

Intelligent Lifelong Learning Companions

or, a young researcher's illustrated workshop

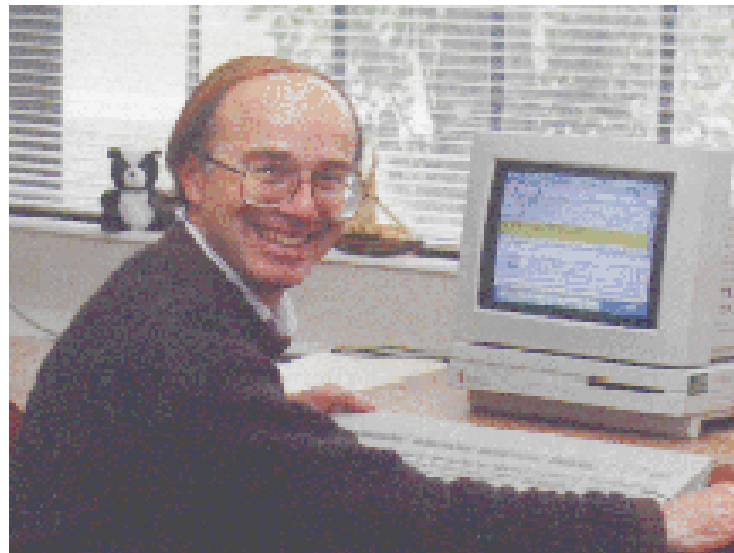
H. Chad Lane, Dave Gomboc | 10/02/2008



Choose your own presentation

- **Why are we all here?**
 - [simple answer](#)
 - [long-winded answer](#)

Why are we all here?



next

Why are we all here?

- **We all have relationships with machines.**
- **We are all lifelong learners.**
- **We all like to think about learning.**
- **We have all built and/or evaluated systems that interact with humans with the intention of having a meaningful and lasting impact on those humans.**
- **For many of us, the goal has been to build and/or assess teaching or helping machines.**
- **For many of us, the goal has been to build systems that think and behave as we do and that try to form relationships.**

next

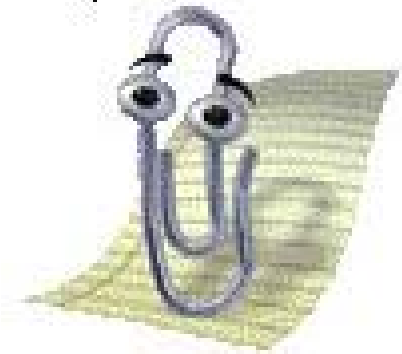
Let's pick a companion

- **Who do you think sounds like fun to come along for the rest of this presentation?**
 - #1: “My primary job is to hold paper together. Most people hate me.”
 - #2: “I am green and from outer space. Very few people have heard of me.”
 - #3: “We will give you both sides of the story.”
 - #4: “Difficult for me, grammar is.”

Clippy

- **he seems to always be around**
- **he *seems* to really want to help**
- **has some knowledge, although maybe not the kind we want**
- **never gets upset with you**
- **tries very hard to understand you**

Sometimes I just popup for no particular reason, like now.



[go back to the choices](#)

[Clippy rules, let's go with him.](#)

The Great Gazoo

- he challenges you
- wants you to be independent
- some might call him “pleasantly frustrating”
- not very dependable
- seems to always be in a good mood



[go back to the choices](#)

[Gazoo will be fun. I pick him.](#)

Devil and Angel Homer

- helps you explore all sides of an issue
- entertaining dialogues
- might not arrive at the idea solution to your problems
- wants to bond with you (Devil Homer, at least)



[go back to the choices](#)

[Homers are great. I choose them.](#)

Yoda

- has a ton of experience
- heavy focus on metacognitive skills
- not very specific
- easily disappointed
- excellent motivator
- gives direct feedback
- likes demonstrating



[go back to the choices](#)

[Who wouldn't want Yoda???](#)

What's it going to take?

- **About Stephenson's Primer, I said:
"Clearly, the Primer would need..."**

- vast amounts of knowledge
- impressive reasoning capabilities
- an understanding of human learning
- to elicit individual needs and desires
- to monitor learning and growth
- to learn individual traits
- to provide emotional support
- to maintain personal relationships
- be perceived as indispensable"

Making some
assumptions
you are, yes?



- **Is all of this true?**

We all know this is hard

Try not! do.
There is no try.

- **“The full realization of the Primer is thus something that can only happen after AI is solved -- not an immediate likelihood.”**
 - McCalla & Greer
- **“On the other hand, research on human tutoring and peer collaboration suggests that domain knowledge is crucial for effectiveness. This is bad news. It suggests that we must “solve the knowledge engineering problem.”**
 - VanLehn
- **“One dimension of the learner modelling representation must deal with ontological issues and the tensions between standards, flexibility and pragmatics so that the lifelong learner model can integrate gracefully with the range of learning contexts, such as classroom learning group learning activities, private study and just-in-time learning.”**
 - Kay



Lifelong Learning Companions

Cover all the bases
did you, hmm?

Human Learning

How do humans learn over time?
How can we strengthen learned skills?
What are the requirements for LCs?

...



Guidance

How can we create the right learning experiences?
What does lifelong learning guidance look like?
What level of sophistication is needed?

...

Learner Modeling

How can we assess lifelong learning?
How do we model memory decay?
How can we model social elements of learning?

...

How are relationships with agents formed?
What are the right modalities for interacting with LCs?
What advanced behaviors should LCs possess?

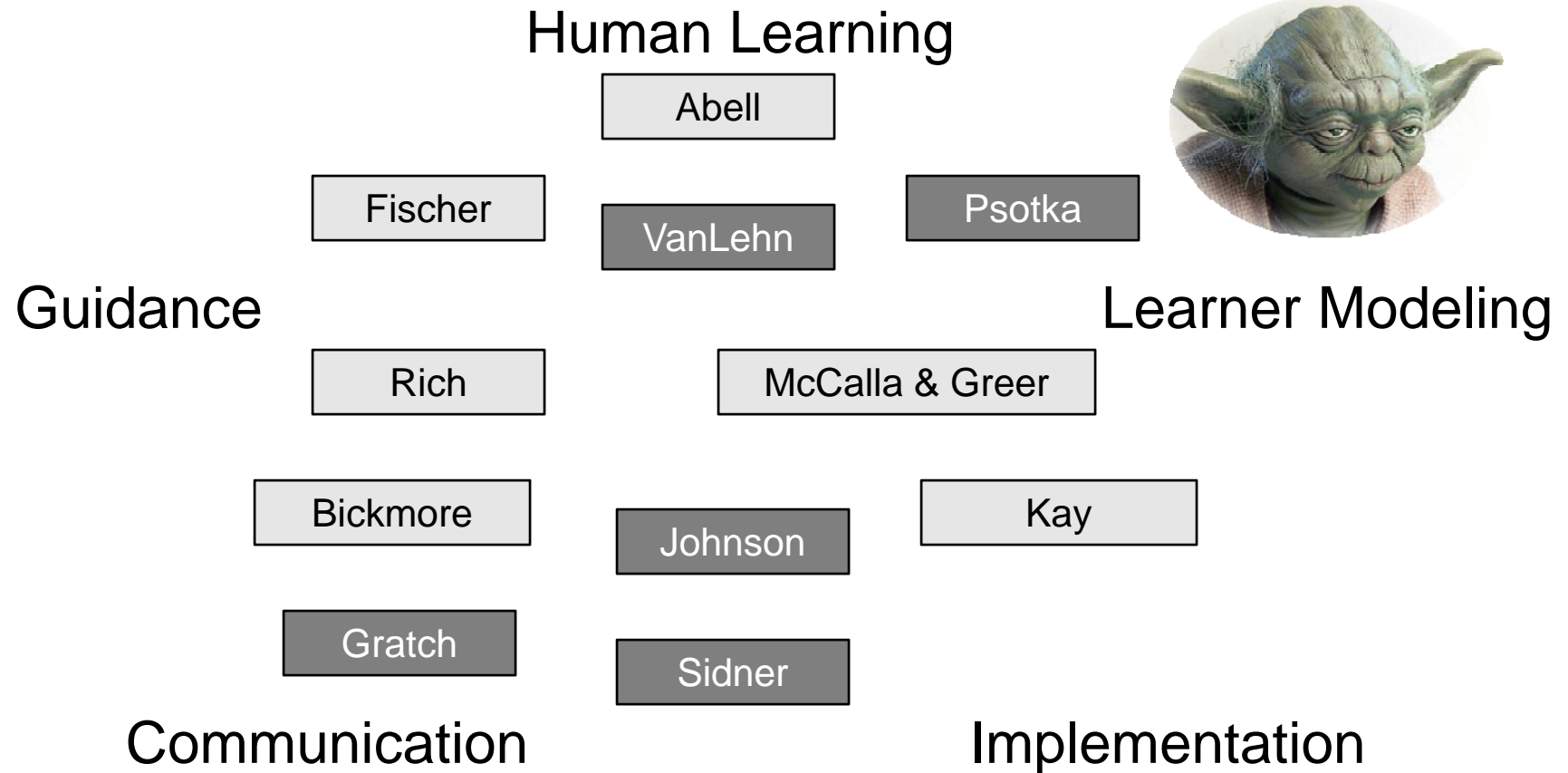
Communication

How feasible is that ITS techniques will scale up?
How can we get systems to talk to one another?
What are the reasoning and representation challenges?

Implementation

Lifelong Learning Companions

Being categorized
people like not.



final kickoff remarks

- **we don't necessarily *need* learning companions**
 - but we do want intelligent technology that supports lifelong learning
- **Hackworth will probably never exist**
 - this is an interdisciplinary effort like no other
- **Some difficult open questions face our group:**
 - What are the links between emotion/affect and learning?
 - What kind of a relationship would a learning companion need to be effective?
 - Are there lines between helper, teacher, and advisor? What are the right roles?
- **Working group:**
 - three basic questions: what do we know? what's going on? what next?
 - please feel free to use narratives – e.g., how would you augment the Primer?
 - interconnections between topic areas; are the topic areas off-base?
 - separate scribe from leader?