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CID – steering group, NADA, KTH

## Catalogue of Current and finished CID projects

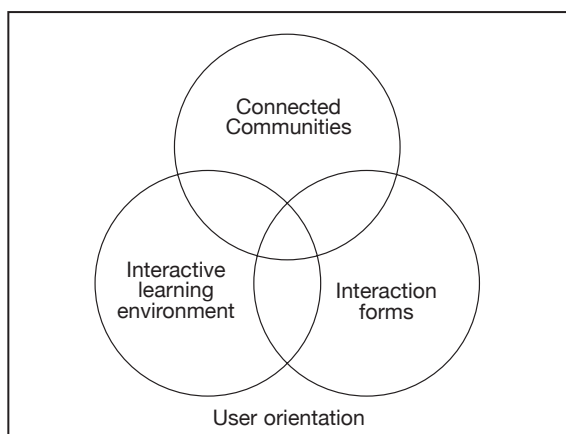


CID – CENTRE FOR USER ORIENTED IT DESIGN

## Catalogue of 14 current and 29 finished CID projects

CID is currently in its fourth phase of funding: July 2003 through June 2005. This catalogue summarizes most current and past projects, together with a list of doctoral students (and their main research interests) and exams (with dissertation titles).

Each current project is listed under the research area (see figure below), where it is managed. The finished projects are given in time order with the most recently finished first. See the list of contents on the next pages.



Publications denoted with CID-*nnn* can be found on the CID web site, <http://cid.nada.kth.se/publikationer/rapporter.html>

The publication list on the website contains more than 250 items in English and in Swedish, of which only major publications, mainly in English, are referenced here.

Stockholm 6 October 2004

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eRENA, Electronic Arenas for Art, Culture and Performance. Sep 1997-Aug 2000

VideoCafé. Jan 1996-Jun 2000

Standardization. Jul 1996-Jun 2000

Content Design on the Internet. Jul 1998-Dec 1999

Garden of knowledge – associations between subject areas. Mar 1996-Jun 1999

Information exchange and communication in large, distributed organizations. Jan 1997-Jun 1999

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CyberYard - virtual meeting area for workplaces. Jul 1997-Jun 1999

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CID'97 and Usor, guidelines and methods. Jul 1997-Jun 1998

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## Current projects in Connected Communities

Coordinated by: Björn Thuresson and Gustav Taxén

The Connected Communities research area investigates how communication, cooperation, social interaction and trust between people can be built and supported through digital networks. It is concerned with how to design digital and hybrid environments for representation and communication, environments that are experienced as natural, immediate and stimulating to use. The projects and subtasks within Connected Communities frequently develop applications and demonstrators (often through collaboration with users), and evaluate them in different usage situations. Many of the demonstrators are designed to nurture awareness and presence, and attempt to deal with digital mediation in such a way that the dialogue between people remains simple and direct.

The Connected Communities area currently consists of four main projects, VideoSpace, Digital Environments, CoPLand and INSCAPE, and a doctoral project on Gender issues. VideoSpace and Digital Environments each consist of a number of subtasks

### VideoSpace

The VideoSpace project builds on the research tradition of Media Spaces. The project studies how informal social interaction, community, and common culture can be upheld between separate locations by means of video- and audio connections. A fibre network with high capacity is used, providing for broadcast-quality, natural-size images, without delays in image or sound. An innovative mirror system permits direct eye contact. VideoSpaces stay continuously open, like doors to distant, physical places. Although the primary purpose is to support everyday interaction and informal contact between people, VideoSpaces can, of course, also be used for more formal videoconference and communication scenarios.

#### Subtasks:

- **Community at-a-distance** studies the use of VideoSpaces for connecting the staff at a distributed workplace: The Call Centre of the Stockholm County Police, which is located on three islands in the Stockholm archipelago, approximately 150 km apart.
- **Power Place.** The primary objective is to study the use of VideoSpaces for integrating the distributed offices of Vattenfall, a major Swedish energy provider, as well as for communication with common service departments within the organization. A secondary objective concerns the use of VideoSpaces for connecting industry to students and the academic world for recruiting and information dissemination purposes.
- **Mixed Mobility.** Mobile use is different from stationary use. This subtask addresses the mixture of both: situations where people are stationary at times, mobile at times, and where people on the move stay in touch with stationary units, e.g., service crews in the field. How can large-scale media spaces be adopted to accommodate communication over the latest generation cellular phones or other wireless, portable communication devices?
- **Access to Governmental Services.** A pre-study in the north of Sweden to examine the use of video mediated communication to improve the services, provide new services and support

collaboration between several different government agencies.

**Participating partners:** TCO, Telia Sonera, Vattenfall

**Observing partners:** The Swedish Handicap Institute.

**From CID:** Minna Räsänen, Gustav Taxén, Björn Thuresson, Bo Westerlund.

**Additional collaboration:** Mats Erixon, Advanced Media Technology Lab, KTH, Charlie Gullström, Gullström Architects AB, Anders Wiberg, ATK Arbetsliv.

**Additional funding:** The Development Council- Government Sector, the Stockholm County Council, Vinnova, the Stockholm County Police, Norrtälje Energi, Nilings AB, Offect AB, Panasonic, Stokab and Telia Sonera.

*Time period: Jan 2000–*

#### **Selected publications and demonstrators:**

Community at a distance: Lenman, S., Räsänen, M., Thuresson, B. A User-Oriented Approach to Building a Video Community in a Distributed Workplace, Proceedings of PDC'02, the Participatory Design Conference, Malmö, Sweden, June 2002

Power Place: demonstrator at Vattenfall and KTH until December 2003

Mixed Mobility: forthcoming demonstrators together with Vattenfall

Access to Governmental Services: forthcoming demonstrator at different locations in Norrland (Northern Sweden)

### **Digital Environments**

The goal of the Digital Environments project is to study how digital environments can be used for representation, and for mediating human-to-human interaction and communication. All kinds of digital environments are of interest, although currently the project focuses on three-dimensional, virtual and hybrid environments. Applications mainly concern exhibitions in museums and other public environments.

#### **Subtasks:**

- **Museums and Exhibitions** is a subtask that brings together current research on museums, technology and user-centred design. We investigate how the different goals of museum exhibitions can be reached through the use of modern computer technologies. We do this by involving visitors in different parts of the exhibition production cycle. Research questions include: How can user-centered design processes be adapted for the museum domain? How does user involvement influence the resulting exhibitions?

- **Virtual Reality for Spatial Navigation.** Training Service personnel often have to enter unfamiliar sites, such as automated power generating stations, to perform critical tasks. It has been widely suggested that Virtual Environments (VE) are effective training media. The aim of this subtask is to evaluate how familiarization training in a VE can facilitate navigation

and location of objects in the real environment. What are the requirements on VE design and on representation techniques in order for familiarization to be efficient?

• **Visitor Orientation, Places and Spaces.** Places and environments come as corporeal, such as museums, or incorporeal, such as web sites, chat places, communities, and 3D worlds. The central questions regarding visitor orientation concerns how it is that incorporeal, soft places arise? How is it we find ourselves at home or not at home in soft places? What kind of implications is there for interaction design if a perspective of visitors to places is adopted rather than the traditional perspective of users in HCI? The results are of general importance for the design of soft (virtual) places for representation and communication. The notion of place also runs deep within *The Art of Memory*, a study where the aim is to investigate how virtual environments can be used to support memorization. Historically, The Art of Memory is a set of memorization techniques with ancient roots that involves using imaginary or physical places to act as scaffolding for information. The study also touches on fundamental questions regarding ways of organizing and presenting information.

• **Technical Support for Prototype Development.** Most of the subtasks above require the development of different demonstrators and test applications. We are bringing together functionality (mainly graphics-related) from a number of these demonstrators in *Wasa*, a programming toolkit for building interactive graphics-oriented applications.

**Participating partners:** LO, Vattenfall, The Museum of Science and Technology, The Vasa Museum, Swedish Travelling Exhibitions, Utbildingsradion

**Observing partners:** TCO, The Swedish Handicap Institute.

**From CID:** Anders Hedman, Sten-Olof Hellström, Eva-Maria Jacobsson, Pär Bäckström, Åke Walldius, Gustav Taxén, Björn Thuresson, Helena Tobiasson.

*Time period: January 2002–*

#### **Selected publications and demonstrators:**

Taxén, G. Introducing Participatory Design in Museums. In Proceedings of PDC'04 Participatory Design Conference, July 2004, Toronto, Canada, 204-213. CID-258

Taxén, G., Bowers, J., Hellström, S-O. and Tobiasson, H. Designing Mixed Media Artefacts for Public Settings. In Darses, F., Dieng, R., Simone, C., and Zacklad, M. (Eds.) Cooperative Systems Design. Scenario-Based Design of Collaborative Systems. Amsterdam: IOS Press, 2004, 195-210, CID-257

Taxén, G. Towards Living Exhibitions, Licentiate Thesis TRITA-NA-0311, KTH, NADA, CID, May 2003, CID-229

Taxén, G., and Naeve, A. A system for exploring open issues in VR-based education. Computers & Graphics, Vol. 26, No. 4, August 2002, 593-598, CID-213

Demonstrator of VR for Spatial Navigation together with Vattenfall



Hedman, A. Visitor Orientation in Context - The historically rooted production of soft places, Doctoral dissertation, NADA, KTH, January 2004, CID-246

Hedman, A. "Visitor-Oriented Design—Three Studies of Visitor Accommodation and a Call for Action", International Journal of Human-Computer Interaction, 15(1), 105-120, Lawrence Earlbaum Associates, Inc.

Hedman, A. and Bäckström, P. Rediscovering the Art of Memory in Computer Based Learning-An Example Application. In Proceedings of E-Learn 2003, World Conference on E-Learning in Corporate, Government, Healthcare & Higher Education, Phoenix, USA, November 2003, 1024-1031.

### **Gender issues in new communication media**

This doctoral project focuses on the following issues. How has media developed over the years and what importance have gender aspects for the changes? Of what importance are social norms and social belongings of men and women for the media development, and vice versa?

The historical development of media in general is important to understand in order to analyse how gender issues may have had an impact. Therefore it seems crucial to begin the project by giving a brief account of this history.

The next step is to look at gender aspects for new technology, and then try to see how media has developed and changed. Then the analysis will try to establish how gender influences and may play a pivotal part in the media evolution. The emphasis will be on new technology, media convergence, gender aspects in general and gender aspects for the development of new communication media in particular.

The conclusion of the work is expected to deepen the understanding of how gender differences influence media development.

**Participant from CID:** Eva-Maria Jacobsson

**Other partner:** Media Technology KTH, Nils Enlund

*Time period: July 2000-*

### **CoPLand – Communities of Practise – Knowledge transfer in “learning” and mobile organisations**

The goal of the project is to support knowledge exchange among people in professions with high mobility elements. This is done by developing methods and technologies supporting this type of exchange. Focus is placed on supporting so called communities of practice within these organisations. Our plan is to use user centered methods for the study of the users and the organisation and participatory design methods for the design of the suggested support. Special care will be taken for providing a system that is sustainable in the future for the respective organisation. The target groups of this project are teachers.

**Participants from CID:** Kristina Groth, Ovidiu Sandor, Cristian Bogdan, Yngve Sundblad

**Other partners:** Metamatrix, Skolutvecklingsverket

**Main funding:** Separate VINNOVA project

*Time period: Oct 2003-Sep 2006*

### **INSCAPE, Interactive Storytelling for Creative People**

INSCAPE aims at enabling ordinary people to use and master the latest Information Society Technologies for interactively conceiving, authoring, publishing and experiencing interactive stories whatever their form, be it theatre, movie, cartoon, puppet show, video-games, interactive manuals, training simulators, etc. INSCAPE generates and develops the knowledge in the emerging domain of Interactive Storytelling by researching, implementing, demonstrating and disseminating a complete suite of innovative concepts, tools and working methods tightly integrated in a homogeneous web-based framework and offering a full chain to people with no particular computer skills, from content acquisition and creation, organising, processing, sharing, and using all the way to publishing, from creators to “viewers”.

**Participating partners:** 13 universities and corporation across Europe, coordinated by CS Toulouse

**Main funding:** EU IST Integrated Project

**From CID:** Björn Thuresson, Pär Bäckström, Yngve Sundblad, Gustav Taxén, Helena Tobiasson.

*Time period: September 2004–August 2008.*

## Current projects in Interaction Forms

Coordinated by: Bosse Westerlund

In this area, new forms of interacting with computers are studied; both in relation to current technology, but also in relation to the new possibilities that arise when computing power moves into the physical world. Interacting with things is a ubiquitous activity, and there is a long experience of designing and reflecting upon how we people use artefacts of all sorts. The Interaction Forms area houses a spectrum of projects, ranging from basic research to reusing existing technologies in new contexts.

### DAPHNE – Digital and Physical Interactive Environments

The current convergence of interactive digital systems, networks and mobile devices is transforming the ways that we carry out our everyday life, e.g. how we entertain ourselves, work, shop and communicate. In contrast to the existing visions of ubiquitous computing, our vision is to recognise from the outset the variable levels of digital richness available in the world and to construct both design techniques and supporting infrastructures that recognise this variability as a fundamental feature. The underpinning model we have is of an electronic landscape constructed of interconnected digital locales often separated by digitally sparse regions.

**Participating partners:** SICS.

**From CID:** Yngve Sundblad (co-ordinator), Pär Bäckström, Bo Westerlund, Gustav Taxén, Björn Thuresson, Sinna Lindquist, Anders Hedman, Åke Walldius.

**Main funding:** Swedish Foundation for Strategic Research (SSF).

**Time period:** Jul 2002-Jun 2005

## **Auditory Interfaces for Blind Computer Users**

This work is about investigating new techniques for giving blind users better access to graphical user interfaces using sound. Experience gained from studying auditory direct manipulation in both a single-user and a collaborative setting is developed further to investigate collaboration between blind and sighted users.

**Participating partner:** HI, Stig Becker.

**From CID:** Fredrik Winberg, Sten-Olof Hellström, Björn Thuresson

*Time period: Jan 2002-Jun 2005*

### **Selected publications:**

Winberg, F. & Hellström, S. O. Designing Accessible Auditory Drag and Drop, Proceedings of CUU2003, Conference on Universal Usability, Vancouver, Nov 2003, CID-242

Winberg, F., Thuresson, B., & Hellström, S. O. A study of cross-modal collaboration between blind and sighted users, Proc. of the 8<sup>th</sup> European Conference on Computer Supported Cooperative Work, ECSCW. Helsinki, Finland, Sept 2003, CID-240

## Current projects in Interactive Learning Environments and Knowledge Management

Coordinated by: Ambjörn Naeve

The overall aim of the Interactive Learning Environments and Knowledge Management research and development efforts at CID is to develop principles, methods and tools that make it possible to use computers to build globally distributed, learner-centric and interest-based educational architectures – as opposed to the traditional ones, which are centralized, teacher-centric and curriculum-based. Our major research questions within this area are the following:

1. How can we make effective use of ICT in order to design a globally distributed and learner-centric infrastructure for ICT enhanced learning?
2. How can we design technology that contributes to the breaking of learner passiveness?
3. How are the traditional educational architectures affected by the introduction of learner-centric technologies?

In order to enable this research we are also developing an educational infrastructure and a number of frameworks and tools that make use of technology from the emerging next generation Internet, the Semantic Web. Taken together, they form a contribution to a Public e-Learning Platform based on open source and open international ICT standards.

### Edutella – Global Exchange Network for Information about Educational Resources on the Semantic Web

Edutella is an infrastructure and a search service for a peer-to-peer network that facilitates the exchange of information (metadata) about educational resources on the Semantic Web. Edutella started as a part of the PADLR project (see below), and is now carried out jointly by several different groups and institutions.

At CID, we have also created an application of Edutella in the form of an Edutella-enabled electronic portfolio system, called *Edufolio* (see below). It enables small producers of resources (such as individual teachers and students) to act as Edutella providers on the same terms as big producers, such as e.g. UR, SVand CFL. The Edufolios are presently being used to set up various forms of “experience networks”, where each user can express her or his own personal experiences of each individual resource in such a way that this information can be easily searched for and retrieved by others. In our view, this creates a kind of “metadata ecosystem” that has the potential to promote quality in a scalable way.

**From CID:** Ambjörn Naeve (Swedish co-ordinator), Mikael Nilsson. Matthias Palmér, Pär Sjöberg.

**Other participants:** Learning Lab Lower Saxony (co-ordinator), AIFB/Universität Karlsruhe, Uppsala DataBase Laboratory. Uppsala Learning Lab, EducaNext.

**Main funding:** Wallenberg Global Learning Network. PROLEARN EU-FP6 Network of Excellence

*Time period: April 2001–*

#### **Selected Publications:**

Nejdl, W., Wolf, B., Qu, C., Decker, S., Sintek, M., Naeve, A., Nilsson, M., Palmér, M., Risch, T., *Edutella: A P2P Networking Infrastructure Based on RDF*, Proc. of the 11th World Wide Web Conference (WWW2002), Hawaii, May 7-11, 2002, CID-205

Nilsson, M. & Palmér, M. & Naeve, A., *Semantic Web Meta-data for e-Learning - Some Architectural Guidelines*, Proceedings of the 11th World Wide Web Conference, Hawaii, May 7-11, 2002, CID-204

Nilsson, M. & Naeve, A. & Palmér, M., *The Edutella P2P Network - Supporting Democratic E-Learning and Communities of Practice*, in McGreal, R. (ed.), *Online Education Using Learning Objects*, Routledge-Falmer, New York, 2004, ISBN 0-415-33512-4, <http://kmr.nada.kth.se/papers/SemanticWeb/Edutella-chapter.pdf>

#### **Standardization of metadata for technology enhanced learning**

CID is actively participating in the development of the main emerging educational metadata standards, within international standards bodies such as IMS, IEEE, ISO and CEN/ISSS. CID is coordinating the development of an RDF binding for the IEE-LOM standard, which creates a strategically important connection between the e-Learning and the Semantic Web communities. Within ISO, we take part in the Swedish subcommittee TK450 of ISO-JTC1/SC36 (Information Technology for Learning Education and Training), the aim of which is to promote standardization of information technologies for learning, education and training to support individuals, groups or organizations, and to enable interoperability and reusability of educational resources and tools.

**Participating partners:** Swedish National Agency for School Improvement (MSU), Swedish Educational Broadcasting Company (UR), Swedish National Centre for Flexible Learning (CFL).

**From CID:** Ambjörn Naeve, Mikael Nilsson, Fredrik Paulsson .

*Time period: May 2001–*

#### **Selected Publication:**

Powell, A. & Nilsson, M. & Naeve, A. & Johnston, P. *Dublin Core Metadata Initiative - Abstract Model*, white paper, working draft, 2004, <http://www.ukoln.ac.uk/metadata/dcmi/abstract-model>.

#### **Network of Semantic Collaboration in Informal Learning**

This project aims to build and support a value-accumulating network involving different

communities of practice of informal learning. Using the semantic web-based infrastructure, frameworks and tools developed by the Knowledge Management Research (KMR) group at CID, the participants will model their respective domain-specific contexts on top of a shared conceptual model of the informal learning landscape. These contexts will include community-specific learner profiles as well as community-specific descriptions of learning resources (learning object metadata). A matching process will then provide personalized courselets for each learner. The learning resources will be shared through a search and retrieval system.

**Participating partners:** Swedish Educational Broadcasting Company (UR), Swedish National Centre for Flexible Learning (CFL), Swedish Terminology Centre (TNC), Uppsala Learning Lab (ULL), Uppsala DataBase Laboratory, Datadoktorn, Ateles Consulting.

**Other Partners:** Swedish National Agency for School Improvement (MSU), L3S Research Centre. Swedish Museum Window.

**From CID:** Ambjörn Naeve , Matthias Palmér, Mikael Nilsson, Fredrik Paulsson.

### **ICT Enhanced Mathematics Education**

CID participates in the *National Research School of the Didactics of Mathematics* that started in 2001. Important starting points for our research within this framework are to address common difficulties within traditional mathematics education, such as, how to stimulate interest, promote understanding, support personalization, and facilitate transformation between different educational levels. Other issues concern integration of abstractions and applications and the integration of mathematics into the landscape of human cultural activities.

**From CID:** Ambjörn Naeve (co-ordinator), Mikael Nilsson.

**Other participants:** Swedish Educational Broadcasting Company (UR), The Swedish Foundation for Enterprise Education (Stiftelsen Företagsam), Ericsson Education, KTH Teacher Education.

**Main funding:** the National Research School of the Didactics of Mathematics, Wallenberg Global Learning Network.

*Time period: Sept 2001–*

### **Selected Publications:**

Naeve, A. & Nilsson, M., *ICT-enhanced Mathematics Education within the Framework of a Knowledge Manifold*, Proceedings of the 10th International Congress of Mathematics Education (ICME), Copenhagen, Denmark, July 2004, <http://kmr.nada.kth.se/papers/MathematicsEducation/ICME2004-ICT-enhanced-math-ed.pdf>.

Nilsson, M., Naeve, A., *On designing a global infrastructure for content sharing in mathematics education*, Proceedings of the 10:th International Congress on Mathematics Education (ICME), Copenhagen, Denmark, July 4-11, 2004, [http://kmr.nada.kth.se/papers/MathematicsEducation/ICME2004-On\\_designing.pdf](http://kmr.nada.kth.se/papers/MathematicsEducation/ICME2004-On_designing.pdf).

## Prototypes

### Standardized Contextualised Access to Metadata (SCAM)

SCAM is a framework for building distributed archives and the shared use of information components. It is built on international standards for metadata and Semantic Web such as Dublin Core, IMS and IEEE/LOM and RDF. We have used SCAM to build the new media library of the Swedish Educational Broadcasting Company. SCAM has also been used by the Swedish National Agency for Education (Skolverket) in the development of several resource repositories such as the NoT-navet and “Projekt i klassrummet”.

**Participating partners:** Swedish National Agency for School Improvement (MSU), Swedish National Agency for Education (SV), Swedish Educational Broadcasting company (UR), National Centre for Flexible Learning (CFL), Uppsala Learning Lab, Ateles Consulting.

**Other participants:** Jan Danils, Jöran Stark.

**From CID:** Ambjörn Naeve (scientific co-ordinator), Mikael Nilsson, Matthias Palmér, Fredrik Paulsson (technical co-ordinator).

**Funding:** MSU, Wallenberg Global Learning Network, UR, CFL.

*Time period: Sept 2001–Dec 2004.*

### Selected Publications:

Palmér, M. & Naeve, A. & Paulsson, F., *The SCAM-framework – helping applications to store and access metadata on the semantic web*, Proceedings of the First European Semantic Web Symposium (ESWC 2004), Heraklion, Greece, May, 2004, Springer, ISBN 3-540-21999-4, <http://kmr.nada.kth.se/papers/SemanticWeb/SCAM-ESWS.pdf>.

Paulsson, F. & Naeve, A., *Standardized Content Archive Management - SCAM*, IEEE Learning Technology newsletter (ISSN 1438-0625), Vol 5, Issue 1, pp 40-42, Jan 2003, CID-214

### Standardized Hyper-Adaptable Metadata Editor (SHAME)

SHAME is an editor framework developed by CID for flexible metadata (evolving annotations) based on Semantic Web technology. The SCAM framework manages many different kinds of metadata as long as they are expressed in RDF. To fully make use of the flexibility of the SCAM framework, an equally capable front-end for presenting and editing metadata is needed. Hence, SHAME is a framework for RDF-based metadata editors rather than a single editor. Features of SHAME are utilized in a portfolio application built on top of SCAM (see “Edufolio” below).

**Participating partners:** Swedish Educational Broadcasting Company (UR), Swedish National Agency for School Improvement (MSU), Uppsala Learning Lab, Ateles Consulting.



**From CID:** Ambjörn Naeve (scientific co-ordinator), Matthias Palmér (technical co-ordinator), Mikael Nilsson, Fredrik Paulsson, Henrik Eriksson.

## **Edufolio**

We are developing an electronic portfolio tool called *Edufolio* (or *SCAM portfolio*) on top of the Edutella infrastructure and the SCAM and SHAME frameworks. Edufolios are interconnected through the peer-to-peer network Edutella, which presently contains information about educational material from e.g. the Swedish Educational Broadcasting Company, the Swedish National Agency for Education, the Media technology students at KTH, the Swedish Museum Window, and a number of different European providers of learning resources. It is possible to search for various types of semantically annotated educational material, create your own annotations of this material in your own Edufolio, and make these annotations searchable across the Edutella network. Soon it will also be possible to search for published opinions (annotations) from others regarding their experiences of a specific learning resource. This represents a crucial step (beyond the present Google-based search technology), which lays the technical foundation for a global reflective learning community with an “experience network” around the use of learning resources that are controlled by the participants themselves.

**Participating partners:** Swedish Educational Broadcasting Company (UR), Swedish National Agency for School Improvement (MSU), Uppsala Learning Lab, Ateles Consulting.

**From CID:** Ambjörn Naeve (scientific co-ordinator), Matthias Palmér (technical co-ordinator), Mikael Nilsson, Fredrik Paulsson, Henrik Eriksson.

## **Conzilla – a Conceptual Browser for the Semantic Web**

Conzilla is a prototype concept browser, a new type of knowledge management tool, which supports a variety of different strategies for context-dependent presentation and suppression of information. Conzilla maintains an overview of the concepts involved by separating their *context* from their *content*, and controls the presentation of “situated content” (content-in-context) by filtering it according to different context-dependent *aspects*.

Conzilla started as a thesis project in 1998. Since then it has gone through several periods of intense development and change of focus even if the basic motivation has remained the same. We currently have two main goals for Conzilla:

First, Conzilla should be a useful knowledge management tool. This includes support for conceptual modeling, flexible support for metadata, division between context and content and allowing exploration through hyperlinked structures. Our strategy to reach this goal is to provide UML-like hyperlinked maps, rich with metadata and content resources accessible as further examples, explanations, more in-depth material etc. on concepts and concept-relations.

Second, Conzilla should be an effective bridge between human- and machine semantics. More specifically we have chosen to focus on providing knowledge-intensive user interfaces to the Semantic Web, especially RDF (Resource Description Framework). In practise, we strive to let Conzilla be an RDF creation/editing/annotation tool as well as to include form-based

RDF editing/presentation through SHAME. We presently work on equipping Conzilla with search capabilities through the Edutella network.

Related to the Conzilla development is various forms of organizational modeling in order to clarify the structure of an organization as well as the structure of its work processes.

**Participating partners:** Datadoktorn, Guide/Astrakan Uppsala Learning Lab.

**Observing partners:** Swedish National Centre for Flexible Learning (CFL), Swedish Educational Broadcasting Company.

**From CID:** Ambjörn Naeve (co-ordinator), Mikael Nilsson, Matthias Palmér, Henrik Eriksson.

*Time period: Jan 1999–*

#### **Selected Publications:**

Naeve, A. & Nilsson, M. & Palmér, M., *The Conceptual Web - our research vision*, Proceedings of the First Semantic Web Working Symposium, Stanford, July 2001, CID-156

Naeve, A., *The Knowledge Manifold - an educational architecture that Supports Inquiry-Based Customizable Forms of E-learning*, Proceedings of the 2nd European Web-based Learning Environments Conference (WBLE 2001), Lund, Sweden, Oct. 24-26, 2001, CID-162

Naeve, A., *The Concept Browser - a New Form of Knowledge Management Tool*, Proceedings of the 2<sup>nd</sup> European Web-Based Learning Environment Conference (WBLE 2001), Lund, Sweden, Oct. 24-26, 2001, CID-159

## Current projects in User Oriented Design

Coordinated by: Åke Walldius

User orientation is the keyword for all projects at CID, regardless if their focus is on the conception, development, implementation, or the follow-up and maintenance of IT support. Therefore, the User Orientation research area supports all projects and all partners at CID with seminars and workshops on user oriented design and research methods. It also follows the developments of new, hands-on design approaches, as well as the trends in national and international standardization and quality assurance initiatives.

CID participates in the EU Network of Excellence Convivio on “People-Centred Design of Interactive Systems”, 2003-2007, especially in promoting the arrangement of Summer Schools, 2003 in Rome, 2004 in Split.

### UsersAward – User-driven software certification

This project implements and develops the work carried out in the project ITQ - Quality of IT support for workplace end-users (see “Finished Projects” below). The main task of UsersAward is to consolidate and extend the criteria and procedures for end-user certification developed within the ITQ project. This is done through a series of pilot studies that focus on certain sets of criteria, such as visualization for implementation supervision, simulation techniques for daily planning, cost/benefit techniques for sustainable accounting etc. CID also continues its participation in the yearly IT Prize competition where the best vendor and workplace implementation is nominated by end-users and evaluated by a jury. The project has specific support from VINNOVA in the form of a five year assignment to provide scientific support for the UsersAward organization, jointly founded by Vinnova and LO.

**Participating partners:** LO.

**Observing partners:** TCO, TimeCare, Vattenfall.

**Other participants:** HCI/Uppsala University, Industrial economics/Gävle, Production technology/Luleå.

**From CID:** Yngve Sundblad, Åke Walldius.

**Main funding:** VINNOVA special grant to LO/UsersAward

*Time period: Sept 2002-Dec 2007*

### Selected Publications:

Walldius, Å., Sundblad, Y., Bengtsson, L., Lind, T. and Sandblad B. (2004). “User-driven Quality Certification of Workplace Software – the Users Award Experience.” Proceedings of WWCS (Work with Computer Systems) conference, Kuala Lumpur, June 2004, **Damai Sciences, 150-155**

BIT paper (forthcoming)

## **Usability requirements in the Swedish public framework agreement**

This feasibility study about the possibility of including usability requirements in the Swedish public framework agreement was initiated by the Swedish Agency for Public Management (Statskontoret) and inspired by the UsersAward Certification project (see above). Based on the self declaration part of the UsersAward certification procedure, a set of relevant quality dimensions and quality levels will be discerned and tested in a general framework agreement for the public procurement of ICT software. The project also studies the applicability of the resulting procedure to the public procurement of ICT services. The procedure's compliance with existing ISO standards (9241, 13407, 18529) and its potential to further develop the UsersAward procedure are other important themes.

**Participating partners:** Statskontoret.

**Observing partners:** LO, ErgoLab.

**From CID:** Åke Walldius, Yngve Sundblad

**Main funding:** VINNOVA.

*Time period: Oct 2003 – Feb 2005.*

## **MESIMA – Manufacturing and Enterprise Simulation and Modeling Arena**

CID participates in the MESIMA-project within the EU sponsored Leonardo da Vinci Programme, coordinated by Luleå University of Technology. The goal of MESIMA is to develop a web based arena where non-experts, as well as experts, in SMEs can learn the basics, as well as recent breakthroughs, of simulation as a practical problem-solving tool. Key challenges is to help learners to navigate through relevant exercises and "handbook material", to design exercises and background information in a realistic and expressive, yet concise way, and to design the arena as a whole in a way that invites researchers, simulation consultants, and simulation package vendors to upgrade the arena in an stepwise manner, as part of their own research and business practices.

**Observing partners:** LO, TCO.

**From CID:** Åke Walldius, Yngve Sundblad

**Main funding:** EU–Leonardo da Vinci Programme.

*Time period: Oct 2003 – Mar 2006.*

## 29 Finished CID Projects

### **SHAPE, Situating Hybrid Assemblies in Public Environments**

This project is part of the *Disappearing Computer* initiative within EUs FET (Future Emerging Technologies). The use of mixed reality is developed and studied by university departments in public environments, especially museums in Stockholm, Nottingham and Limerick.

**From CID:** John Bowers (co-ordinator), Sten-Olof Hellström, Gustav Taxén, Helena Tobiasson.

**Other participants:** Universities of Limerick and Nottingham; King's College London

**Main funding:** EU IST-FET-DC-initiative.

*Time period: Jan 2001–Jun 2004.*

#### **Selected publications:**

Taxén, G., Bowers, J., Hellström, S.-O., and Tobiasson, H, Designing Mixed Media Artefacts for Public Settings Proceedings of the 6th International Conference on the Design of Cooperative Systems, May 2004, Hyères, France, CID-257

Tobiasson, H., Taxén, G. and Bowers, J. Scaffolding Visitors Experience of Technology. Proceedings of the CIDOC/ADIT Conference, Sep 2003, St. Petersburg, CID-241

Fraser M., Stanton, D., Ng, K. H., Benford, S., O'Malley, C., Bowers, J., Taxén, G., Ferris, K., Hindmarsh, J. Assembling History: Achieving Coherent Experiences with Diverse Technologies. Proceedings of ECSCW 2003, Helsinki, Sept 2003, 179-198.

Taxén, G., Hellström, S.-O., Tobiasson, H., Back, M., Bowers, J. The Well of Inventions - Learning, Interaction and Participatory Design in Museum Installations. Proceedings of the Seventh International Cultural Heritage Informatics Meeting, Ecole du Louvre, Paris, 8-12 Sept, 2003. CD-ROM Proceedings, CID-228

### **PADLR**

#### **(Personalized Access to Distributed Learning Repositories)**

The vision and goal of the PADLR project has been to produce a distributed learning web infrastructure and a set of tools that will facilitate greater flexibility and functionality at all levels of university teaching. This enables knowledge and learning materials to be constantly restructured and remodelled, as well as individually accessed when they are needed.

The technical contributions of the PADLR project have taken the form of an infrastructure, an architecture, two frameworks and a number of tools for a *Public e-Learning Platform* based on semantic web technology, open source and emerging international ICT standards. More specifically, the PADLR project has been part of producing:

the *Edutella infrastructure*: A democratic (peer-to-peer) network infrastructure for search and retrieval of information about learning resources on the semantic web.

the *Knowledge Manifold architecture*: an information architecture which highlights the complementarity of *context* and *content* and supports a variety of different strategies for context-dependent presentation and suppression of information.

the *SCAM framework*: a framework that helps applications to store and share information about learning resources.

the *SHAME framework*: an editor framework that supports an evolving annotation process of learning resources in a way that enables the growth of an “ecosystem” of quality metadata.

the *Formulator SHAMEditorEditor*: a tool for editing metadata editors that is built on top of the SHAME framework.

the *Conzilla concept browser*: a knowledge management tool that supports the construction, navigation, annotation and presentation of the information in a knowledge manifold.

the *EduFolio networked portfolios*: an electronic portfolio system built on top of SCAM, SHAME and Edutella, which supports collaborative and reflective learning techniques.

the *PSELO search engine*: a tool that allows access to (and personalized learning views of) heterogeneous information on the ‘hidden web’, which is stored in traditional databases. In this way, semantic web queries on Edutella can transparently retrieve information from relational database servers.

the *BiP tool*: enables researchers and students to manage and share bibliographical data in a peer-to-peer network. The BiP tool can import, edit and export BibTeX data sets, and categorize documents according to predefined or self-defined categories.

**From CID:** Ambjörn Naeve (Swedish co-ordinator), Mikael Nilsson, Matthias Palmér, Henrik Eriksson.

**Other participants:** Uppsala Learning Lab, Uppsala DataBase Laboratory, Learning Lab Lower Saxony (co-ordinator), Stanford University, AIFB/Universität Karlsruhe,

**Main funding:** Wallenberg Global Learning Network

**Publications and reports:** <http://www.learninglab.de/english/projects/padlr.html>

*Time period: Jan 2001–Jun 2004*

## **Making sense – design for well-being**

The focus of this work is on “unhealth” issues and the design of IT products in the home. What is the relation between design and health? What are the aesthetical issues in design for Home health care? What is “healthy” and “unhealthy” in the home? It is particularly important

today to understand those issues when stress and sick leaves are increasing and we are facing large demographic problems. The methods were multiples ranging from surveys, interviews and user studies to design concepts, developing products and finally to evaluate them. The work attempts to look at and create a basis for understanding design as both a process and an aesthetic practice within the HCI context.

**From CID:** Sara Ilstedt Hjelm.

**Partner:** Interactive Institute, Stockholm

*Time period: Jan 2000–Mar 2004.*

#### **Selected publications:**

Ilstedt Hjelm, S. Making sense - Design for Well-being, Doctoral dissertation, NADA, KTH, March 2004, CID-250

Ilstedt Hjelm, S. The Dysfunctionality of Everyday Things, Designjournalen, 1/03, Stiftelsen svensk Industridesign 2003, CID-234

### **interLiving, Designing Interactive, Intergenerational Interfaces for Living Together**

This project, is part of the Disappearing computer initiative within EU FET (Future Emerging Technologies). Communication over generations is studied in families in Sweden and in France. Possible IT support in the form of communication surfaces was prototyped and studied together with the families.

**From CID:** Yngve Sundblad (co-ordinator), Björn Eiderbäck, Sinna Lindquist, Bo Westerlund, Helena Tobiasson and (mainly affiliated with University of Maryland) Ben Bederson, Allison Druin,, Hilary Hutchinson and Catherine Plaisant.

**Partners:** Université Paris Sud and INRIA in Paris

**Main funding:** EU IST-FET-DC-initiative.

*Time period: Jan 2001-Dec 2003.*

#### **Selected publications:**

Westerlund, B., Lindquist, K., and Sundblad, Y. (2003). "Co-designing with and for Families." Proceedings of "Good - Bad - Irrelevant - The user and the future of information and communication technologies" conference Helsinki, September 2003. Helsinki: Media Lab / UIAH, 290-294, CID-227

Westerlund, B., Lindqvist, K., Mackay, W. and Sundblad, Y. Codesigning methods for design with and for families, Proceedings for 5th European Academy of Design Conference, Barcelona, April 2003, CID-218

Hutchinson, H., Mackay, W., Westerlund, B., Bederson, B., Druin, A., Plaisant, C., Beaudouin-Lafon, M., Conversy, S., Evans, H., Hansen, H., Roussel, N., Eiderbäck, B., Lindquist, K., and Sundblad, Y. (2003). "Technology Probes: Inspiring Design for and with Families." Proceedings ACM CHI 2003, Fort Lauderdale, April 2003. New York : ACM Press. 17-24, CID-217

### **Silent Sound Sculpture**

With the project "Silent Sound Sculpture" we want to achieve silent zones in noisy environments. The purpose is artistic, to "visualise" our noisy environment to a wide audience and open the debate on this issue, as well as a practical contribution to the development of a better sonic environment. A condition for realising the silent sound sculpture is broad research and development work including new methods and technical solutions on active sound control.

**From CID:** Ann Rosén (coordinator), Sten-Olof Hellström, Ann Lantz, Yngve Sundblad.

**Other participants:** Dept. for Telecommunication and Signal Processing at Blekinge Institute of Technology

**Main funding:** Pre-study and project initiation funding from Stiftelsen framtidens kultur ("Culture of the Future"), Riksbankens Jubilumsfond, Vinnova, KK-Stiftelsen and Konstnärnämnden. Sveriges bildkonstnärnsfond (Arts Grants Committee).

**Demonstrator** showing the feasibility May 2003

*Time period: Sep 2001-Aug 2003.*

### **Amöba – formless and sexless – gender and technology**

Amöba – formless and sexless was a project investigating the relation between technology and gender, and exploring methods to elaborate on those relations and bring them to a discussable level. There is a connection between how we constitute our sex's roles and how we produce, use and value technological artifacts. Gender perspective is one way of making the accepted and oppressive structures in society, that is giving special treatment to anyone because of his/her sex, visible. The Amöba project was a multidisciplinary cooperation between CID and the Interactive Institute (II).

**Participants from CID:** Sara Ilstedt-Hjelm, Sinna Lindquist

**Participants from II:** Lotten Wiklund, Carolina Browall, Joakim Persson

**Technical Report:** CID-254 (in Swedish)

*Time period: June 2000-June 2003*

### **Gestural Interfaces**

The project is collaboration between CID and CVAP at NADA, KTH. It studies the use of hand gestures for interaction. The approach is based on recognition of gestures by computer vision.



The main scenario is ubiquitous, everyday computing, with a focus on developing interfaces for people with special needs. The scope is limited to Multimodal user interfaces. Gestures need not be natural gestures: they could be developed for the situation, or based on some standard sign language. Conversational interfaces, automatic recognition of natural, human gesture falls outside of the scope of the project. The current focus is on developing command sets for interaction. As a starting point remote control of electronic appliances in a home environment, such as TV sets and DVD players has been chosen.

**Participating partners:** The Swedish Handicap Institute, Telia Sonera

**From CID:** Sören Lenman, Olle Sundblad, Björn Thuresson.

**From Computer Vision and Active Perception Laboratory,** NADA:Lars Bretzner

*Time period: Jan 2000–Jun 2003*

**Follow-up current project:** Daphne

#### **Selected publication:**

Lenman, S., Bretzner, L. & Thuresson, B. Using Marking Menus to Develop Command Sets for Computer Vision Based Hand Gesture Interfaces., Proceedings of the Second Nordic Conference on Human-Computer Interaction, pp. 239-242. Aarhus, Denmark 2002, CID-209

#### **Online Amateur Communities**

Field study of 'voluntary working order' was conducted in several voluntary communities: amateur radio and three student organisations. In studying such working order, one must renounce a set of assumptions that are commonly made about work, starting with the very idea of remuneration as a basic motivation. Instead, challenge as a major motivation is proposed for work in voluntary communities. To draw inspiration for future design, an examination is made of the way this motivation is reflected in the features of technology created by the communities for their own use, in the working contexts of the field settings.

Lessons learned about amateur work are then used and refined while reflecting on amateur-work-oriented design of IT artefacts conducted within a student organisation, with a particular interest in self-sustainability of participatory design practices in such settings. Practices of participatory design are re-considered in the context of voluntary work, the absence of the employer-employee conflict, the challenges and learning trajectories of the members. As development is done by members of the student community, design interventions for self-sustainability of amateur software development are described and reflected upon. A generic approach is proposed for action aimed at self-sustainability in amateur settings.

**CID participants:** Cristian Bogdan

*Time period: Jan 1998–Feb 2003.*

**Follow-up current project:** CoPLand

**Selected publications:**

Bogdan, C., IT Design for Amateur Communities, Doctoral Dissertation, Royal Institute of Technology, Department of Numerical Analysis and Computer Science, Stockholm January 2003, CID-196

Bogdan, C., Cerratto Pargman, T. Reconsidering Support for the Members of Specialized Online Communities, Proceedings of the 34th Congress of the Nordic Ergonomics Society, NES 2002, Linköpings Universitet, Volume I, pp. 121-126, October 2002

**ITQ - Quality of IT support for workplace end-users**

This project carries out a series of pilot studies of IT support for local planning of daily work on the work floor in industry and in health care. It also arranges the yearly “User’s Award” presentation to the best vendor and workplace, evaluated by a jury, from nominations by the end users. From this experience a process of quality certification of IT support for local planning is developed and studied. The project has specific support from NUTEK/VINNOVA’s MTO (Human-Technology-Organisation) programme.

**Participating partners:** LO, Torbjörn Lind & Renée Andersson.

**Observing partners:** TCO; TimeCare; Vattenfall .

**From CID:** Yngve Sundblad (coordinator), Åke Walldius.

**Other universities:** HCI/Uppsala University, Industrial economics/Gävle, Production technology/Luleå.

**Main funding:** NUTEK/VINNOVA.

*Time period: Sept 1999-Dec 2002*

**Follow-up current project:** UsersAward

**Selected publication:**

Sundblad, Y., Lind, T. and Rudling, J. IT product requirements and certification from the users’ perspective, Proc. WWDU 2002 Conference, Bavaria, May 22-25, 2002, pp.280-282, CID-176

**Citizens’ Internet Terminals**

This was a Sweden-wide project, between a numbers of governmental agencies, where CID contributed with user studies of terminals in public areas. The terminals offered public information and services via Internet also for them who do not have access to a computer of their own. It was seen as a matter of accessibility and democracy.

**Participating partners:** RSV.

**Observing partners:** Sverige Direkt, RFV (State Social Insurance agency).

**From CID:** Sinna Lindquist, Minna Räsänen, Cecilia Torngren.

**Other universities:** Blekinge tekniska högskola, Sara Eriksén & Annelie Ekelin; Mitthögskolan, Peder Björk.

*Time period: Jan 2001-Dec 2002*

### **Report:**

Torngren. C. Medborgarterminalernas Tillgänglighet (The availability of citizens terminals, in Swedish), Master's thesis, Stockholms University, Dept DSV, Stockholm November 2002, CID-197

### **MathViz – Personalized and Shared Mathematical Courselets**

This project attacked two major difficulties for teachers and learners: the difficulty to share and reuse learning material among students and teachers and across geographical and organizational boundaries and the difficulty to personalize and adapt existing learning material to a particular learning situation. Adaptation is relevant both with respect to the students characteristics and the context of learning. Our particular concern is mathematics education. By courselets we mean fragments of courses composed from multimedia explanation modules or content modules in electronic form.

In our approach the students were stimulated to play with preauthored visualisations and other multimedia explanation modules for mathematical concepts, create, reuse or modify such modules, create their own conceptual models of mathematical knowledge, annotate nodes in conceptual structures with personal information, create courselets based on sequences of explanations generated from the personal conceptual models, indirectly create courselets generated through knowledge-based techniques basing their inferences on metadata coding relevant contextual information, browse courselet structures, exchange courselets. Conzilla provided the basic platform for these activities, and the Graphing Calculator (<http://www.pacifict.com>) was the basic visualization tool.

Interactive visualization sessions were carried out with students at the IT university during the spring term of 2002. Results showed that students were in general quite positive to this way of working with the mathematical material.

**From CID:** Ambjörn Naeve, Mikael Nilsson, Matthias Palmér,

**Other participants:** DSV/KTH

**Main funding:** Wallenberg Global Learning Network (part of the PADLR project).

*Time period: Sept 2001–August 2002*

**Prototype environment:** <http://kmr.nada.kth.se/math/conzilla-demo.html>

### **Selected Publications:**

Naeve, A., My Work within the Field of Mathematics Educational Reform, CID-110 , KTH, 2001, [http://kmr.nada.kth.se/papers/MathematicsEducation/mathematics\\_educational\\_reform.pdf](http://kmr.nada.kth.se/papers/MathematicsEducation/mathematics_educational_reform.pdf).

Karlgren, K., Naeve, A., Nilsson, M. (2002), MathViz - PADLR progress report May 2002.

### **Archives, Portfolios and 3D Environments (APE)**

The aim of this project was to develop and test tools, principles and practices in the management of digital archives and portfolios, and 3D communication and visualization environments for learning. The project was part of the Swedish Learning Lab network and included three sub-projects: Content and context of Mathematics in Engineering Education (CCM), Digital resources in the humanities (DRH) and 3D communication and visualization environments for learning (CVEL). Among the activities were applications of conceptual modelling techniques in order to encourage students to reflect on their learning process. Another activity was CyberMath – a 3D Visualization Environments for Exploring Mathematics. A digital archive/portfolio application was developed.

**From CID:** Donald Broady, Ambjörn Naeve, Mikael Nilsson, Matthias Palmér, Gustav Taxén.

**Other participants:** DSV/KTH, Medieteknik/KTH, DIS/Uppsala University, Linguistics, Uppsala University, ILU/Uppsala University.

**Funding:** Knut and Alice Wallenberg Foundation.

*Time period: Jan 2000 - Dec 2001*

### **Explorative mathematics with 3D visualization**

The project, which consisted of two subprojects, was part of a collaborative project called *Archives, Portfolios, Environments (APE)* within the Swedish Learning Lab. The first subproject was *Context and Content of Mathematics in Engineering Education* with the goal to encourage the students to reflect on their mathematical learning process by making use of conceptual modeling techniques. The other subproject was *CyberMath – a 3D Visualization Environments for Exploring Mathematics*, which aimed to increase the ability of the students to understand complex spatial and dynamic mathematical relationships, as well as to increase the possibilities of collaborative interaction between students and shared exploration of mathematical course content from remote teacher settings.

**From CID:** Ambjörn Naeve, Gustav Taxén.

**Other participants:** DSV/KTH , DIS/Uppsala University

**Main funding:** Wallenberg Global Learning Network.

*Time period: Jan 2000–Dec 2001*

#### **Selected Publications:**

Taxén G., & Naeve, A. *CyberMath - A Shared 3D Virtual Environment for Exploring Mathematics*, the 20:th ICDE world conference, Düsseldorf, April 2001, (on Compact Disc), CID-129

Taxén G., & Naeve, A. *CyberMath - Exploring Open Issues in VR-based Learning*, SIGGRAPH 2001, Educators Program, SIGGRAPH 2001 Conf. Abstracts and Applications, pp. 49-51., CID-137

#### **Sonification of Towers of Hanoi**

In order to investigate the nature of auditory direct manipulation, we have implemented an auditory version of the game Towers of Hanoi (where discs of different sizes have to be moved between three towers according to certain rules).

The sonification model is exclusively based on the sounds of the discs. Every disc has a sound that differs mainly in pitch and in timbre. The larger the disc, the lower the pitch. In order to distinguish which tower a disc is located on, both stereo panning and amplitude envelopes are used. We use a mouse as input device. The volume of the discs on the tower that the mouse cursor is located on is increased. The key aspect we investigate is continuous presentation where three different configurations are tested with blind and seeing persons.

**From CID:** Fredrik Winberg, Sten-Olof Hellström.

**Participating partners:** Handicap Institute.

**Prototype:** Towers of Hanoi, exhibited also at Technical museum etc.

**Time period:** July 1999–Dec 2001.

#### **Selected publications:**

Winberg, F. *Auditory Direct Manipulation for Blind Computer Users*, Licentiate Thesis, TRITA-NA-0137, NADA, KTH, NADA, November 2001, CID-145

Winberg, F. & Hellström, S.-O. *Qualitative Aspects of Auditory Direct Manipulation: A Case Study of the Towers of Hanoi*, 7th international conference on auditory display ICAD 2001, Espoo, Finland, July-August 2001, CID-132

#### **Digital Television**

This project investigated interaction design of digital television at two major actors on the Swedish market. Several user studies were conducted in order to understand the requirements of the general public as a wide user group. Interaction with traditional, as well as with

experimental, models of user interfaces for digital television were studied. The findings are documented in the following reports which should be of interest to anyone involved in the development of interfaces for digital television.

**From CID:** Anders Hedman, Sören Lenman

**Participating partners:** Teracom, UR (Swedish Educational Broadcasting Company)

*Time period: July 2000–Dec 2001*

#### **Selected publication:**

Hedman, A. A Media Rich Interface vs A Simple Interface for Interactive Television. In proc of E-Learn 2002 World Conference on E-Learning in Corporate, Government, Healthcare & Higher Education, Montreal, Canada Nov 2002, 420-425, CID-212.

#### **KidStory – Collaborative Storytelling for Children - with Children**

This project was part of the Experimental School Environments, initiative within ESPRIT LTR (Long-Term Research). Tools for collaborative storytelling has been developed as prototypes and studied together with the same elementary school children (5 to 9 years old) over 3 years. Technology started with a desktop drawing tool (KidPad) with zooming and referencing facilities, which over the second and third years was combined with storytelling objects for creation and navigation (dice, sofa, carpet, active feet) and other control devices into a storytelling room.

**From CID:** Angela Boltman (also University of Maryland), Allison Druin (d:o), Carina Fast (also Teachers Training dept, Uppsala University), Marita Kjellin (d:o), Yngve Sundblad, Gustav Taxén, Helena Tobiasson.

**Other participants:** Rågsvedsskolan; SICS; Univ. of Nottingham (co-ordinator) with Albany Infant School; Univ. of Maryland (indirectly).

**Main funding:** EU ESPRIT-ESE-initiative.

*Time period: Sep 1998–Aug 2001*

#### **Selected publications:**

Taxén, G., Druin, A., Fast C., and Kjellin, M. KidStory: a technology design partnership with children. Behaviour & Information Technology, Vol. 20, No. 2, March-April 2001, 119-125, CID-127

Angela Boltman, Childrens Storytelling Technologies: Differences in Elaboration and Recall Ph.D. Dissertation, Univ. of Maryland, September 2001, CID-146

Benford, S., Bederson, B., Åkesson, K.-P., Bayon, V., Druin, A., Hansson, P., Hourcade, J. P., Ingram, R., Neale, H., O'Malley, C. , Simsarian, K. T., Stanton, D., Sundblad, Y.

and Taxén, G. (2000). "Designing Storytelling Technologies to Encourage Collaboration Between Young Children." Proc. CHI 2000, April 2000, 556–563, CID-69

### **Kom hem apartment**

The apartment, installed in the premises of Skanova/Telia, with video mediated communication installed in different forms in living room, kitchen and sleeping room/working room will be used for demonstration and testing of gestural and haptic interfaces as part of Videospace (Connected communities).

**Participating partners:** Telia/Skanova.

**From CID:** Konrad Tollmar, Stefan Junestrand, Sören Lenman, Björn Thuresson

**Other participants:** Interactive institute; Ericsson.

**Prototypes:** Video installations in bedroom, kitchen, living room in test apartment at Telia in Farsta

*Time period: Jan 1999–Jun 2001*

### **Selected publications:**

Junestrand, S. IT och Bostaden – ett arkitektoniskt perspektiv (IT and the Dwelling – an architectonic perspective), Licentiate thesis, Architecture, Oct 1998

Tollmar, K. & Junestrand, S. Video mediated communication for domestic environments. in N. Streitz, S. Konomi, (Eds.), *Cooperative Buildings - Integrating Information, Organization, and Architecture*. Proceedings of CoBuild'99, Pittsburgh, Springer Lecture Notes in Computer Science, Vol. 1670, Heidelberg, 1999, CID-82

Junestrand, L., Lenman, S., Thuresson, B. and Tollmar, K. Private and Public Spaces - Video Mediated Communication in a Future Home Environment. Video presentation at CHI2000, the Hague, April 2000, CID-61

### **DiME – Digital Meeting Environments for formal meetings**

The DiME project was a collaboration between the DCE group at SICS, the 3D/VR group at Telia Research, and the Digital Worlds project at CID. The main objective of the project was to study the use of shared, 3D-, virtual environments for formal computer supported meetings between geographically separated persons. The main finding was that current technology for VR-meetings lack important functionality for supporting meetings and, especially, for representing people.

**Participating partners:** The DCE group at SICS; Telia Research.

**From CID:** Sören Lenman, Olle Sundblad, Eva-Marie Wadman.

**Prototype:** 3D shared environments for meetings implemented in DIVE.

**Follow-up projects:** Wasa, Cybermath.

*Time period: Jan 1999–Jun 2001*

### **eRENA, Electronic Arenas for Art, Culture and Performance**

This project was part of the I3, Intelligent Information Interfaces, initiative within ESPRIT LTR (Long-Term Research).

Results include

Techniques for visualisation and sonification of data from performances

Production tools for inhabited television and mixed reality events

Ethnographic studies of inhabited television and mixed reality event production as well as mixed reality performances

**From CID:** Yngve Sundblad (coordinator of whole project), John Bowers, Sten-Olof Hellström, Kai-Mikael Jää-Aro, Marie-Louise Rinman, Helena Tobiasson.

**Other participants:** Blast Theory theatre group and Illuminations television production-company in London; Universities of Nottingham and Geneva; EPFL-Lausanne; GMD-Bonn; ZKM-Karlsruhe.

**Main funding:** EU ESPRIT-I3-initiative.

**Prototypes:** Visualisation and sonification round table, Blast Theory performance “Desert Rain” at KTH September 2000.

*Time period: Sep 1997–Aug 2000.*

### **Selected publications:**

Bowers, J., Hellström, S-O., and Jää-Aro, K-M. The Lightwork Performance: algorithmically mediated interaction for virtual environments. In CHI 98 conference summary on Human factors in computing systems 1998, Los Angeles, USA, April 1998, 291-292, CID-77

Greenhalgh, C., Benford, S., Taylor, I., Bowers, J., Walker, G. & Wyver, J. Creating a Live Broadcast from a Virtual Environment. In Proceedings of SIGGRAPH 1999, Los Angeles, USA, August 1999, 374-384, CID-85

Benford, S., Greenhalgh, C., Craven, M., Walker, G., Regan, T., Morphett, J., Wyver, J. & Bowers, J. Broadcasting On-Line Social Interaction as Inhabited Television. In *Proceedings of ECSCW99, European Conference in Computer Supported Cooperative Work*, Copenhagen, September 1999. Dordrecht: Kluwer Academic Publishers, CID-93

Bowers, J. Crossing the Line - a Field Study of Inhabited Television. BIT, Behaviour & Information Technology, vol. 20, no. 2, pp. 127-140, March-April 2001, CID-128



Craven, M., Taylor, I., Drozd, A., Purbrick, J., Greenhalgh, C., Benford, S., Fraser, M., Bowers, J., Jää-Aro, K.-M., Lintermann, B., & Hoch, M. Exploiting interactivity, influence, space and time to explore non-linear drama in virtual worlds, Proceedings Exploiting Interactivity conference, CHI: April 2001, 30-37, CID-153

Rinman, M.-L. Forms of Interaction in Mixed Reality Media Performance A study of the artistic event DESERT RAIN, Licentiate Thesis TRITA-NA-0214, NADA, KTH, May 2002, CID-168

## VideoCafé

Human communication resulting from using broadband technology to connect geographically distant rooms into a “common room” for informal (coffee break) and formal meetings using video and audio has been studied technically, socially and behaviourally. In an iterative process a prototype that illustrates critical requirements concluded from user studies has been installed and refined, also with interior design aspects, including adapted furniture, made as graduation work from Konstfack. It was also the basis for extended work, technical and sociological on video mediated communication and its acceptance from awareness, presence and integrity aspects.

**Participating partners:** Ericsson Medialab, Telia.

**From CID:** Konrad Tollmar, Yngve Sundblad, Tomas Soltesz, Ann Lantz, Sören Lenman.

**Prototype:** The video café is in continuous use between CID and partners, e.g. Vattenfall, Telia apartment, SICS and the Interactive Institute. It was also used as an art installation (unexpected social communication) between Rågsvedsskolan and Arlanda Sky City in September 1998. It has also become a product, installed by Ericsson between two Swedish airports.

*Time period: Jan 1996–Jun 2000*

## Selected publications:

Tollmar, K., Chincholle, D., Klasson, B. & Stephanson, T. VideoCafé - Exploring Mediaspaces in Public Places within Organizations. BIT, Behaviour & Information Technology, vol. 20, no. 2, pp. 101-110, March-April 2001, CID-126

Tollmar, K. Towards CSCW Design in the Scandinavian tradition, Doctoral Thesis, NADA transaction TRITA-NA-0131, October 2001, CID-160

## Standardization

CID represented KTH in work in the following two international standards:

TC 159, SC 4, WG 5 software and Ergonomics and Human-Computer Dialogues Interaction

TC 159, SC 4, WG 5 Human Centred Design Process for Interactive Systems

**Observing partners:** HI; LO; TCO; Vattenfall.

**From CID:** Jan Gulliksen, Tomas Berns.

*Time period: July 1996-June 2000*

### **Content Design on the Internet**

The project consisted of two parts: Markup languages, metadata and adaptation to international standards for textual markup (Donald Broady), and Analysis and design of user interfaces (Bosse Westerlund). Among the results were the archive platform AntiLoop.

**From CID:** Mats B. Andersson, Donald Broady, Hans Melkersson, Bosse Westerlund.

**Funding:** KK-stiftelsen.

**Prototype:** AntiLoop.

*Time period: July 1998-Dec 1999*

### **Garden of knowledge – associations between subject areas**

The Garden of Knowledge is an interactive learning environment for keeping track of the interrelated structure of ideas, designed to support the expression of their relations to other ideas as well as their evolution over time and culture.

The GoK can be regarded as a knowledge-management tool, which consists of a collection of interlinked knowledge patches, each with its own *knowledge gardener*, who is responsible for the content of the patch. This makes the GOK especially well suited for an interactive, communicative and customizable learning experience in a networked environment.

The GoK aims to support its visitors in developing an interdisciplinary understanding of the world of phenomena by enabling their conceptualization, exploration and explanation in a multimedia-supported way. The major implemented example makes use of the concept of *symmetry* in order to explore some of the structural connections between *mathematics* and *music*.

Project members include university teachers of music and mathematics, graphic designers, social scientists, computer scientists and programmers. Two major prototypes were developed:

The GoK program developed in Macromedia Director illustrates the ideas in a graphic and sound and film environment (“The Garden of Knowledge”)

Conzilla-1, the first version of the Conzilla concept browser

**Participating partners:** Apple, Skolverket.

**From CID:** Ambjörn Naeve, Kenneth Olausson, Bo Westerlund, Fredrik Winberg,

*Time period: Mar 1996-Jun 1999*

**Selected presentations:**

The GoK-program was presented at Siggraph2000, New Orleans, July 25, 2000, in connection with a 1-day course on Geometric Algebra:

[http://cid.nada.kth.se/il/external\\_lectures/GoK-Siggraph.pdf](http://cid.nada.kth.se/il/external_lectures/GoK-Siggraph.pdf)

A web version of (part of) the GoK is available at

<http://kmr.nada.kth.se/gok/evol/thirdproto.html>

**Information exchange and communication in large, distributed organizations**

The project has designed flexible, shared visual environments on the World Wide Web for exhibitions, meetings, and discussions in large distributed organizations. The digital sites build on existing networks in the real world, in which members have a shared interest and a clear sense of community and purpose. Both 2D Web and 3D Active worlds meeting environments have been built and used in broad communication and information exchange between members of the large Swedish trade union confederations LO and TCO. A 3-D “Virtual Congress Arena” was built for the 1997 TCO Congress convening in Stockholm. Communication patterns are studied and the users’ own building of meeting places was encouraged. An observation is that for in experienced computer users building in Active Worlds seems a lot easier than building directly for the Web. Communication patterns within the trade union user community, that has grown to spread all over Sweden, were studied.

**Participating partners:** LO; TCO; Telia; UI-Design.

**From CID:** Sören Lenman, Ann Lantz, Åke Walldius. Anders Hedman, Björn Thuresson, Yngve Sundblad.

**Prototype:** 2D Web and 3D Active worlds environments.

*Time period: Jan 1997–June 1999.*

**Follow-up project:** CyberYard

**Selected publication**

Lenman, S. 3D-, Digital Environments for Social Contact in Distance Work. In Electronic Proceedings of Webnet’99 World Conference on the WWW and Internet, Honolulu, Hawaii, Oct. 24-30, 1999. CID-73

**Smart and emotional things for Communication**

Work was done on *Smart things and environments* in the first two years of CID’s phase 2, which resulted in the following demonstrators: *White Stone*, *6th sense - active family tree*, *Softair Communication - light in chairs*.

**Participating partners:** Ericsson Medialab, Staffan Liljegren & al; NoPicnic Industrial.Designers.

**From CID:** Konrad Tollmar, Olle Torgny, Yngve Sundblad.

*Time period: Jul 1997–Jun 1999*

**Follow-up:** The “Smart things and environments” studio at the Interactive Institute

### **CyberYard – virtual meeting area for workplaces**

The CyberYard project grew out of the project “Information exchange and communication in large, distributed organisations” (see above). When the TCO Congress 1997 visited by delegates from LO, the idea was born to try out the shared 3-D environment as a means for local union members to share their experiences in implementing new ideas in work organisation and local competence development. The resulting CyperYard project arranged three design workshops and a series of local “building courses” through which 80 union members from all over Sweden got a first-hand experience of navigation and building in the Active World environment. Their use of the Yard resulted in a series of “installations” within the 3-D world, employing design patterns such as Invitational posters that welcomed and informed visitors, Central exhibition spots that showed series of photographs or short video sequences from workplaces (bakeries, veterinarian clinics, mechanical industries etc.), and Posters signals community event that invited visitors and fellow builders to join a gathering at a certain time and location in the virtual world. One of the key events in the project was when seven union members set up a “Virtual Congress Arena” all of their own at the 2000 LO Congress, showing their own installations and building the Congress Arena “in real time”, as their fellow delegates watched and got a first hand introduction to the environment by the local members themselves. The sustainability of the concept was demonstrated when this event was repeated four years later, at the 2004 LO Congress.

**Participating partners:** LO

**From CID:** Åke Walldius, Sören Lenman

**Prototype:** 3D ActiveWorld environments used in local trade union education and exhibited on the LO Congress 1998 and 2004 and on several similar conferences.

*Time period: Jul 1997–Jun 1999*

### **Selected publication**

Walldius, Å. Shared 3-D Workplace Exhibitions as Sites for Community Meetings. BIT, Behaviour & Information Technology, vol. 20, no. 2, pp. 91-99, March-April 2001, CID-125

### **CUT! a film is made - and you're editing it**

CUT! is a double CD-ROM. On CD 1 you follow the process of making a film, from the idea of a script to the finished film. We produced a Swedish version (Åka svart) of a German short

film, Schwarzfahrer. On CD 2 we have included all the takes used in our film (approx. 30 mins) which you edit to your own version of about 4 mins. You can also compare your version with a version edited by a professional editor. On CD 1 you can either watch a compressed version as a lecture (Short Cut) or browse the extensive version (Cut) at your own will. The process of the production of the film is thoroughly documented and presented in a pedagogical manner. The material is structured from the three main topics in the production: pre-production, production and post-production, all attached with several sub-headings. The package is mainly aimed as a pedagogical tool, but has proved to have wider general interest. You learn some of the basic fundamentals in telling a story with moving images, and you get the opportunity to get "hands-on" experience. For the film we used an all-professional crew, both behind and in front of the camera. Firstly, to get a good result, secondly, for interviews on their different professions. On the day of the shooting, we actually made two films: the "real" film and a documentation of the process. In the CD-ROM context the combination of the two gives a good, simultaneous view of the process.

**Partner:** Department of Cinema Studies, Stockholm University

**From CID:** Yngve Sundblad, Ann Lantz, Björn Thuresson

**Prototype:** CD-ROM published by FilmHusförlaget.

*Time period: Mar 1996 - Dec 1998*

### **CID'97 and Usor, guidelines and methods**

Efficient and enjoyable interfaces, that support users in gaining information from web documents, and help in navigation through the complex, hyper-linked information structures that characterise the Web, and that encourage communication and collaboration between users, are studied. Practical solutions and guidelines for the use of advanced metaphors, especially concerning problems related to navigation, have been developed and collected into a WWW prototype presentation. These are guidelines and advice for developing Web sites for use in daily work situations and to user oriented methods for development, including experience and advice on their applicability in different situation. Practical solutions and guidelines for the use of advanced metaphors, especially concerning problems related to navigation have been developed and collected . They are based on extensive study of literature and experience from users in academic, industrial and user organisations.

**Participating partners:** Enator, Nomos; Telia; TCO; UI-design; Vattenfall.

**From CID:** Ann Lantz, Michael Ortman, Johanna Ullman, Fredrik Winberg.

### **Selected publication:**

Fredrik Winberg. Usor: A Web Based Collection of User Oriented Methods. In R. Chatfield, S. Kuhn, M. Muller (editor), *Proceedings of Participatory Design Conference, PDC 98* , CPSR, Seattle, WA USA, November 1998, CID-42

**Prototypes:** Usor and CID'97 are available on CID's web site.

*Time period: Jul 1997–Jun 1998.*

### **Olga- multimodal information assistant**

The aim of the OLGA project was to create and study the use of an interactive multimodal tool with voice and visual interaction for navigation with help of an animated person ("Olga"). This 3D-animated assistant was intended to help in situations where people seek information. It was demonstrated with consumer advice about microwave ovens.

**Participating partner:** Telia.

**Other participants:** Speech Technology; KTH; Linguistics; SU; SICS.

**Main funding:** KK-stiftelsen.

**From CID:** Olle Sundblad, Eva-Marie Wadman, Yngve Sundblad.

**Prototypes:** Fully working prototype using connected computers between participants.

*Time period: Jul 1996–Dec 1997*

### **Selected publication (and video):**

Sundblad, Y., and Sundblad, O. Olga - a multimodal Interactive Information Assistant. In CHI 98 conference summary on Human factors in computing systems 1998, Los Angeles, USA, April 1998, 183-184, CID-20

## Doctoral Students

### Current Projects

Rósa Gudjonsdottir, HCI: Visualisation of user requirements

Sten-Olof Hellström, Music Composition: Sonification.

Eva-Maria Jacobsson, Media Technology:  
Gender issues of Internet and the development of media

Jin Moen, HCI: Bodily interaction

Sinna Lindquist, HCI:  
Ethnographic studies of communication in intergenerational families.

Mikael Nilsson, Mathematics: VR and concept browsers in mathematics education.

Matthias Palmér, Computer Science: Learning environments.

Fredrik Paulsson, HCI: Learning components.

Minna Räsänen, HCI: Ethnographic studies of video communication.

Gustav Taxén, HCI: Visitor orientation and exhibition design.

Björn Thuresson, Cinema Studies: Narrative in digital media.

Fredrik Winberg, HCI: Auditory direct manipulation for blind computer users.

## Finished Theses

### Doctorial Dissertations

Sara Ilstedt, PhD, HCI, KTH, 26 Mar 2004: Making sense - Design for Well-being,  
CID-250

Kai-Mikael Jää-Aro, PhD, Computer Science, KTH, 5 Mar 2004: Reconsidering the avatar:  
From user mirror to interaction locus, CID-249

Anders Hedman, PhD, HCI, KTH, Jan 2004: Visitor Orientation in Context - The historically  
rooted production of soft places, CID-246

Cristian Bogdan, TechD, Computer Science, KTH, 14 Feb 2003:  
IT Design for Amateur Communities, CID-196

Åke Walldius, PhD, Cinema Studies, SU, 18 Dec 2001:  
Patterns of Recollection; The Documentary Meets Digital Media, CID-142

Konrad Tollmar, PhD, Computer Science, SU, 12 Oct 2001:  
Towards CSCW design in the Scandinavian tradition, CID-160

Angela Boltman, PhD, Computers and learning, Maryland, 25 Sept 2001:  
Childrens Storytelling Technologies: Differences in Elaboration and Recall, CID-146

Björn Eiderbäck, PhD, Computer Science, Stockholm University, 23 March  
2001: Object Oriented Frameworks with Design Patterns for Building  
Distributed Information Sharing, CID-147

### **Licentiates**

Gustav Taxén, Tech L, Human-Computer Interaction, May 2003:  
Towards Living Exhibitions, CID-229

Marie-Louise Rinman, Fil L, Human-Computer Interaction, May 2002:  
Forms of Interaction in Mixed Reality Media Performance: A study of the artistic event  
DESERT RAIN, CID-168

Fredrik Winberg, Tech L, Human-Computer Interaction, Dec 2001:  
Auditory direct manipulation for blind computer users, CID-145

Anders Hedman, Tech L, Human-Computer Interaction, Feb 2001: Accommodating  
visitors in digital communities, CID-107

Stefan Junestrand, Tech L, Architecture, Oct 1998:  
IT och Bostaden – ett arkitektoniskt perspektiv (IT and the Dwelling – an architectonic  
perspective)

Kai-Mikael Jää-Aro, Tech L, Computer Science, Oct 1996:  
Three-dimensional interaction and presentation for Computer-Supported Collaborative  
Work



## **CID's industrial and user organisation partners**

CID has the following 27 partners 2003-2005. Their participation is described under each project.

2 large industries: Telia Sonera, Vattenfall

4 user organisations: HI (Handicap institute), HO (Handicap Ombudsman), LO and TCO (Trade union central organisations)

8 interaction design and system development consultancies: Ateles, DataDoktorn, Ergolab, Guide, Made in Stockholm, Metamatrix, No Picnic Industrial Designers, Usability Partners

3 specific interaction device companies: Anoto (digital pen), ReachIn (haptics), tobii (eye movement control)

2 governmental agencies: Skatteverket, Statskontoret,

3 museum and exhibition organisations: Riksställningar, Tekniska museet, Vasamuseet

5 educational and information agencies: Bollnäs barn- och ungdomsförvaltning, Swedish National centre for Flexible Learning (CFL), Swedish National Agency for School Improvement (MSU), Swedish Educational Broadcasting Company (UR), Swedish Terminology Centre (TNC).