Project proposal

NETWORKED EDUCATION

Course development and education in a distributed multimedia environment

DSV, University of Stockholm

NADA, Royal Institute of Technology

IT, Royal Institute of Technology

SICS

0. Introduction

The recent developments in computer multimedia technology radically changes the possibilities for applications using video and sound, both live and recorded, with good computer supported tools for transmitting, recording, authoring, editing and receiving/selecting multimedia documents of all kinds.

This proposal addresses the particular field of using multimedia technology in a distributed educational environment.

Two brief example scenarios:

A university course developed with traditional tools (course books, OH slides, course notes, lectures, etc) is "converted" into a multimedia document by video recording the lectures and making all course materials and course books available digitally. This gives students opportunities to individually access lectures or parts of them and search the course material for specific topics. By integrating the written course material with the recorded lectures, the video recording will also be searchable by topic.

A course is developed with tools specific for a multimedia environment. This gives the author opportunities to create course segments which are not bound by traditional limits of time and space. Live lectures may be transformed into distributed interactive sessions with individuals or groups, which may later be used for reference by other students. Course materials may be reused by other course authors. Students have a working environment where everything pertaining to the course is readily available: library references, exercises, demonstrations, hand-outs and hand-ins, exam results etc.

The proposed project will address these issues by gathering existing relevant tools and developing new ones. An experimental platform with sound/video equipped lecture halls and seminar room will be built. Experiments with real courses and real students will be performed. Methods for evaluation of pedagogical results will be developed and applied.

1. Project Plan

The work will be divided into a number of areas:

a. Storage, indexing and retrieval of video recorded material

- compression techniques

- breakpoint detection and indexing by image and natural language processing

- synchronization of video, sound, graphics and text material

b. Hypermedia in education

- Structured document bases in a collaborative working environment as a means of distributing, accessing, and using multimedia course material

- Use of hypermedia and information retrieval techniques in document bases

- Studies of the applicability of ISO standards such as SGML and HyTime (ISO 8879 and 10744, respectively) for document interchange in thecontext of multimedia course   materia

c. Interaction Mechanisms

- desktop collaboration environment

- teleconferencing

- shared applications

- asynchronous tools

d. Establishment of experimental platform (equipment applied for at FRN)

e. Pedagogical issues and course organization; pilot experiments

- Evaluated pilot experiments with selected courses

1a. Storage, indexing and retrieval

B. Pehrson, U. Bilting

The storage of video documents in uncompressed form on digital media is not feasible with today's technology. Various compression techniques exist mainly to reduce the amount of data to be transmitted on low bandwidth channels e.g. for picture telephone and video conferences, e.g. CCITT H.261. Other standards address the compression of full multimedia data streams, e.g. MPEG, developed for moving image applications including sound compression.

The problem of storing video and sound documents will be addressed in this project as well as methods for synchronizing the video and sound data with other pertinent data, e.g. course notes and other material to be cross referenced.

Other ways of indexing the information contained in a video document will be explored, e.g. explicit insertion of breakpoint in the document, implicit detection by change of speakers, OH slide change, camera change etc.

Natural language processing of the sound track provides yet another indexing method.

Methods for storing and synchronizing text and graphic documents (e.g. SGML and PostScript) with video will be studied.

Methods for storage and retrieval in very large databases of multimedia documents will be studied.

1b. Hypermedia in Education

D. Broady, H. Haitto, P. Lidbaum, M. Tobiasson

Studies and development of usable mechanisms for searching, cross referencing, and distributing, corpuses of multimedia courseware, as well as full scholarly papers, critical editions, etc, will be explored.

In particular, the use and development of distributed, structured document bases for course purposes will be examined. Also, to encourage document reuse and interchange, insofar as possible, the use of platform-independent international standards will be attempted (SGML, ISO 8879, as a standard document description language; HyTime, ISO 10744, as a standard for multimedia and time-dependent documents). In this context, guidelines from the Text Encoding Initiative should be tested.

Some relevant tools for these activities exist already, while others are at a prototype stage. Also, in-house developed software (Darc) for document database management will be used..

1c. Interaction Mechanisms

H. Eriksson, A. Avatare

Within the MultiG project we have developed a prototype of CoDesk, a collaboration environment based on a desktop and a rooms metaphor. Partners and tools, including teleconferencing shared applications, represented by icons, can by the user be collected into a "room" and a collaboration session started. Asynchronous tools, notably email, are also included.

These interaction mechanisms have been designed mainly with a work collaboration situation in mind. Here we intend to develop suitful interaction mechanisms and metaphors and collaboration tools for educational situations. One important such extension of CoDesk for education would be with tools for asynchronus tasks of course administrative nature, e.g. giving assignments, handing in assignments, reserve a workstation for a laboration etc.

In contrast to the full-lecture hall type of information dissemination, a group exercise is more interactive and the number of participants is small. For such situation we envision a workstation-based conference facility to be designed and developed.

Most of the interactions will be a student, or a small number of students (<3), that will confer with lab-assistant. From time to time, maybe the lab-assistant will adress the whole class (<30). In addition to video and audio it will also be necessary to show each other what there is on the screen i.e. shared view. It would also be advantageous to be able to control input from a remote host, i.e. the lab-assistant could enter the statements that the student are missing from the students program.

During the first six-months a prototype will be developed to be able to get early feedback. The quality should be sufficient to depend on it in one course given that there are support available from the devlopers to the students and assistants. That prototype will be enhanced so that after the first year, the lab-assistants could handle the system themselves.

After one year a system will be available that is fully functional (audio, video, shared view, etc). In year two, the system will be integrated with the lecture-hall system and to the off-line information system so that, for example, old lectures or other material can be brought up on the screen.

During experimentation and real usage of the system, feedback will be collected and evaluated. The system will be changed accordingly.

1d. Experimental Platform

E.Perez, M. Ortiz

A selected number of lecture halls and seminar rooms will be equipped with video cameras, sound facilities, editing consoles and equipment for digitally handling video signals, to permit full scale experiments with live distribution of lectures, and seminars, including interactive discussions where participants are physically remote from each other. This will test to what extent current and foreseen on-the-fly video compression techniques permit an acceptable quality of perceived interaction.

The goal should not be less than "cinematic" HDTV subjective quality: it remains to be seen how an actual transmission rate this is compatible with.

It is not intended that the lecture should be though of as the "real" locus of the education process event, with a filmed record of it only a substitute for those who were not able to be present. One never think that watching a film was merely a next-best alternative to being present when the vari

scenes of the film were being filmed. The whole point of the film is the final assemblage of scene they are perceived.

For the purposes we envisage, participation in lectures is just one component in the total process computer-assisted education.

As well as on-line transmission of educational activity to distant sites, and two-way communicati between sites, we also need to acquire experience in all off-line aspects of the proposed approach. Technologies for the integration, storage, retrieval, editing, usage, evaluation, updating, distributi and administration of course material need to be investigated.

Funding for the equipment has been applied for at FRN.

1e. Pedagogical issues and course organization, pilot experiments

C.G. Jansson, A. Kollerbaur, A. Danielsson, D. Busch

The use of technologies for educational purposes has a long tradition. Plato and TICCIT - projects introduced integrated use of different communication media, sound, color, moving and still pictures in the beginning of the 70´s. Technologies for disseminating lectures via sound and video communication have been applied even longer. Much knowledge is available from research, particularly in the area of interactive use of computers in different educational settings. Hypermedia was introduced for training purposes in the beginning of the 80´s in some industrial applications.

However, most research and applications of modern information technology to education have been performed in limited environments and laboratory settings with a small number of learners due to cost and different technical constraints.

With the high bandwidth technologies under development and the increased knowledge in areas like human-computer interaction and computer- and video-based systems for support of different types of cooperative work new prospects can be seen for applying information technology to education

Particularly interesting are the possibilities of integrating facts from different traditional sources and educational forms, like lectures, literature, exercises and articles in a hypermedia base, and make these available as a resource for the learner, together with other interactive sources (like databases and communication tools, electronic blackboards etc) This IT-based resource can be utilized as the only means for imparting knowledge or as complement to regular education.

We would like to realize such an IT-based learning environment in a regular educational setting in order to investigate:
• problems, prospects and methods in relation to IT as a learning resource, especially.for distance and distributed education
• the effects on learning

				• the
Björn Pehrsson, DSV, SU / Carl Gustaf Jansson, DSV, SU	50%	50%	50%	
Edouardo Perez, DSV, SU	50%	35%	35%	
Mario Ortiz, DSV, SU	25%	40%	40%	
Douglas Busch, DSV, SU	25%	25%	25%	
Magnus Tobiasson, IPLab, NADA,KTH	50%	50%	50%	
Peter Lidbaum, IPLab, NADA,KTH	25%	25%	25%	
Hasse Haitto, IPLab, NADA,KTH	25%	25%	25%	
Hans Eriksson, SICS	50%	50%	50%	
Annali Avatare, SICS	20%	20%	20%	

requirements on the interface to the technology
• effects on the life cycle of a course.

We would realize the idea within a few different courses offered at DSV, Stockholm University and KTH during the next three-year period, a logic course could be one. Each course will be analysed and converted to the IT-environment, tested in education and evaluated with respect to the research questions. For courses with large number of students it might be possible to perform comparative studies.

A later development would be to incorporate some built-in pedagogical logic, by applying artificial intelligence, possibly a la neural nets to form helping function for individual students using the resource and to be used for improving and maintaining IT-based courses.

2. Project Participants

	93/94	94/95	95/96
Ulf Bilting, IT, KTH	80%	80%	80%
Anita Kollerbaur, DSV	10%	10%	10%
Donald Broady, NADA/KTH	10%	10%	10%

Note: Hans Eriksson and Anneli Avatare is employed by SICS and their funding is not applied for here.

Anna Danielsson, SU/DSV
Graduate student in computer and systems sciences. Has worked for several years in the industry as project manager at Cap Programmator in parallel with lecturing at the department. She has been responsible for several courses over a period of more than five years. In particular programming methodology courses focused on systems programming.

Eduardo Perez, SU/DSV
Fil. Lic.
BA - Economics Leeds University, England
Employed at DSV as teacher and researcher since 1988.
One year course in university pedagogics. Assitant lecturer.
Worked with pedagogical development and being responsible for the SATS course.
Project leader for the SATS video conference project.

Mario Ortiz, SU/DSV
Born 1953 in Santiago de Chile, Swedish citizen.
B.Sc. 1984 in Business Administration, University of Uppsala, Sweden.
1980 - 1985 Instructor in software and computers, (Kursverksamheten,
Medborgarskolan, ABF, Vuxenskolan) in Uppsala and Stockholm.
1986 - 1989 Teacher in Business Administration, Statistic and Automatic Dataproccesing at the
Municipal University of Solna (Solna Kommunala Högskola), Solna.
1989 - Assistant Lecturer (Högskoleadjunkt), Department of Computer
and System Sciences, University of Stockholm / Royal Institute of Technology.

Douglas Busch, SU/DSV
is 50% employed as a visiting Associate Professor during the current academic year 92-93 at the Department of Computer and Systems Science (DSV), Stockholm University and Royal Institute of Technology (KTH), while on 50% leave of absence from a permanent position as Associate Professor (högskolektor) at the Department of Computer and Information Science (IDA), Linköping University. The possibility of moving permanently to DSV from July 1993 is under discussion. For the purposes of this proposal it is assumed that this will take place.
Busch also intends to apply for nomination to the title of "docent"' at the Royal Institute of Technology within the present year.

Magnus Tobiasson, KTH/NADA
M Sc 1991.
Participant in the project "Computer Supported Knowledge Work" (Datorstöd för kunskapsarbete).

Peter Lidbaum, KTH/NADA
M Sc 1992.
Participant in the project "Computer Supported Knowledge Work" (Datorstöd för kunskapsarbete).

Hasse Haitto, KTH/NADA

M Sc 1989, doctoral student, lecturer, deptartment of numerical analysis and computing science, Royal Institute of Technology.
Participant in the project "Computer Supported Knowledge Work" (Datorstöd för kunskapsarbete).

Hans Eriksson, SICS
Researcher at SICS in areas of real-time conferencing in multimedia environments.
Participant in the CoDesk project.

Anneli Avatare, SICS
M Sc in Computer Sience and Mathematics, 1985-1989, University of Stockholm, Sweden.
I am a Ph.D. student at NADA KTH/SU.
I am working at SICS and have been active in the CoDesk project.

Ulf Bilting, KTH/IT
B. Sc. 1978 in Computer Science, University of Gothenburg.
Worked as half-time university lecturer at the department of computer science at Chalmers University of Technology and University of Gothenburg 1978–1990, developing and techning courses in data communications, compiler techniques, computer music and programming.
The other half-time spent working for the academic network community: SUNET, NORDUNET and the Chalmers campus network, mostly involved in computer message services (mail, X.400).
1991 moved to Uppsala and worked half-time at SICS with the "Electrum Demonstrator", a facility for presenting research results of the Electrum institutes.
Currently working half-time at SICS preparing ground for the project of this proposal.
Intend to complete a "licentiate" degree within the frame of this project.

Carl Gustaf Jansson, DSV
PhD in Computer Science and Engineering at DSV (Dept. of Computer and Systems sciences) 1986.
Acting professor in information processing at DSV/SU an KTH on 50% time since 1987.
Associate professor (högskolelektor med egen forskning) in artificial intelligence at DSV/KTH since 1992.
Deputy head of department at DSV since 1986.
Chairman of the graduate studies committee at DSV.
Chairman of the board for the Swedish Association for Artificial Intelligence.
Member of the board for the Electrum Foundation.
Chairman of the board for the centre for Information Technology and Cognitive Science at KTH/SU.
Member of the planning committee for a research program on Learning in Humans and Machines initiated by the European Science Foundation (starting in january 1994).
Research on
Computer-based Learning Environments (1975-1980)
Knowledge Representation (1981-1985)
The thesis work Taxonomic Representation , studied concept hierarchies as used in programming and representation languages. Machine Learning (1986-1992)
Project manager for a research group comprising 7 researchers which
has been partly funded by STU(NUTEK)s computer science program.

Graduate supervision in the areas of artificial intelligence, applied
logic and man-machine interaction
Has examined 16 licentiate theses since 1990.
Has examined one PhD in 1991. 10 graduate students plan to finish their
PhD within the forthcoming year.
Opponent and Committee member at 10 dissertations since 1989.

Anita Kollerbaur

1973 fil lic i Informationsbehandling
1973-1983. Projektledare for PRINCESS-projektet. Resultaten av PRINCESS introducerade och
utvärderade datorn som ett stöd för inlärning och har haft en dirket påverkan på datorers
pedagogiska användning i skolan. Projektet finansierades av STU och SÖ
1973-1981 Projektledare för RPODIS-Programvara och Datoranvändning I Skolan - ett SÖ-
projekt.
1980 - Forskningsledare för CLEA-centret. CLEA forskar om datorer som pedagogiska hjälpmed
och interaktiva system Ansvar och deltagare i en rad projekt.
1983-1987 Projektledare för DUNS projektet som studerade hur generella databehandlingsverkty
såsom databashanteringssystem, kunde användas i skolan.
1984 Datalär-84. Initiativtagare och ansvarig för populärvetenskaplig presntation av forskning on
data och systemvetenskap till lärare i skolan. 1987 Datalär-87 se ovan.
1987-1991 Projektledare för CIM projektet, Communicative Interactive Multimedia Systems. CIN
studerade hur människa-dator interaktion kunde förbättras genom att tillämpa kunskaper från
professionella kommunikatorer. 1989-1991 Projektledre för Håbo-projektet. Håbo-projketet avså
att ge kunskaper om reguljär användning av datorstöd i hundervisningen på låg- och
mellanstadierna. Det genomfördes i tre skolor i Håbo kommun.
1989 - Ledamot av Bild- och Ordakademien. Innhear stolen datorpedagogik. 1989 -
Anlitad som expert på människa-dator interaktion av SAS, i flera olika projekt och vid
utbildning av systemkonstruktörer.

Björn Pehrsson

Professor at the department of Teleinformatics, Royal Institute of Technology,

Donald Broady

PhD in education, University of Stockholm.

Since 1990 acting professor, Stockholm Institute of Education, Department of
Educational Research.

Head of the Research Group for the Sociology of Education and Sociology of Culture,
Stockholm Institute of Education, Department of Educational Research.

Since 1988 part-time research at IPLab (Interaction and Presentation Laboratory),
Department of Numerical Analysis and Computing Science, Royal Institute of
Technology

1990-1993 Project manager of "Computer Supported Knowledge Work" (Datorstöd för kunskapsarbete), also known as "Computer Support for writing and Cooperation in Education" (Datorstöd för författande och samarbete i utbildning). This project is part of NUTEK's program ITYP (project no. ITYP 90-02737P), also supported by The national board of education (Skolverket) and the Swedish Council for Planning and Coordination of Research, and undertaken in cooperation between NADA, KTH and Department of Educational Research, Stockholm Institute of Eduaction.

Commissions in committees at the State Department of Education (Utbildningsdepartementet), i. a. 1991-92 in the committee for national curricula (Läroplanskommittén).

3. Total Budget

The budgets are given on the cover sheet for each part of the project.

4. Industrial Relevance

Education is of universal importance in society. The proposed project will produce technical systems, tools and experiences which are easily disseminated to other interested partners.

Several companies and public agencies, including Ellemtel, Telia Research, Utbildningsradion an the Customs, have already explicitly declared an interest in integrating the results in their own organizations for internal education purposes or in distance education and are involved in discussions about knowledge transfer projects in the SiREN framework.

5. Relevance for the IT Research Program

The relevance of the proposed project for the NUTEK research program in information technolog falls mainly in the following areas

• telecommunication (telecommunication networks and personal communication)

• computer technology and computer science (information systems and cognition technology)

• computer supported cooperation and learning at work

• SiREN

The proposed project closely adheres to the intentions of the SiREN program and we have choser emphasize this in the classification of the project. It is obvious that it also fits well in the "learnin work" program. The parts of the project concerning network and multimedia data bases on a tech

level and video technology fits in the frame of the telecommunication programs. The parts coveri
methodological and pedagocical issues and interaction mechanisms belongs in the cognition
technology program. Even if applications of of this type have not been emphasized in the wordin
the information systems program, the proposed project is clearly relevant also for this program.

Distributed multimedia applications provide the basis for a variety of new telecommunication ser
Two central research issues regarding distributed multimedia applications in general are: end-use
acceptance and quality of service requirements imposed on the underlying networks. Networked
education is a good application area for exploring these issues since education is of general impor
and education via telecommunication networks could become a major contribution to the infrastr
of society. Results of the proposed research in this proposal which must be considered as relevant
NUTEK's intentions in the Telecommunication network program include specifications of multin
services supporting networked education, models of the resulting traffic and the quality of servic
requirements they impose on the networks, together with experimental data validating these mode

6. Other activities relevant to the project

De delar av projektet som rör metodfrågor och pedagogiska frågor resp forskning om
interaktionsformer är nära kopplade till verksamheten vid Centrum för Informationsteknologi oc
Kognitionsvetenskap (Kognitionscentrum), ett forskningscentrum etablerat av Kungliga Tekniska
Högskolan och Stockholms Universitet i september 1993. Centrets syfte är att stödja grundläggan
långsiktig kompetensutveckling och forskning av hög kvalite, som kombinerar
informationsteknologiska, kognitionsvetenskapliga och neurovetenskapliga inslag. Verksamheten
ett antal institutioner vid KTH och SU (data- och systemvetenskap, numerisk analys och datalogi
talöverföring, tillverkningssystem, arbetsvetenskap, lingvistik psykologi och filosofi), Stockholm
Institute of Education (department of educational research), ett antal forskningsinstitutet (SICS oc
SISU), företag, organisationer samt enstaka institutioner vid andra högskolor.

Kopplingen mellan neurovetenskap/kognitionsvetenskap och informationsteknologi avser
• utvärderingen av tekniska system ur ett perceptions- och kognitionsvetenskapligt perspektiv
• utvecklingen av komponenter i tekniska system vilka realiserar avgränsade perceptuella och kog
funktioner.
• utredningen av grundläggande förutsättningar för informationsteknologins möjligheter att stödja
perceptuella och kognitiva funktioner.

Forskning knuten till centrum skall fokuseras på
• Kognitions/kommunikations teknologi som kombinerar metod och teknikutveckling inom: mär
dator-interaktion, artificiell intelligens och språkteknologi
• Kognitiva arkitekturer och beräkningsmodeller baserade på logik
• Konnektionistiska modeller för perception, minne, kognition och språk
• Autonoma, adaptiva, reaktiva system

Avsikten är att integrera och förstärka i Stockholmsområdet existerande forskarutbildning och fo
med angiven inriktning. Viktiga element i centrets planerade verksamhet är
• att stödja kommunikation mellan befintliga projekt i Stockholmsregionen exempelvis genom
regelbundet återkommande kognitiva seminarier, symposier, workshops, konferenser och inbjudn
gästforskare.

• att stödja utformningen och genomförandet av utbildningsprogram på grundutbildningsnivå i Stockholmsregionen vilka har starka inslag av kognitionsvetenskapliga ämnen,

• att bidra till rimlig långsiktighet, kvalitet på handledning, kvalitet på forskarutbildningskurser sa avhandlingskvalitet inom forskarutbildningen.

• att verka för etablerandet av ett mindre antal nya utpräglat tvärvetenskapliga projekt, dvs proje ligger på gränslinjerna mellan de kognitiva vetenskaperna, formalvetenskaperna och teknologiäm

• att ge stöd till utformningen av individuella forskares ansökningar om projektmedel, stipendier samt verka för att nya doktorandtjänster med kognitionsteknisk inriktning kommer till stånd.

• att forskningspolitiskt agera till förmån för forskning inom centrets intresseinriktning,

Donald Broady, Carl Gustaf Jansson, Björn Pehrsson: Networked Education. Project proposal, Febr. 1993

SPÅNOR

1993-03-25 Ansöknblankett insänd till NUTEK för projektet Distribuerade undervisningssystem

Donald Broady, Carl Gustaf Jansson, Björn Pehrsson: Networked Education. Project proposal, Febr. 1993

1993-03-25 Ansöknblankett insänd till NUTEK för projektet Distribuerade undervisningssystem

ANSÖKAN OM FORSKNINGSANSLAG

NUTEK
Närings- och teknikutvecklingsverket

117 86 Stockholm
Tel 08-681 91 00, Fax 08-19 68 26

För NUTEK:s registrering

NUTEK:s ankomststämpel

Sökande (efternamn, förnamn och titel)
Broady, Donald, PhD, tf. professor

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Institutionen för Numerisk Analys och Datalogi
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Projektledare (efternamn, förnamn titel och institution)	Telefon
Broady, Donald, PhD, tf. professor	08-7906299

Projekttitel

Distribuerade undervisningssystem

Project Titel (In English)

Networked education

Projekt Summary (In English) Syfte, mål, angreppssätt, nyhetsvärde (högst 18 rader om 80 tecken)

The recent developments in computer multimedia technology radically changes the possibilities
applications using video and sound, both live and recorded, with good computer supported tools
transmitting, recording, authoring, editing and receiving/selecting multimedia documents of
kinds.

This proposal addresses the particular field of using multimedia technology in a distribu
educational environment.

The proposed project will address the issues by gathering existing relevant tools and developing
ones. An experimental platform with sound/video equipped lecture halls and seminar room will
built. Experiments with real courses and real students will be performed. Methods for evaluation
pedagogical results will be developed and applied.

The project will be carried out in cooporation between the departments of computer and syste
sciences, teleinformatics as well as numerical analysis and computing science. This particu
application concerns the organizational and pedagogical issues as well as the video technology.

Nutekprogram	Datum för projektstart	Tidpunkt då projektet beräknas vara gen
Informationssystem (SiREN)	93-07-01	96-06-30

Exkl. moms och omkostnadspålägg	1993/94	1994/95	1995/96	Kort specificering
Löner, doktorander	80	80	80	H. Haitto
Löner, forskare, proj.led.	40	40	40	D. Broady

Löner, övrig personal	214	214	214	M. Lidbaum, P. Tobiasson
Lab. och verkstadskostnad				
Datorbearbetning				
Utrustning < 300000 SEK	60	60	60	
Material	10	10	10	
Resor	30	30	30	
Övriga kostnader				
Summa sökta medel	434.000	434.000	434.00	

Ansökan avser nytt projekt

Ansökan avser fortsättning på NUTEK-projekt

Ansökan avser industriell samarbetsprojekt/konsortieverksamhet

Detta projekt är lika med projekt förvilken ansökan ingivits/avses inges till:

AMFO   CF   HSFR   MFR   NFR   SFR   SJFR   TFR   EG

andra: ....

Sökt dyrbar utrustning (FRN, Wallenbergstiftelsen e.d.)

Klassningskod

Nyckelord

datorstödd undervisning, distansundervisning, multimediadatabaser, höghastighetsnätverk

Industriell relevans: behov/vision, potentiella effekter, förutsättningar och möjligheter, hinder och begränsningar.

Education is of universal importance in society. The proposed project will produce technical syst
tools and experiences which are easily disseminated to other interested partners.

Several companies and public agencies, including Ellemtel, TeliaResearch, Utbildningsradion an
Customs services, have already explicitly declared an interest in integrating the results in their ov
organizations for internal education purposes or in distance education and are involved in discus
about knowledge transfer projects in the SiREN framework.

Kontaktperson, företag	Telefonnummer
Jan Jansson, Tullverket	tel: 789 73 00
Valter Samuelsson, Utbildningsradion	tel: 784 00 00

Ev. samarbetspartners

Teleinformatik (prof. Björn Persson), Data- och systemvetenskap (Carl Gustaf Jansson, tf prof.)
Ellemtel, Telia Research, Utbildningsradion, Högskolan för lärarutbildning.

Tvärdisciplinära/värtekniska kopplingar

Projektet är av utpräglat tvärvetenskaplig karaktär.

Övrigt, bl.a. internationellt samarbete

Denna ansökan omfattar NADA's del ("Hypermedia in Education") av projekt som söks tillsammans med institution
Teleinformatik samt Data- och systemvetenskap.

Projektet är relevant för programmen telekommunikation (telekommunikationsnät och personkommunikation), dat
och datavetenskap (informationssystem och kognitionsteknologi), SIREN samt lärande i arbetet.

NADA's del av projektet har kopplingar till internationellt utvecklingsarbete med ISO-standarderna SGML och HyT
(ISO 8879 resp 10744), samt med det internationella forskarsamarbetsorganisationen TEI (Text Encoding Initiative)

Förteckning över bilagor

Projektbeskrivning omfattar den föreskrivna bilagorna och är gemensam för projektansökningar
de respektive institutionerna.

Donald Broady, Carl Gustaf Jansson, Björn Pehrsson: Networked Education. Project proposal, Febr. 1993

Datum och sökandes underskrift 93-03-25	Datum och prefektens (motsvarandes) underskript
 Donald Broady	Namnförtydligande och prefektens telefon

1993-03-25 Löst blad bifogat ansökan till NUTEK om projekt Distribuerade undervisningssystem

1993-03-25

Budget, "Hypermedia in Education"
(part of the proposed project "Networked Education")

	Salary March 1993	% of full-time	93/94	94/95	95/96
Donald Broady, acting professor	23000	10%[1]	28	28	28
Hasse Haitto, M Sc	18600	25%	56	56	56
Magnus Tobiasson, M Sc	16500	50%	100	100	100
Peter Lidbaum, M Sc	16500	25%	50	50	50
Salaries total			234	234	234
LKP			100	100	100
Salaries + LKP			334	334	334
Hardware and software (upgrading of existing)			60	60	60
Material, literature			10	10	10
Travel expenses			30	30	30
Grand total			434	434	434

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[1] And as part of current position

Donald Broady, Carl Gustaf Jansson, Björn Pehrsson: Networked Education. Project proposal, Febr. 1993