Investigating Synthetic Web-Based Tutoring: Research on What Works

Chris M. Nakamura, Brian Adrian, Dean A. Zollman, Mike Christel, and Scott Stevens

Physics Education Research Group
Kansas State University

Carnegie Mellon

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Motivation

Student-tutor interaction

- More effective than typical classrooms and mastery learning[1]
- Perceived interaction is known to be important[2]
- Provides direct access to students' knowledge construction process

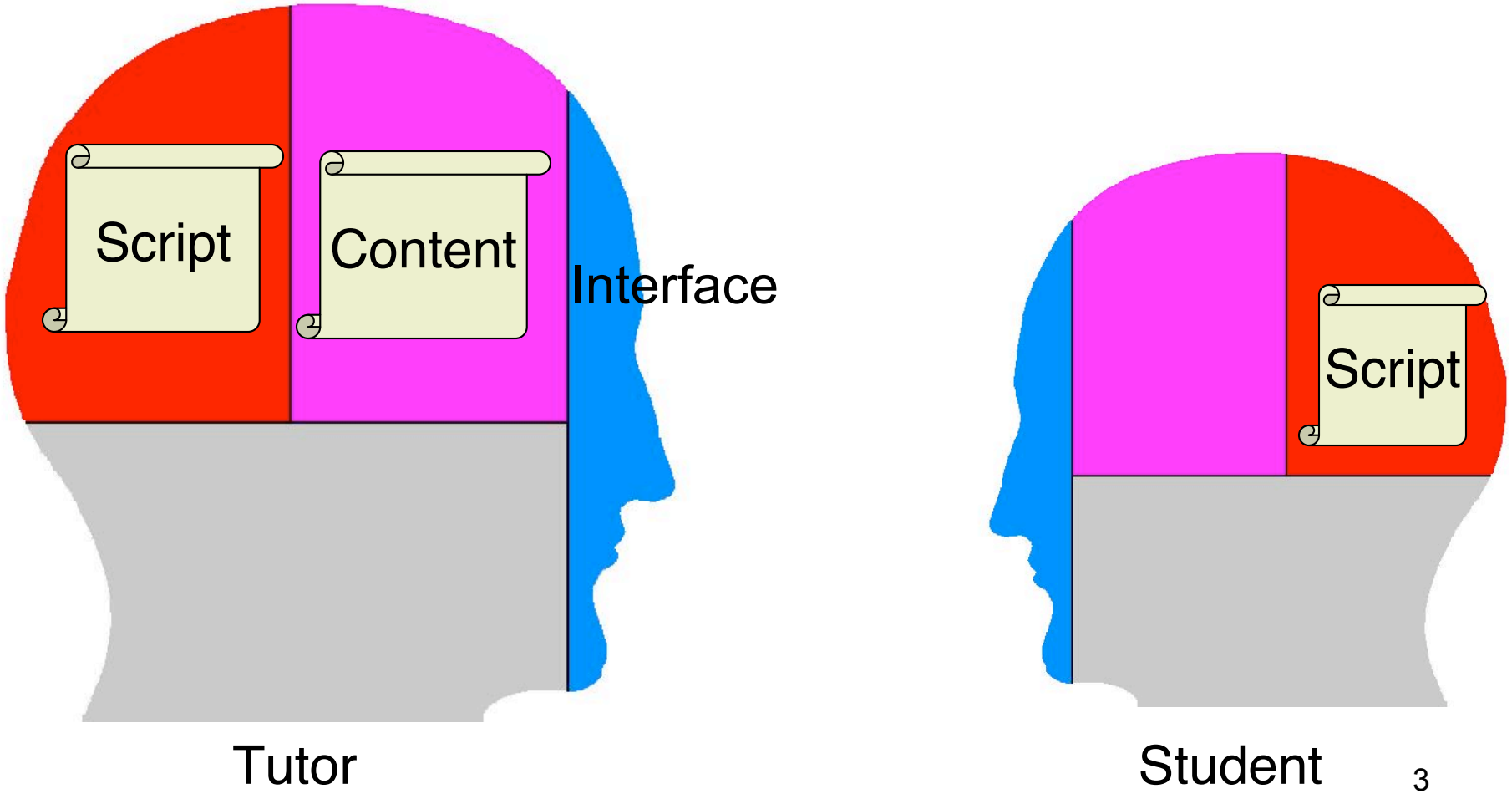
Can we simulate this interaction?

- To provide a supplemental learning aid
- To provide insight into students' learning process

[1] Bloom (1984) [2] Okita (2007)

Tutoring Interaction

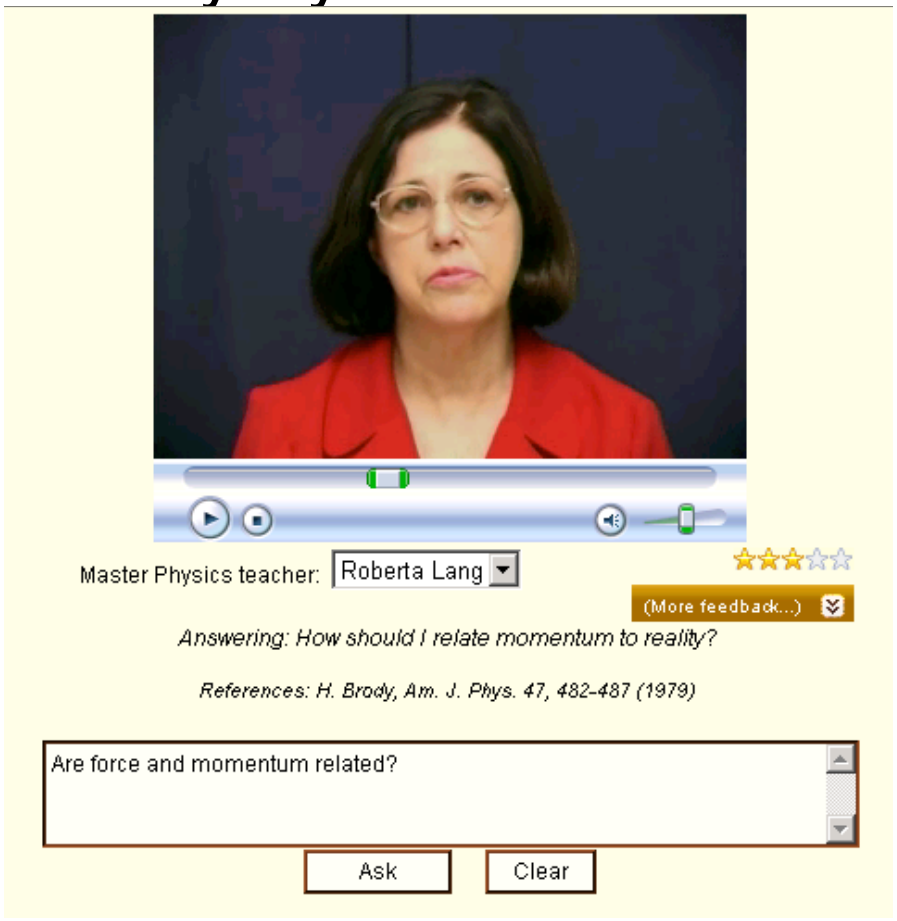
A view of the tutoring interaction



Synthetic Interaction

The Interface

provided by Synthetic Interview Technology[3]



Natural language questions

Answered by a real person

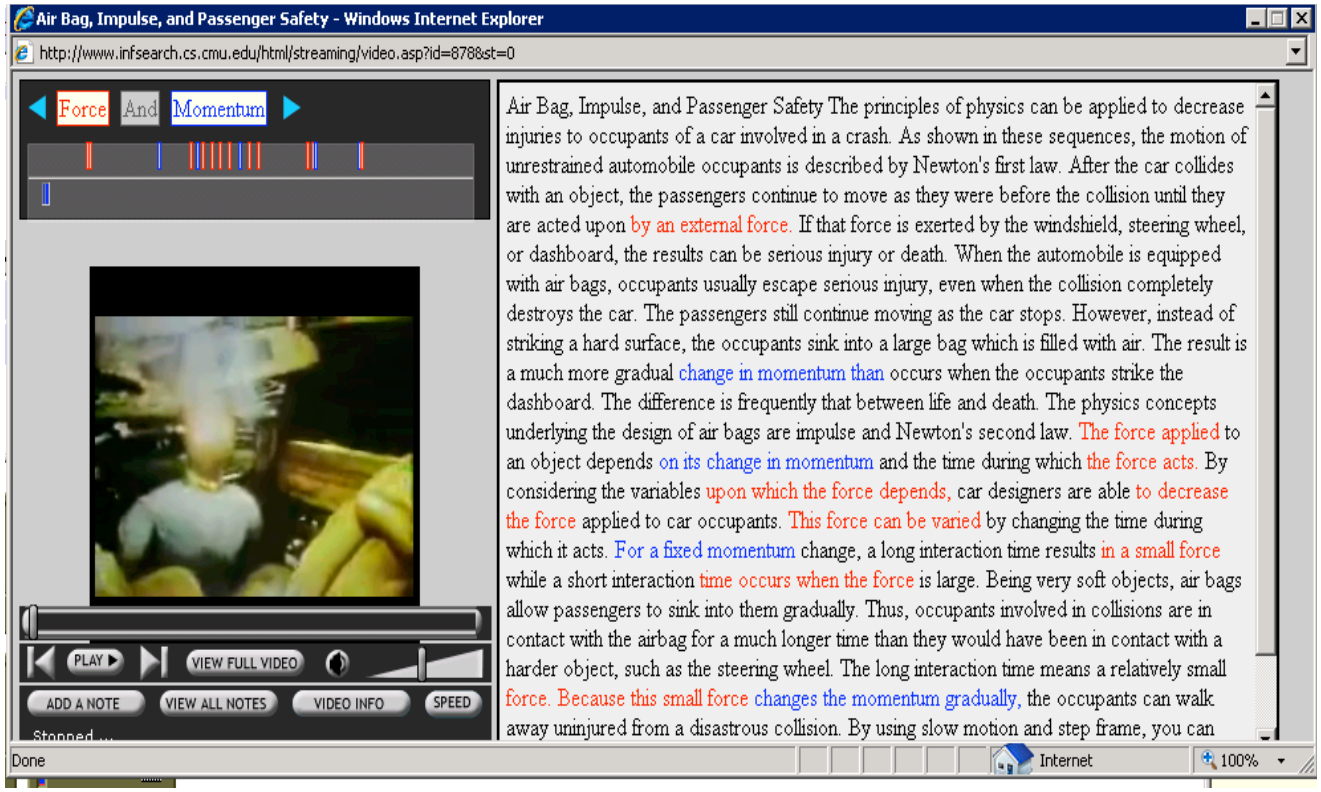
Responses are pre-recorded, but can simulate a real conversation.

[3] Stevens (2007)

Synthetic Interaction

The Content Knowledge

Stored in the Informedia Digital Video Library[3]



- Multimedia content can be searched by keywords
- Complete transcripts are displayed
- Can be linked to Synthetic Interview

[3] Stevens (2007)

Synthetic Interaction

The Script

What should be taught?

What should a tutor say for effective results?

What do students expect from the interaction?

Synthetic Interaction

The Script

What should be taught? ← Our Choice

- Newton's Laws

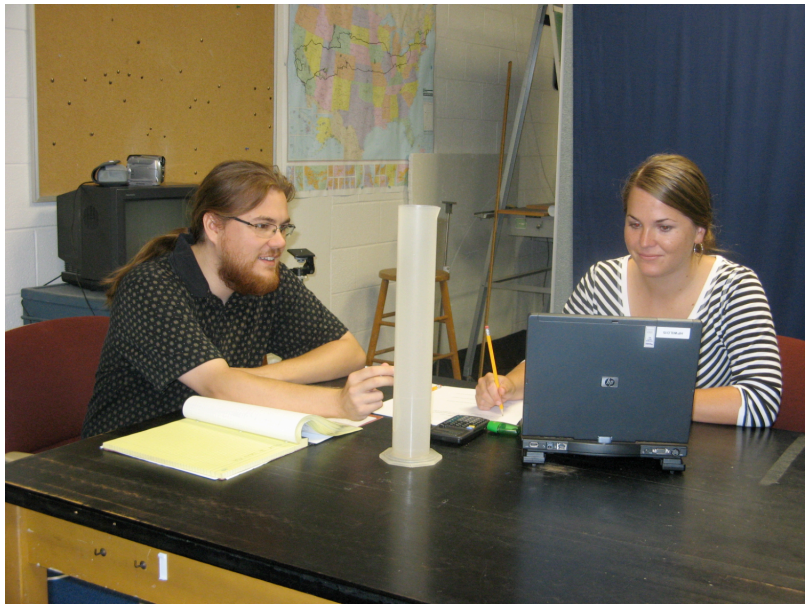
Current Research Questions:
What should a tutor say for effective results?[4,5]

What do students' expect from the interaction?

[4] Chi (1996) [5] Chi (2001)

Creating the Script

- Designed 3 lessons on Newton's Laws
- Lesson scenarios inspired by FCI questions[6]
- Utilize a 3 stage learning cycle for each lesson[7]
- Implementation combines Web materials, traditional written materials and a live human facilitator
- Lessons focus on empirical observation and task as measure of understanding



[6] Hestenes (1992) [7] Karplus (1977)

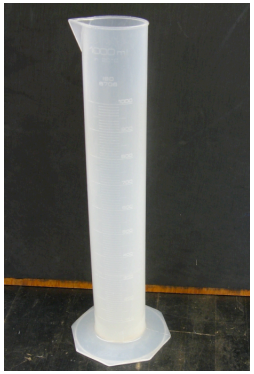
Creating the Script

Sample

I. Exploration: Make observations or measurements


II.Formal Introduction/Discussion: Discuss exploration results in context

III. Application: Perform a relevant task and explain solution




Pilot Testing

Summer 2008 Study:

- 7 students in algebra-based and concept-based physics
- 3 female, 4 male
- 2 hour tutoring/interview sessions
- A human tutor facilitated the sessions

Pilot Testing

Preliminary Results:

Confirming the things we (hopefully) already knew

- Questions are the language of tutoring.
- Observed normal student difficulties (Ex: Force moves with objects., Motion implies force. etc…)
- Students believe lessons and tutor are helpful.
- Time per lesson varied 30min to 2hrs.

A detailed analysis is in progress to find what works.

Ongoing Efforts

- Refine scripts based on student & teacher feedback
- Combine scripts with synthetic interview and informedia digital library technologies
- Study relation between available interactions and student learning

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Thank You!

More info:

http://perg.phys.ksu.edu

Contact:

cnakamur@phys.ksu.edu