Wisdom is not the product of schooling but the lifelong attempt to acquire it. - Albert Einstein

Cognitive Levers (CLEVER): Helping People Help Themselves — Empowerment, Augmentation, Inclusion and Independence”

A L3D Project funded by the Coleman Family Foundation

The Coleman Project Team
Center for LifeLong Learning & Design (L³D)
Department of Computer Science and Institute of Cognitive Science

L3D Presentation, October 18, 2000
Helping People Help Themselves

A socio-technical research project funded by the Coleman Family Foundation
Distributed Cognition and Collaborative Human-Computer Systems

dependents: eye glasses, cognitive prosthesis, reading and writing, ....

addressing the “digital divide”
People with disabilities form “a universe of one”

research challenges:
- personalization
- user modeling
- adaption
- mapping between a space of needs and a space of solutions → query by reformulation, contextualization and extensions to the RABBIT/HELGON systems
Individuals can (and in some cases must) follow very different learning paths

Research challenges:

- to create environments that match individual needs and learning styles

- match needs of individuals with available technologies (user modeling, Helgon/ Rabbit style systems, specification components)
Space Program Effect

research challenges:

• looking at the work and needs of humans with special educational needs and with very different cognitive abilities can help to understand the thinking of humans in general

• new architectures for collaborative human-computer systems providing new user experiences
Example: Autism

research challenges:

• autistic people suffer from the following: impairment of social interaction with other, impairment of verbal and nonverbal communication, and impairment of play and imaginative activities

• they have no true concept of other minds or even of their own

• claim: such problems can be successfully addressed by environments such as the EDC by supporting multi-model interactions, visualization
Example: “Down (Chromosome 18)” and “Trisome 13” Syndrome

research challenges:

• down syndrome people suffer some impairment of some of the following cognitive characteristics:
  • generalization
  • auditory memory
  • auditory processing
  • word retrieval
  • abstract thinking
  • asynchrony of language skills: better at comprehending language than putting thoughts and ideas into words

• claim: use basic comprehension research and Latent Semantic Analysis (LSA) techniques to create representation which will be easier to comprehend by people with down syndrome
Lifelong Learning Aspect

research challenges

• the problem is not that there are no technologies out there for disabled people (there is actually too much in the abstract, and not enough for specific situations)
  \(\Rightarrow\) challenge: to make information relevant to the task at hand and to match the specific needs of people to specific devices

• teachers and parents do not have the time and the knowledge to identify the most important devices and explore their adequacy to their specific needs
  \(\Rightarrow\) challenge: provide support for lifelong learning, and develop an infrastructure in which task-relevant knowledge can be shared

• this problem is very similar to what we have explored in our project “Teachers as LifeLong Learners”
Research Objectives — Theory Development

- theoretically grounded classification scheme for disabilities
- knowledge building environments and social creativity
- distributed cognition
- open system environments: from access to informed participation
- comprehension: narratives, visualization and personalization
- making information relevant to the task at hand
Community Building

- innovative website

- creation of experience journals among specific communities

- collaboration with
  - New Vista Project: Technology in Support of Inclusive Learning
  - (Boulder Valley) School District
  - Colorado Assistive Technology Project (Cathy Bodine)
  - Health Science Center

- additional funding: **AOL Foundation** — e.g. “elderly people” (e.g. everyone who is out of school for more than 10 years): lifelong learning challenges, sensory problems, cognitive problems,
Tool Kit and Systems Development and Test

- collaborative knowledge building environments (stories, experience journals)
- development of a component-based, customizable portal
- portals and human-edit directories of the web
- EDC extensions
- portable devices of the VISION system
- Coleman showcase collaboratory in the DLC
Presentations

• Andy Gorman: “SPIDER: Sharing Pertinent Information in Dynamically Evolving Repositories
  My talk will discuss models of personalization and how they can be used to address the problem of information overload. I will touch on some of the important dimensions of personalization: saying the right thing (is the information of interest) at the right time (is it of interest in this particular context) in the right way (does the content and modality match my cognitive abilities or background, e.g. health professional vs. computer scientist).

• Leo Burd: “Inclusive Mail (I-Mail)”

• Rogerio dePaula (and Eddie Caley): “Iktomi -- Collaborative Toolbox”
  The primary goal of the project is to create a community and a culture of collaboration among teachers and parents of kids with cognitive disabilities. From a technical perspective, the project's goal are to design and develop a comprehensive "wizard" that help teachers and parents to find the "right" software application to support teaching and learning activities, and to develop a collaborative and evolvable repository of those applications, where people can not just find them, but exchange their experiences and stories, as well as add new applications onto it. The project is then based on the idea of extending the CD Anja Kintsch created, making it available on the web, which can be eventually access from a client application.

• Stefan Carmien: “Interviews with Researchers and Wearable Prompting System”
  My goal for a master's project is to implement a small testable device or system that acts as a cognitive prosthesis for cognitively disabled individuals. What I am proposing to do is appropriately implement a PDA like device to assist cognitively disabled individuals to participate more fully in the larger unsheltered world.
Other members of the Cognitive Levers (CLEVER) Project Team

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