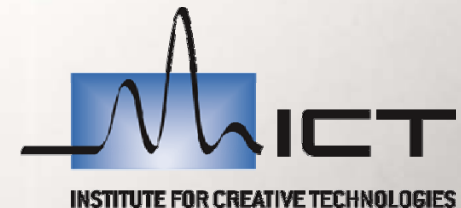


# Guidance, experience, & assistance

...or at least, some topics related to ILLC research

Working group notes: ICT ILLC Workshop, October 2-3, 2008

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# Key ingredients of ILLC research

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- **Why is this research new?**
  1. **Relationships**
  2. **Pervasiveness**
  3. **Informal learning in ill-defined domains**

# 1. Relationships

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- **Contrast between *singular* and *multiple* companions**
- **Multiple (human) companions...**
  - Can share a broader range of experiences
  - Can divide up the labor of attending to you
- **Singular (human) companions**
  - Can get to know you well over time
  - Can foster trust, shared experience, affective affordances
- **Neal Stephenson *missed the boat* as a futurist**
  - We live in a connected world, we are *never* in need of more companions
  - We publicly share private aspects of our lives with large communities
  - Twitter / Weblogs / MySpace / FaceBook is at least half the answer to ILLC
  - ...missing are the benefits of singular companions

## 2. Pervasiveness

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- **20<sup>th</sup> century learning**
  - Takes place in at a specific place at a specific time
  - Antithetical to the ILLC vision
- **Example: Hiking in the Santa Monica mountains**
  - Lots of things attract my attention
  - Me: This plant is cool...
  - My ILLC: Really? In fact that tuber was used by native Americans for...
- **Critical issue: Push & Pull**
  - If I *Pull*, then how do I frame the question / problem / context?
  - If I *Push*, the central challenge is relevance / intrusiveness / timing

### 3. Informal learning in ill-defined domains

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- **20<sup>th</sup> century learning**
  - Learning of *subjects* in *courses*
  - ITS research could pursue a *planning*-based approach, in defined spaces
- **In the real world, problems are never given**
  - Real problems need to be framed
    - Example: In the *Numb3rs* TV show, everything is a math problem
  - “*Ill-Defined*” underscores that framing is as important as solving
  - Challenge is integrating *framing* and *solving* in lifelong learning
- **Neal Stephenson’s *bait and switch* on situated learning**
  - In the beginning, Nell learns Kung Fu to escape from an enemy
  - Later, Nell is engaged in logic puzzles and weird quests

# ILLC in in the *information age*

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- **Computer Hard Drive as Companion**

- It helps me through search
- It should guess that I know a lot about Photoshop
- It could guess who I should go to for PowerPoint problems
- It is my e-portfolio
- It lots of *pull*, little *push*

- **FaceBook as Companion**

- My companion is my social network
- My social network distribute the work of paying attention to me
- I keep my social network aware of what I'm doing
- The relationships with my companions transcend technology

# Toward the *diamond age* of ILLC

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- **Intelligent Lifelong Learning Travel Companion (ILLTC)**
  - Relationships: People often travel together, go to the same places
  - Pervasiveness: Travel is inherently situated
  - Informal / Ill-defined: Travel transcends subject boundaries, or course definition
- **Mashup approach**
  - Put a singular persona on my social network
  - Let the Hard Drives of my Facebook community all talk with each other
- **Great funding argument**
  - Researchers all love to travel and know the domain very well
  - The military also likes to travel

# Notes

Why are we here?  
Bootstrap a new research program?  
Get new funding?  
Relevant conferences / areas / journals / labs / people?  
ITS  
Interactive narrative?  
ICWSM? Social media?  
Ed-Media  
Cognitive Science -> Learning sciences

Why AI?  
ITS has an unbalanced focus on planning over situated action  
Winograd / Suchman view of planning and situated action  
People who are truly knowledgeable can answer the 21st question, when 20 are given  
How does a ILLC assist when some domain knowledge is already known  
Distinction between planning and situated action  
Example: SAP enterprise software  
Supports work processes, assumes people work according to work practices  
Real work is defined by dealing with exceptions  
Need to rethink the contribution of planning, when situated action is needed

What is new here?  
This not just an excuse to do more basic AI research...  
The real difference is that this is going to be lifelong  
The non-negotiable thing about this research program is that it is going to be lifelong

Automated (lifelong) curriculum planner?  
Minimal thing you could call a "lifelong learning companion"  
Has to have a model of the learner  
What you have done already  
Should handle the (blue) non-formal learning as well as (yellow) formal learning  
A 4 year period is pretty good – an exciting challenge

Relationship  
Pervasive...?  
Ill-defined domains...?  
  
Informal learning  
Key difference between ITS now and Diamond Age  
Primer  
Bait and switch in Neal Stephenson's book  
Teach kung fu in order to get away from mean dude  
Later, weird quests are abstracted from real world context  
Shift away from focus on Subjects  
Algebra, Physics  
Well organized bodies of knowledge  
Is there an Informal physics instruction  
Informal learning  
Change the oil on your car

1. Relationships  
Relationships take time to develop  
Companion (sing) handles the learner model  
Relationship work ends up being central here  
Tim's work  
Cory Kidd – Intuitive Autonomy  
Graeser's group at Memphis, effect of emotion on learning  
All of Jon Gratch's collaborators  
Scott McQuiggen  
Also emotion / relationship among humans  
Theories of "Flow"  
Frameworks are needed, can be tested in HCI systems  
Working Alliance, dependent measure?

2. Pervasive  
Key: Place and time that it happens  
Classroom learning is at time X place Y  
ILLC is the antithesis of this  
(LIFE) Learning in Informal and Formal

Environments...  
Example  
You are on a hike  
You see an interesting plant  
Time for your ILLC to speak up  
Pervasive is the supporting technology  
Learning in the context of doing outside of the classroom

3. Ill-defined domains  
In the real world, problems are never given  
Need to be framed  
Unstructured is another word  
"ill defined" underscores that the framing is as important as the solving  
How to build intertwining elements between framing and solving?  
Ex. Numb3rz TV show, framing everything as a math problem

Closest existing examples of ILLC  
Your hard disk is your best companion  
Search is the way it helps me  
It should guess that one knows a lot about photoshop  
It could guess who you should go to for photoshop problems  
It is your e-portfolio  
MyLifeBits – Started investigating storage, focus is really on what you know  
Social Network systems – Facebook / Twitter  
Ex. John Seeley Brown on watercooler talk  
Stephenson misses the boat – technology is communication  
The term "companion" implies you are alone.  
This century, you are never alone – you already have dozens of companions

User modeling  
Singular companion  
Gets to know you over time

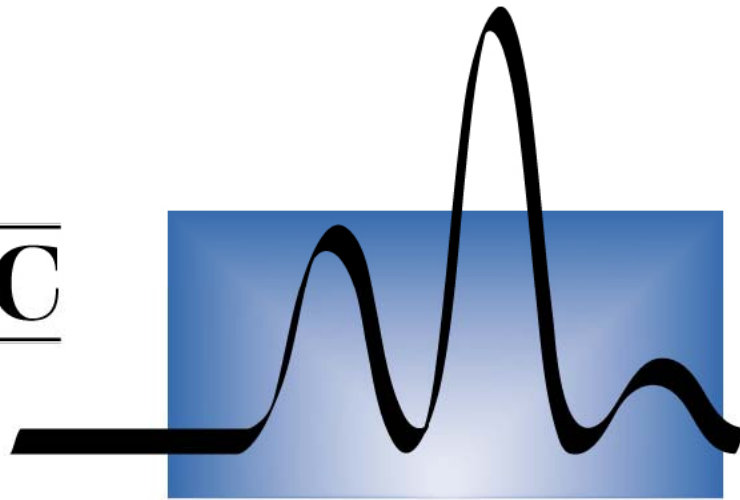
Multiple companions  
Provides access to  
If it knows is me, that is not very useful  
Social Psychology  
Transactive memory  
If I know who to ask, it is as good as knowing  
Does it help if you get it from your companion, rather than a human source?  
Distributed intelligence / Cybernetics / network companions, etc...

Good domain for ILLC: Travel  
Researchers like to travel  
Wisdom of crowds  
Pervasive  
Dynamic / Open / Always changing  
Military does it too...  
Sounds like situation awareness, cultural awareness  
Bad things happen to tourists as well...

1. What to deliver  
The learning companion also needs to learn  
How?  
From your experience?  
From the experience of others?  
What to deliver depends on what it knows about you  
  
2. When to intervene  
Push / Pull  
If I pull, I need to frame a query / problem / know what is available  
If I push, the central challenge is relevance / intrusiveness / timing  
Circa 1998 : You've got mail!  
Now, miniscule icon change  
Perhaps related critically to What is given  
Utility analysis of delaying the delivery of information  
Eric Horvitz at Microsoft Research has done some nice utility analysis



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