.g., linking ideas, flow, connective phrases); range: 0-13 points

Reading Assessment
- Gates-MacGinitie Reading Test (median split)

Task Perceptions Survey (6-point scale)
- e.g., creativity, ease, enjoyment, utility

Results

Learning Gains
- 2 (test) x 3 (condition) x 2 (reading ability)
  - gains: F(1,45) = 18.98, p < .001, η² = .30
  - x condition: F(2,45) = 2.67, p = .081, η² = .11
  - x reading: F(2,45) = 2.15, p = .150, η² = .05

New Knowledge at Posttest
- 3 (condition) x 2 (reading ability)
  - condition: F(2,45) = 3.88, p = .028, η² = .15

Knowledge
- Total Pretest: Learner 3.5 (2.4)  Teacher 4.0 (2.4)  Designer 5.0 (2.0)
- Total Posttest: Learner 6.0 (1.9)  Teacher 5.4 (1.4)  Designer 5.6 (2.1)
- New at Posttest: Learner 4.3 (1.4)  Teacher 3.0 (1.2)  Designer 3.1 (1.9)

Perceptions
- Creative: Learner 3.8 (1.7)  Teacher 3.6 (1.5)  Designer 4.1 (1.4)
- Easy: Learner 5.3 (1.1)  Teacher 5.2 (0.8)  Designer 5.0 (0.5)
- Enjoyable: Learner 4.0 (1.4)  Teacher 3.6 (1.3)  Designer 4.4 (1.2)
- Interesting: Learner 4.3 (1.4)  Teacher 3.9 (1.4)  Designer 4.1 (1.3)
- Worthwhile: Learner 4.6 (1.4)  Teacher 4.3 (1.4)  Designer 4.8 (0.9)

Task Perceptions
- 3 (condition) x 2 (reading ability)
- **condition:** no significant differences
- **reading:** more skilled readers perceived their task as less creative, enjoyable, or interesting

Conclusion

Key Findings
- students learned in all roles, but better in the learner role (counter to hypothesis)
- **higher agency induces greater demands**
- students perceived tasks favorably; skilled readers seemed to have higher standards
- designer role may have induced a **distracting design cost** when focused on aesthetics

Future Directions
- improved role guidance and structure
- investigate additional roles (e.g., “marketer”)

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