COLDEX

Collaborative Learning and Distributed Experimentation

Information Society Technologies Programme
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FR – FINAL REPORT

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1. General

This deliverable represents the Final Report of the COLDEX project. The purpose of this deliverable is to provide an overview of the whole project including an overall overview, a summary of the objectives, project results and achievements, the methodologies and the European added value.

The Final Report is meant to concentrate the central and focal aspects of the project, the lessons learnt and also failure and success within the project's lifetime. Thus the Final Report represents the balance sheet of the outcomes along with the essence of the project at large.

2. Project overview

In this section, a concise summary is listed with the central hypthesis, the Consortium's composition including the roles of the partners involved and the main achievements of the project.

2.1. Central hypothesis

For the COLDEX project, a central hypothesis represents the essence of the main objective:

> It is possible to initiate and to maintain an exchange of learning results and social interaction through "thematic objects" in a virtual community made up of subgroups with face-to-face interaction based on learning challenges in the form of non-standard problems!

For the initiation and maintenance of exchanging learning objects, the LOR serves as supporting technology. The artefacts constructed within the scenarios are the "thematic objects" within the COLDEX communities. The virtual community, composed of groups and subgroups, down to face-to-face collaborative teams, has been established. The learning challenges are non-stadard and highly motivating for students, since the thematic embedment is the "space exploration" – programming robots, calculation for moon cartography, biodiversity in the meaning of food in space etc.

2.2. Consortium's composition

The consortium consists in eight partners, six European partners, and two Chilean partners. As an associated partner the science centre in Växjö, Sweden, is one of the institutions where COLDEX scenarios and ideas are implemented. The same holds for the ORT school in Argentina and the German School in Santiago de Chile. The following table shows the responsibilities of the partners per workpackage.

Partner	WP1	WP2	WP3	WP4	WP5	WP6	WP7	WP8
UDUI	Leader	Minor	Minor	Minor	Minor	Minor	Leader	Minor
UCH			Minor	Major	Minor	Minor	Major	Minor
VXU		Leader			Major		Minor	Leader
USB			Leader	Minor	Major		Minor	
UNED			Major		Major	Leader	Major	Minor
UPM			Major	Leader			Minor	Minor
INESC-ID		Minor	Major		Leader	Minor	Minor	Minor
UCN			Minor	Major			Minor	

Table 1. Responsibilities: Major contribution > 1/2 person months of leader; Minor contribution <= 1/2 person months of leader

The planned and actual personal effort is shown in section 4.3.

2.3. Community building in the OUS

The general goal of forming a sustainable trans-continental user community involving educational institutions in Latin America and Europe has been achieved by implementing the Open User Scheme. The initial activities have been conducted in Germany, Sweden, Portugal and Latin America. The means for establishing this community are the following. After subscribing as a OUS partner, several projects have been started with the help of COLDEX support:

- Access to the COLDEX common repository, the LOR
- Provision of material in English and Spanish
- Organisation of workshops: OUS Workshops (Buenos Aires, Argentina / Cercedilla, Spain)

The first OUS workshop in Buenos Aires (Argentina) was hold in May 2004 in a technical school, ORT Argentina. It was a meeting of 25 participants from 11 institutions in South America. Teacher educators from six countries got an introduction in the COLDEX ideas and scenarios on the first workshop day. They were able to play around with the main scenarios in a hands-on session for half a day to get experiences with the tools. Based on this we analysed the needs of the participants. The conclusion was to add some scenarios to the initial ones (maze, moon etc.): System Dynamics and Stochastics. Especially the maths education turned out to be highly interesting for the participants of the first OUS workshop.

The second OUS workshop in Cercedilla (Spain) was hold in March / April 2005. There was an aggregation of experience from on-going practices in Sweden, Chile, Colombia, Portugal, and Germany was presented to the participants. mainly teachers from Europe. The scope of this workshop consisted mainly in fostering of exchange between local teams using the LOR, the propagation of evaluation instruments as well as the future activities and sustainability.

2.4. Related concepts

Related concepts in COLDEX are shown in figure 1. The thematic areas are astronomy, biodiversity, robot programming etc. These have sub-areas which become manifest in the scenarios.

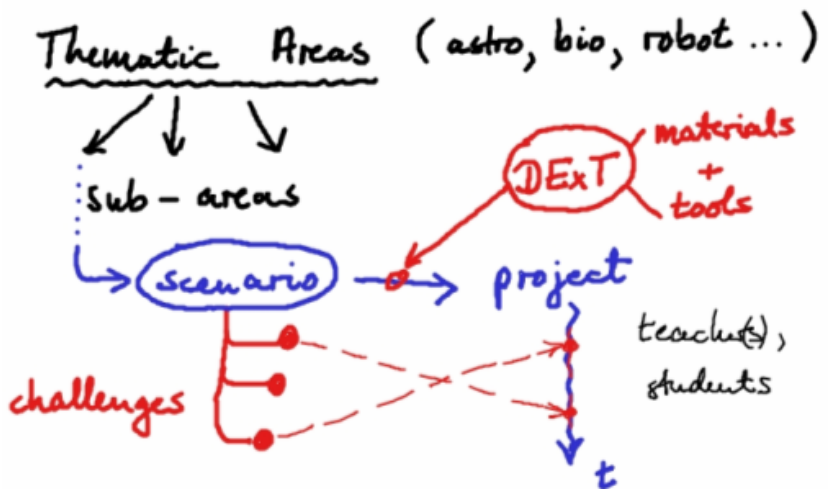

Figure 1. Coherences

Through the DExTs, i.e. materials and tools, projects can be initiated. Within the scenarios, different challenges are inherent. Teachers or students can accept these challenges within the projects.

3. Project objectives

3.1. General goals

Putting new educational technologies in a rich social and global, multi-cultural context is the first goal within COLDEX. Thus it is possible to build a heterogeneous community of learners in science and technology and the project actively supports this from a local to a global level. Blending and integrating different forms of direct and remote experience with computer-supported (collaborative) learning and modelling is the means to implement this goal.

3.2. Educational goals

This section describes the main goals for the pedagogical issues in the project. The underlying approach – challenge based learning – is described in more detail in the deliverables D2.2.1 Learning Requirements and D2.3.1 Evaluation Plan I: Methodology and Examples.

Educational goals

COLDEX activities stimulate interest for the understanding of complex phenomena and provide a means to improve comprehension by challenging current understandings. Additionally, COLDEX fosters a "mixed reality" transition between virtual and tangible

environments. This leads to facilitating experience sharing between learners within and between different learning groups. For the large scale, participants develop awareness and sensitivity to global cultural issues and perspectives.

Experiential Learning

The DExT idea is to provide "Digital Experimentation Toolkits", i.e. packages in the web containing interactive materials and tools. The delivery model is the following. People interested in the COLDEX DexTs download the materials they want and can start immediately with the scenarios. The effort for installation is rather tiny, and the learning material is mostly self-contained and usage independent of personal contact or training.

Survey of themes / DexTs

"Exploring Space" is the general theme which ties up the single parts containing robot vehicles on planets or moons, moon cartography, plant growing in space (biospheres), crater simulation, earthquakes (seismology) and probabilities. The latter two are also related to the space theme: probabilities, i.e. stochastics is part of the theoretic background one needs for travels to the stars; earthquakes (resp. seismic phenomena) happen not only on the planet earth, but also far beyond on other planets.

Collaboration modes

CSCL is integrated by putting the origin challenges defined in COLDEX into a technical framework consisting of tools and the common repository. The tools, namely Cool Modes, allow for a synchronous modelling mode. The repository provides as one of the services a chat. These two tools ensure the possibility for users to work and learn collaboratively in a synchronous session. The other side of the CSCL support lies in technology which allows for asynchronous collaboration, first of all the repository itself with the purpose of re-use. Therefore the archiving and retrieval functionality guarantees the enlargement of the data base as well as the narrowing of the objects searched for. An issue to be (re-)studied is the interoperability between different scales in cooperative learning. The initial user groups, i.e. learning groups, in COLDEX started as local face-to-face groups and hardly cooperated among these groups. Thus, now as we have overcome the "cold start" problem for the learning object repository, we can observe what happens next. Thanks to the commitment we can try to improve the support for "educational workflow" or "learning flow" appropriate to the before mentioned observation results even beyond the project's lifetime.

4. Project results and achievements

This section describes the systems, tools, and models arrived at and how they relate to current or prospective user needs. The following table shows the main assessment of the projects' achievements:

Assessment	Outcome	
+	Hypothesis has been exemplified	
+	Subcommunities and infrastructure have been established (community support)	
+	LOR is operational	
+	Specific LO types for a number of scenarios	
+	LOR access integrated with Cool Modes	
+/–	Current base: about 300 objects in the LOR	
	+	"Cold start" phase overcome
	–	Unsufficient / Inadequate classifications
+/–	Usability	

Table 2. Assessed outcome of COLDEX

4.1. Technology, community building and instruments

The experiences and our assessment of some example scenarios are shown in the following table.

Scenario	Assessm.	Results and achievements
"Mission Moon"	+	coherent set of activities (observation, calculation, "crater" simulation)
	?	crater height calc. not "discoverable"
"Mission Mars" (plant growing in space)	+	rich activities, open ended
	–/?	learning objects too unspecific (BeLife has the key!)
"Robot in Maze"	+	attractive, motivating, concrete
	+	dual "physical / virtual" representation
	?	connection to "Mission Mars" desirable
"Mission Earth - Seismology"	+	authentic task, professional devices (new!)
	–	LOR connection "under construction"
"Probabilities"	+	high interest of math teachers
	–	not closely connected to "space" theme

Table 3. Assessment of scenarios

Additional to the DExTs, two more applications belong to COLDEX, namely the "Smart Planets" which is a demonstrator and will be used to explain the effects of planetary orbits to students. There is also the remote telescope access as a general resource for the astronomy scenario.

Regarding CSCL technologies, there are three positive outcomes compared to one rather not assessable one. Positive are the integration of synchronous and asynchronous collaboration support, the thematic, artefact-based social linking (for which a joint CSCL 2005 paper is accepted!) and the extensible, re-usable platform LOR. The workflows involving individual activities are possible, but yet not explicit.

In the area of community building we have even more positive results. First, there are good examples of active and creative communities, especially in Sweden and Germany. Then the connection to "informal sector" has been set up very promising; there are already some very interesting results for the pedagogical scenarios. Another achievement is the take-up in Colombia and Chile which affirms the decision for an inter-continental project within the EC administration. The last item on this "plus" list is the value of the LOR that is very well understood by teachers. There are two problems encountered. On the one hand the scale; on the other hand the failure (as yet) of the "anonymous delivery model" which did not work as foreseen.

The pedagogical principles are assessed as a success for the challenge based learning approach which has been creatively adopted by Swedish teachers. Not asssessable is the real exchange of learning objects and thus sharing of ideas, since now in the beginning phase of the LOR the learning flow has just started.

Concerning evaluation, we have again some successful results. The main achievement here is the provision of a re-usable set of instruments comprising established and new elements and the fact that these instruments allow for comparison between different settings. The final report for the analysed data as well as evaluation and observation results will be described in detail in deliverable D8.3.1 Evaluation Report.

4.2. Scientific Achievements

COLDEX-related publications in CSCL conferences, in areas of technical innovations and pedagogic events have been produced during the projects' lifetime and will be written even after the project's end. Additionally, exhibitions and educational fairs have been enriched by COLDEX presentations. A detailed list can be found in the annex of this deliverable.

4.3. Administrative Remarks

The adminitrative conclusion is at a large positive. The planned figures match almost the actual ones, apart from minor exceptions. There have been delays in the deliverables' submissions, but the practical work has been done. Some technical prototypes have been late, however, finally they are available.

The following diagram (fig 2) shows the cumulative effort of all partners. The planned work can be seen next to the actual done work. Obviously, the figures prove the good mapping of the two categories.

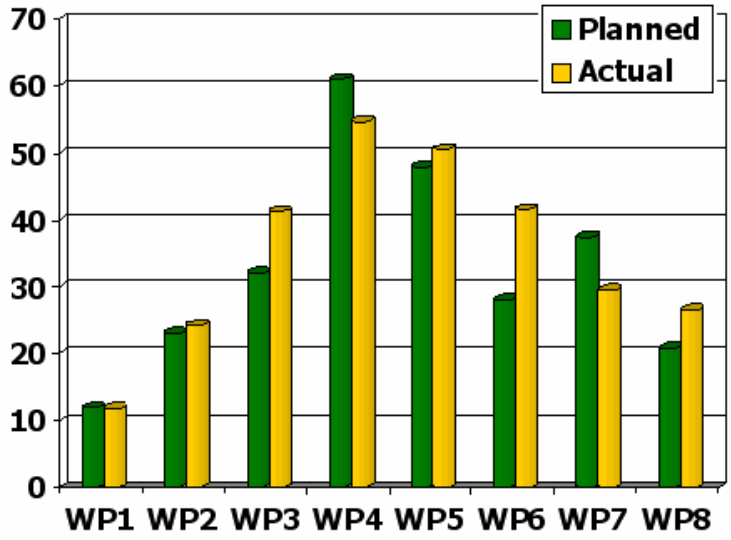

Figure 2. Person months in M33

5. Methodologies

This section includes comments on the advantages of methodologies, especially for the evaluation which is one of the most important workpackages in COLDEX. Although this is a quite good overview over the evaluation within the project, a more detailed view also on the results is available with the deliverable D8.3.1 Evaluation Report. Nevertheless, the topic has such a high relevance that the long elaboration here is appropriate here.

5.1. Evaluation

According to the project's educational objectives, the evaluation has been developed. COLDEX aims at a learner centred approach. In this sense, the evaluation of the technology and scenarios addresses the following aspects: active science discovery in mixed groups, stimulation of creativity, enabling cultural diversity. Furthermore, new methodologies for creating, processing and exploiting digital content might be adopted by the learners.

Considering the recommendations of evaluation experts, appropriate data collection instruments had to be selected for identifying sites for evaluation activities and reinforcing European "Open User Scheme" activities. Thus the evaluation plan has been revised:

- Suggestion to apply an evaluation plan across COLDEX scenarios
- Additional evaluation related to local scenarios
- Focus on students' perceptions
- COLDEX requirements as objectives that guide operationalizing the evaluation

As it is said in the deliverable D2.2.1 Learning Requirements: Authenticity, construction, collaboration, reflection and multi-modal interaction are to be evaluated.

5.2. Translation of Questionnaires

For usage of the questionnaires IMI, TOSRA, CAQ (see 5.6), we tried to offer them in different languages, and that in a validate manner. For that purpose, we developed a procedure to get validate translations. The first translation was the English-German one.

The procedure developed in COLDEX is like this:

1) Two independent translations
2) Discussion between the two translators and one reviewer
3) Back translation by two different translators
4) Revision
5) Face validity testing
6) Again: Revision

The translation process can be used as a general method for such instruments which means that the scientific outcome will last longer as a long-term outcome.

5.3. Scope of Evaluation

The determination of evaluation scope depends on the estimated richness of scenarios, but also on the actual done workshops. For example, the stochastics activities have been risen during the project's lifetime, but were not foreseen in the beginning. Additionally, they refer just peripherally to the space exploration theme. The table below shows the scenarios with the modules belonging to these. Astronomy, for instance, has the highest number of modules.

Scenario	Module
Astronomy	Crater Moon Water Rocket Telescope
Biodiversity	BeLife FoodInSpace Workshop School Project
Maze	Maze
Stochastics	Stochastics

Table 4. Scenarios and included modules

5.4. Evaluation means

In this section the evaluation variables and instruments are listed. Some of them are standard instruments, most of them were adjusted to COLDEX needs, some have been developed especially for the COLDEX activities. Details about the instruments can, again, be found in the deliverable D8.3.1 Evaluation Report.

Evaluation Variables	Evaluation Instruments
Knowledge	Questionnaire
Attitudes and Motivation	Intrinsic Motivation Questionnaire Science Attitudes Questionnaire Computer Attitude Questionnaire
Usability	System Usability Questionnaire One-to-One Observation
Coldex Requirements	Teacher Checklist
Collaboration	Observation Rubric
Other	Content Analysis, Ethnography, Interviews

Table 5. Evaluation variables and instruments

5.5. Knowledge

The knowledge tests within the scenarios base on TIMMS (Teachers' Instructional Mapping & Management System) and COLDEX specific parameters.

Competency Levels	Competency Types
Factual knowledge	Scientific Competence
Applied knowledge	Conceptual Competence

Table 6. Structure of the knowledge test

Table 6 shows the matrix of competency which builds the structure of the COLDEX knowledge tests. Of course, more examples and a deeper insights can be found in the deliverable D8.3.1 Evaluation Report. Knowledge tests have been developed for the maze scenario, biodiversity, stochastics and moon cartography.

5.6. Attitudes and Motivation

In this area, the basic instruments are the following:

- Test of Science-Related Attitude (TOSRA)
- Computer Attitude Questionnaire (CAQ)
- Intrinsic Motivation Questionnaire (IMI)

These tools have been adapted for COLDEX needs.

The target group of these are students working in the COLDEX world. To adjust the given instruments to the project's needs, we selected the scales of enjoyment, scientific inquiry, anxiety, effort and importance. Exemplified is this COLDEX adaption of the instruments in the D8.3.1 Evaluation Report. There are also described in detailed all instrument, used ones,

adapted ones and specifically for COLDEX designed ones (which are now a "product" of COLDEX and can and will be re-used for evaluation in the future).

5.7. Usability

For usability evaluation we used the System Usability Scale (SUS), One to One usability etc. The target group here consisted in students as well as in evaluators. For example, one of the SUS questions we used is: "I think that I would like to use this system frequently".

5.8. COLDEX Requirements

For the specific COLDEX requirements we have an Activity Questionnaire, and an Environment Questionnaire. These target at teachers. The focus here were the COLDEX activity requirements (described in D2.2.1) and the DExT approach.

5.9. Collaboration

The COLDEX Collaboration Rubric serves as the evaluation instrument for observing types of collaboration, types of argumentation, types of information, type of communicated content, and type of instructional approach; these types may be observed by evaluators who spy students and students' groups in a student activity. The collaboration rubrics can be seen from D8.3.1 Evaluation Report.

5.10. Other

The projects' DExTs and students' activities are evaluated using content analysis, ethnograpy and open questionnaires. Focus in this area of evaluation are students' explanations, the learning setting and the constructed artefacts, (documents, models, learning objects). The DExT questionnaire can be found in the D8.3.1 Evaluation Report.

5.11. Overview Evaluation of Scenarios

	Knowledge	Attitudes and Motivation	COLDEX Requirements	Collaboration	Usability	Other
Astronomy	✓	✓	✓	✓	✓	✓
Biodiversity	✓	✓	✓		✓	✓
Maze	✓	✓		✓	✓	
Stochastics	✓	✓	✓	✓		✓

✓ = accomplished ✓ = partly accomplished, but not finalised

Table 7. Accomplishment of evaluation instruments

5.12. Evaluation basic data

This sections gives an overview of the benchmark data for the COLDEX evaluation as well as some of the first results. The purpose of this section is to get an impression of the evaluation and observation situation and rough summary of some aspects covered by the questionnaires.

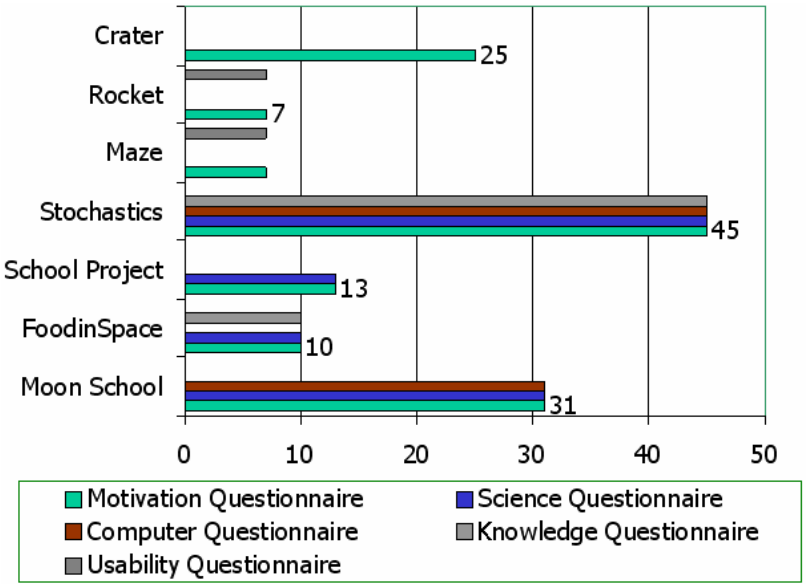

Figure 3. Sample sizes

Figure 3 shows the sample sizes for the activities and which evaluation instruments have been implemented per scenario. There were some more activities and questionnaires before, for details see deliverable D8.3.1 Evaluation Report. Analysing the collected data, two example diagrams have been selected (fig 4 and 5). The underlying questionnaire is the intrinsic motivation inventory (IMI) which is used to investigate the intrinsic motivation. The scale on the left refers to the Likert scale (1 – 7, i.e. graduation from disagreement to agreement). The y-axis represents different subscales: EN means enjoyment, CO is the perceived competence and EF is the abbreviation for the effort and importance.

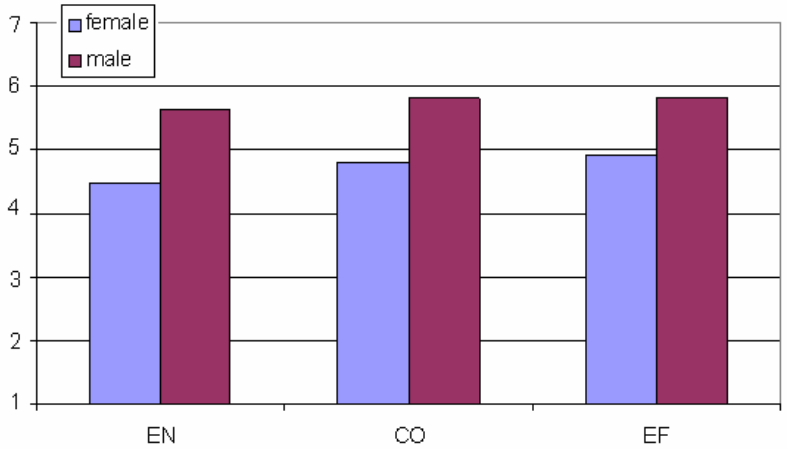

Figure 4. Motivation towards activity: Gender aspects

Figure 4 shows the gender aspect of the intrinsic motivation instrument questionnaire. The tendency of the participants is quite homogen. There are different possible interpretations of this result, e.g. that the boys had more fun, felt more competence and spent more effort resp. estimated the activities as more important than the girls. Another interpretation could be that the girls had – at a large – the same results as the boys, but assessed their involvement in a different way.

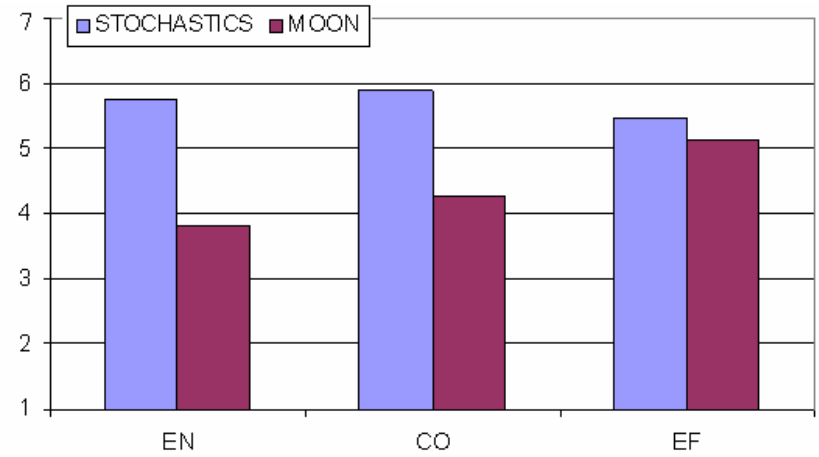

Figure 5. Motivation towards activity: scenarios stochastics and moon

Figure 5 shows the motivation results for the scenarios stochastics and moon. Again, the bars show the self-assessment of the students given in a Likert scale from 1 to 7 (disagree – agree). This diagram draws another picture. Here, the stochastics scenario has been assessed quite positive whereas the moon caused less enjoyment, although this scenario was perceived as rather important.

Furthermore, the observation of one typical workshop schedule – starting with getting to know the application, use the common group memory and getting back to work with the application as such – can be summarised as follows (see table 1). The collaboration working with the application as such mainly took place within the small groups, whereas the collaboration among these small groups has risen from the beginning to the end. The collaboration within the repository phases remained within the small groups only.

Phase	**Type of collaboration**	
	Within small groups	**Among small groups**
Starting in the tool environment	Much	Little
Starting with the group memory	Some	None
On-going work in the tool environment	Much	Some/much

Tab 1. Observation of collaboration types

Table 1 shows the tendencies of collaboration: for the working phases within the tool environment the students started already with much collaboration within their small groups (mostly pairs), and the collaboration among the groups increased. Although in the group memory phase the collaboration mode of the students changed, they continued their modelling tasks with even more collaborative behaviour.

5.13. Potential re-use of instruments

The re-use of the evaluation instruments depends among other things on the reliability of the translated instruments; the correlation of motivation and science scales is highly significant and good alpha values for science and motivation, but not for the computer attitude questionnaire are important. The collaboration rubric for observation and the knowledge tests are re-usable in school activities.

For the future, we plan further analysis of the questionnaire data and a backup with observational data. The LOR student artefacts can be analysed in a content analysis. Another aspect is the correlation between the knowledge tests and the attitude questionnaires. Finally, the analysis of the teacher perceptions is part of the deliverable D8.3.1 Evaluation Report.

The evaluation instruments used and developed in COLDEX can and will be re-used in future evaluation studies. To give the reader an impression of the evaluation instruments, we now list example questions of the questionnaires in the next paragraphs.

Maze Knowledge Item

What categories of mazes did you identify?

a) Detour maze
b) Maze with islands
c) Multiple exits
d) Inner exit(s)

Biodiversity Knowledge Item

What is the name of the plant part where carbon dioxide and oxygen can move in and out of the plant?

a) Granum
b) Thylakoid
c) Stoma
d) Chlorophyll

Stochastics Knowledge Item

A coin was thrown 60 times. 27 times "Averse" occured. The relative frequency is

a) 27
b) 27%
c) 27/60
d) 50%

COLDEX Activity Items

Authentic Activities	What kind of scientific activities are possible in the overall learning activity? *Examples* hypotheses, do experiments, formulating a scientific problem, defining rules, taking measurements
Construction of artefacts	Did students produce objects (e.g. Documents, visual representations, data…)? Have these objects been re-used?

COLDEX Environment Items

Sharing and exchange of Information	Did your environment allow uploading or sharing information, objects, and results using the COLDEX platform?
Use of COLDEX tools and learning material	Did your learning environment support using help files, different COLDEX software in the COLDEX platform or other instructional material?

Example Scientific Inquiry Survey

- Was the process of experimentation that you experienced in the workshop different compared to the process that you are used to in school ? How was it different?
- Did explaining/justifying your guesses help you to think about the conditions that could affect your investigation?

Science Attitude Questionnaire

- "Science is one of the most interesting school subjects"
- "I would prefer to do my own experiments than to find out information from a teacher."
- "I would rather find out about things by asking an expert than by doing an experiment."

Computer Attitude Questionnaire

- "I am tired of using a computer."
- "I will be able to get a good job if I learn how to use a computer."
- "I enjoy computer games very much."

Motivation Questionnaire

- "I am satisfied with my performance at this task."
- "I didn't put much energy into this."
- "I didn't try very hard to do well at this activity."

DExT Questionnaire

Did the structure of the DExT provide sufficient guideline for you to enable you to carry out these activities in your classroom with your students?

a) yes

b) no

5.14. Translation of Questionnaires

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The translation process can be used as a general method for such instruments which means that the scientific outcome will last longer as a long-term outcome.

6. European added value

The lessons learnt from working together in the European project COLDEX with additional partners in Latin America, are mainly three achievements. First, the example of an outreach from Europe to Latin America beyond "scientific exchange" turned out to be very successful. Escpecially the activities with the OUS partners from Chile and Colombia have proofed that the objective of being in this sense trans-continental and aiming at cross-fertilisation of experience and scientific understanding in a multicultural and multi-experiential community worked very well. Another positive result is the mix of "Scandinavian" with other (positivistic?) approaches. Last, but not least, the impact in the scientific community (as a cooperative EU project) is just a start for such-like projects in the future, we foresee.

7. Outlook

This sections describes how the results and achievements of the project have benefited the partners and how the partners intend to use and exploit these further.

7.1. Concrete "customer requests"

Some of the partners from the OUS community have been so kind to let us share their impressions of the COLDEX materials, tools and scenarios. A "teachers' wish list" has been submitted during the second Open User Scheme workshop in Cercedilla. The following examples are a summary of this document. (todo attached in the annex: Teachers' wish list)

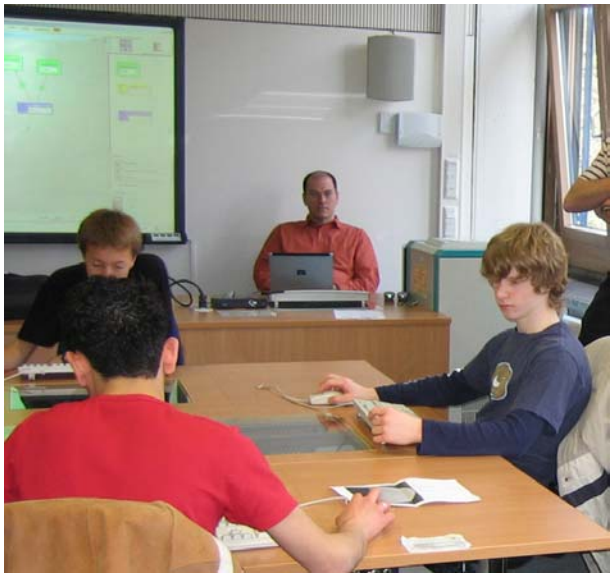

Figure 6. Moon activity with a German class

A group of German teachers is involved in a European school project and the teachers are interested to use COLDEX innovations to enrich their activities there. The advantage to serve these groups from the COLDEX view is that the students have to improve not only their scientific work modes, but also their English so the cultural exchange with other bilingual students (e.g. the Swedish students) is easy.

Xperiment Huset

The pedagogical experts at the science centre in Växjö, Sweden, plan to continue their COLDEX related activities. They will go on using innovative installations like the robot in a maze, and the "smart planets" (so far a demonstrator, but then a running part of the astronomy scenario). School and teacher workshops will take place with the astronomy scenario as well as the probabilities in the stochastics scenario. Furthermore, there is a workshop planned for

June about the usage of smart planets in the science centre, including technology (RFID) and embedding of this module into the astronomy scenario along with CRATER.

Araby school (Växjö)

This Swedish school – which has won an award partly because of COLDEX – will conduct projects "Mission Mars" and "Lunar Cartography". They are also highly interested in more of the biodiversity ideas. The teachers who presented their activities at the Open User Scheme workshop in Cercedilla, are willing to conduct further activities and offered their feedback of the tools.

Figure 7. "Spaceship Earth" activity

They made the pedagogical approach of challenge-based learning alive. The space theme was here used as idea to motivate the students with the "Mission to Mars" and "Spaceship Earth" where studying plants is important in order to bring food on spaceships for missions to space.

Colombia: national project "SIMAS y COOL MODES"

A Colombian project induced by Prof. Luis Maldonado will use COLDEX materials and conduct activities with COLDEX scenarios. There the combination of the modelling tools Cool Modes and SIMAS (a semantic modelling tool) will be used to support the cognitive aspects in collaborative learning. So, using the broader range of two modelling environments with the support of the learning object repository, the cognitive learning processes will be in the focus of this project.

7.2. Our commitment

As a service to our OUS partners, we will continue COLDEX for at least 18 months, including

- maintenance of the LOR
- conceptual evolution of the LOR
- provision of materials to new partners
- elaboration of materials (e.g. translation)
- provision / evaluation of questionaires
- personal presence and support (selective)

Scientific continuation

Based on successful scientific publications for CSCL 2005 and AIED 2005 we will continue with:

- Contribution to WS on "Discovery Learning" in Genova (May 2005)
- A presentation of COLDEX at ICCE 2005 and ICALT 2006
- "Smart Planets" at WMTE 2005
- LOR-based community support at SWEL workshops, "social navigation" theme
- COLDEX exhibition and showcase at the KALEIDOSCOPE Symposium 2005

Take-up in on-going / new projects

In the European project CONNECT (among others VXU, UDE, XpH) the pedagogical design and the integration of formal / informal learning can benefit from COLDEX results. The SkyWatch project prepares a European science week event in Athens 2005 where students can participate in a contest. For these students, the materials and scenarios of COLDEX can play the role of a motivating impulse for their own projects they develop and submit for SkyWatch. Furthermore, the ALFA projects deal with "Teacher education for new media". This is ongoing with the participation of UDE. Another project is submitted (VXU - UDE): "Computers and diversity in math education".

Finally, the NoE Kaleidoscope can be used as platform for COLDEX ideas and results. COLDEX will be presented as part of the FP 5 project exhibition and as part of the showcases at the first Kaleidoscope Symposium, 6-8 July 2005 in Oberhausen, Germany.

8. Conclusions

In summary COLDEX has been successful in:

- Building up a number of rich experimentation and modelling scenarios for science learning
- Packaging materials and tools for these challenge-based scenarios for teachers and multipliers
- Building up a community support infrastructure in the form of the LOR
- Developing a set of evaluation tools which are easy to use also in local contexts

The further exploitation of this potential will take place at least within the next 18 months in the framework of other projects and self-sustained activities. A more detailed description of the exploitations and the project results can be seen from the deliverable TIP – Technology Implementation and Exploitation plan.

9. Annex

- Deliverables and References, additional material
- Publications
- Print and electronic material illustrating the results
    - Teachers' wishlist

9.1. Deliverables and References

The following table shows the deliverables and references according to COLDEX.

Deliverables [D] and References

Workpackage 1 – Coordination and management

- D1.2.1 Project Presentation [D]
    - COLDEX website http://www.coldex.info [D]
    - COLDEX Project Video - online version [D]
    - COLDEX Project Video - higher quality [D]
    - COLDEX Flyer [D]
    - COLDEX OUS Flyer [D]
    - COLDEX Poster [D]

- D1.3.1 Quality Plan [D]
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Workpackage 2 – Pedagogical models and scenarios

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Workpackage 3 – Platforms and tools

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Workpackage 4 – Remote scenarios

- D4.2.1/D4.3.1 Remote Scenarios - Description of System Prototypes [D]
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  - Debian. www.debian.org, 2004.
  - Motion. http://motion.sourceforge.net/, 2004.
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  - GNU. GNU General Free Documentation License. http://www.gnu.org/copyleft/fdl.html, 2004.
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Workpackage 5 – Local Scenarios

- D5.2.1/D5.3.1 Local Scenarios - Description of System Prototypes [D]
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    - D7.2.1 Learning Material and Guidelines (COLDEX deliverable). http://www.coldex.info > ous > downloads

Workpackage 6 – Communication and pedagogical networking

- D6.1.1 Network Specification [D]
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    - RDF (1999) Resource Description Framework Model and Syntax Specification http://www.w3.org/TR/REC-rdf-syntax/

- D6.2.1 Coldex Portal Access Guidelines [D]

- D6.3.1 Coldex System Architecture Summary [D]

- (D6.3.1) Addenda: Network Specifications - Distributed Issues for COLDEX System Architecture [D]
    - JMS. http://java.sun.com/products/jms/
    - OpenLDAP. http://www.openldap.org/
    - MySQL. http://www.mysql.com/
    - C-JDBC. http://c-jdbc.objectweb.org/

- Deliverable web services AXIS Web Services. http://ws.apache.org/axis/

Workpackage 7 – Open user scheme

- D7.2.1 Learning Material and Guidelines [D]
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  - http://seed.01p.gr/Communities/

- (D7.2.1) Learning Object Repository: Tutorial LOR English [D]

- (D7.2.1) Learning Object Repository: Tutorial LOR Spanish [D]

- (D7.2.1) BeLife tutorial [D]

- D7.2.2 Functional Documentation [D]
  - Pinkwart, N. (2003). A Plug-In Architecture for Graph Based Collaborative Modeling Systems. In U. Hoppe, F. Verdejo & J. Kay (eds.): Shaping the Future of Learning through Intelligent Technologies. Proceedings of the 11th Conference on Artificial Intelligence in Education, pp. 535-536. Amsterdam, IOS Press.
  - IEEE Standard for Learning Object Metadata v6.1 to Final Draft Standard IEEE 1484.12.1-2002 1484.12.1 Learning Technology Standards Committee of the IEEE (http://ltsc.ieee.org)
  - Freed, N.; Borenstein, N. Multipurpose Internet Mail Extensions (MIME) Part One: Format of Internet Message Bodies RFC 2045, November 1996
  - Freed, N.; Borenstein, N. Multipurpose Internet Mail Extensions (MIME) Part One: Media Types RFC 2046, November 1996
  - International Standard Organization Codes for the Representation of Names of Languages ISO 639-2 http://www.loc.gov/standards/iso639-2/langcodes.html

- (D7.2.2) Addenda: Metadata Definitions [D]

    - IEEE Standard for Learning Object Metadata v6.1 to Final Draft Standard IEEE 1484.12.1-2002 1484.12.1 Learning Technology Standards Committee of the IEEE (http://ltsc.ieee.org)
    - Freed, N.; Borenstein, N. Multipurpose Internet Mail Extensions (MIME) Part One: Format of Internet Message Bodies RFC 2045, November 1996
    - Freed, N.; Borenstein, N. Multipurpose Internet Mail Extensions (MIME) Part One: Media Types RFC 2046, November 1996
    - International Standard Organization Codes for the Representation of Names of Languages ISO 639-2 http://www.loc.gov/standards/iso639-2/langcodes.html

- (D7.2.2) Addenda: Tools Integration [D]
    - AXIS Web Services. http://ws.apache.org/axis/
    - Deliverable D.7.2.2

- D7.3.1 System Report [D]
    - Pinkwart, N., Jansen, M., Oelinger, M., Korchounova, L., & Hoppe, H. U. (2004). Partial generation of contextualized metadata in a collaborative modeling environment. In L. Aroyo and C. Tasso (Eds.), Workshop proceedings of the 3rd International Conference on Adaptive Hypermedia. Eindhoven (NL): Technical University Eindhoven, 372-376.
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Workpackage 8 - Pedagogical evaluation

- D8.1.1 Evaluation Plan II: Specialised Evaluation and Test Plan [D]
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    - Deci, E. L., Eghrari, H., Patrick, B. C., & Leone, D. (1994). Facilitating internalization: The self-determination theory perspective. Journal of Personality, 62, 119-142.
    - Deci, E. and Ryan, R. (2003) Intrinsic Motivation Inventory. University of Rochester. [Online] http://www.psych.rochester.edu/SDT/measures/intrins.html [2003, October 6].
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- D8.3.1 Evaluation Report [D]
    - COLDEX deliverables: D. 2.2.1, D.2.3.2, D.8.1.1
    - Engeström, Y. (1987). Learning by expanding: An activity-theoretical approach to developmental research. Helsinki, Finland: Orienta-Konsultit Oy.
    - Ministry of Education and Science in Sweden and National Agency for Education. Curriculum for the compulsory school system, the pre-school class and the leisure-time centre, LPO 94 , Article no. U98.013, Graphium Västra Aros 2001
    - http://www.skolverket.se/pdf/lpoe.pdf
    - Schuler, Douglas, and Aki Namioka (1993). Participatory Design: Principles and Practices. Hillsdale, NJ: Lawrence Erlbaum.
    - Wichmann, A, Kraemer, T, Jonassen, D (2005). Exploring the Benefits of Using Metacognitive Strategies within Scientific Inquiry. In J. Wirth,Computer-Based Assessment and Support of Metacognition . Symposium to be conducted at the 11th EARLI Conference, Nikosia, Cyprus.
    - Deci, E. L., Eghrari, H., Patrick, B. C., & Leone, D. (1994). Facilitating internalization: The selfdetermination theory perspective. Journal of Personality, 62, 119-142.
    - Test of Science-Related Attitudes (TOSRA): Fraser, B. L. (1978). Development of a test of sciencerelated attitudes. Science Education, 62, 509-515. (Public Domain)
    - KNEZEK, G., & CHRISTENSEN , R. (2000). Internal Consistency Reliabilities for 14 Computer Attitude Scales. Journal of Technology and Teacher Education 8(4), 327-336.
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    - http://timss.bc.edu/TIMSS1/Items.html
    - Heuristic evaluation, Focus group, user testing etc.: http://it.coe.uga.edu/~treeves/edit8350/tools.html

- (D8.3.1) Questionnaires [D]
    - (see D8.3.1)

- (D8.3.1) Observation Collaboration Rubrics [D]
    - (see D8.3.1)

Final reports

TIP – Technology Implementation and Exploitation Plan [D]

FR – Final Report [D]

Additional materials (publications etc.)

- Additional videos (if you have problems viewing the videos, try a mouse-click with the right button and select "save link target as...")
    - Activities
        - COLDEX Activities at Araby school, Växjö, Sweden
        - COLDEX Activities with BeLife
    - Interviews with OUS partners (teachers etc.)
        - Britt-Mari Karlsson, Araby Schook, Växjö, Sweden
        - Jan Sjökvist, Xperiment Huset, Växjö, Sweden
        - Nelson Baloian, activity at the "German School", Santiago de Chile, Chile

- Concise Letter 2004 (Internal Document)

- Work Report Biodiversity Scenario (Technical Report)

- An Interactive Maze Scenario with Physical Robots and Other Smart Devices

- Interactive Processing of Astronomical Observations in a Cooperative Modelling Environment

- Implementing the Challenge Based Learning in Classroom Scenarios

- A Scenario for Local & Remote Experimentation in Chemistry (Technical Report)

- A Scenario Testbed for a Local Experiment site in Chemistry (Chemistry UNED pilot evaluation / Technical Report)

Note: The deliverables and additional material are available at the COLDEX website: www.coldex.info > deliverables. There are also the presentations of the three project reviews online.

9.2. Publications

This table shows the contributions to conferences, workshops etc. There are posters, presentations, papers, etc.

Date	Event	Author(s) and title
4 - 9 May 2003	Dagstuhl Seminar 2003	"Conceptual and Technical Aspects of Electronic Learning": Presentation with the title "Collaborative Learning and Distributed Experimentation" - focussing on the seismic scenario with Lego robots, 1 person from USB
5 - 8 May 2003	International Symposium of Mathematics Education, Argentina	"The Collaborative Learning and Distributed Experimentation (COLDEX) Project: Making Complex Scientific Phenomena available to everyone", 1 person from VXU
12 - 14 May 2003	First National Workshop of Mathematics Education, Paraguay	"The Collaborative Learning and Distributed Experimentation (COLDEX) Project: Making Complex Scientific Phenomena available to everyone", 1 person from VXU
14 - 17 May 2003	WRTP 2003, Poland	27th IFAC/IFIP/IEEE Workshop on Real-Time Programming "A low cost laboratory for teaching embedded real-time systems" 1 person from UPM
14 - 18 Jun 2003	CSCL 2003	Participant of the program committee Ulrich Hoppe, UDUI
23 - 28 Jun 2003	ED-MEDIA 2003	World Conference on Educational Multimedia, Hypermedia & Telecommunications • T.Read, F.Verdejo, B.Barros: Incorporating interoperability into a distributed eLearning system. To be published in ED-MEDIA 2003 Conference Proceedings
7 - 9 Jul 2003	ITHET 2003	International Conference on Information Technology Based Higher Education and Training • M.Felisa Verdejo, Beatriz Barros, Rosa Gómez Antón and Timothy Read: The design and implementation of experimental collaborative learning in a Distance Learning context. To be publised in ITHET 2003 Conference Proceedings. ITHET03 "4th international conference on Information Technology Based Higher Education" Conference Proceedings, in cooperation with the Institute of Electrical and Electronics Engineers (IEEE) Education Society and with the United Nations Educational, Scientific and Cultural Organization (UNESCO).

Date	Event	Author(s) and title
20 - 24 Jul 2003	AI-ED 2003	International Conference on Artificial Intelligence in Education • Jansen, M (2003), MatchMaker - A Framework to Support Collaborative Java Applications, In U. Hoppe, F. Verdejo & J. Kay (eds.): Shaping the Future of Learning through Intelligent Technologies. Proceedings of the 11th Conference on Artificial Intelligence in Education. Amsterdam, IOS Press. • Pinkwart, N. (2003). A Plug-In Architecture for Graph Based Collaborative Modeling Systems. In U. Hoppe, F. Verdejo & J. Kay (eds.): Shaping the Future of Learning through Intelligent Technologies. Proceedings of the 11th Conference on Artificial Intelligence in Education. Amsterdam, IOS Press. • Hardings, J. (2003). An XML-based Query Mechanism to Augment Awareness in Computer integrated Classrooms. In U. Hoppe, F. Verdejo & J. Kay (eds.): Shaping the Future of Learning through Intelligent Technologies. Proceedings of the 11th Conference on Artificial Intelligence in Education. Amsterdam, IOS Press. • M.F.Verdejo, B.Barros, J.I.Mayorga, T.Read: Including collaborative learning designs in a Learning Object Repository. AIED 2003 Conference Proceedings Program Co-Chair Ulrich Hoppe, UDUI
16 Sep 2003	KI 2003, Hamburg, Germany	German Conference on Artificial Intelligence • Workshop "Expressive Media and Intelligent Tools for Learning" • Marc Jansen; Kunal Sachdeva; Harrer, Andreas: About a Framework for Integrating Smart Devices in Java Applications, In: A. Harrer, K. Gaßner (eds.), / Proceedings of the Workshop on Expressive Media and Intelligent Tools for Learning /. German Conference on Artificial Intelligence KI-2003, Hamburg, 2003
10 - 12 Sep 2003	XXIV Jornadas de Automatica, Spain	Francisco M. Sánchez, A. Pinazo, R. Martinez, J.M. Sebastian. Paper and presentation "Teleoperación de un telescopio Vía web", Leon, Spain
6 - 8 Nov 2003	EADTU 2003, Madrid, Spain	A presentation was given at the EADTU Annual Conference "E-Bologna: progressing the European learning space" celebrated 6-8 November in Madrid.

Date	Event	Author(s) and title
11 - 14 Nov 2003	CAEPIA 2003, San Sebastián, Spain	Paper and workshop • Diseño de un portal semántico para comunidades de aprendizaje colaborativo.Verdejo, M.F., Mayorga, J.I., Read, T. & Barros, B. En Actas de la X Conferencia de la Asociación Española para la Inteligencia Artificial. ISBN 84-8373-654-4, pg 329-338, 2003 • A workshop "Trabajo en grupo y aprendizaje colaborativo: experiencias y perspectives" was co-organized by B. Barros, in the framework of CAEPIA, where the project was also presented
2 - 5 Dec 2003	ICCE 2003	Milrad, M., Gottdenker, J., Strobel, J., Björn, M. & Karlsson, M. (2003). Exploring Technologies and Activities to Support Authentic Scientific Inquiry Learning. To be published at Proceedings of The International Conference on Computers in Education 2003, Hong Kong.
7 – 10 Dec 2003	Winter Simulation'2003, New Orleans, USA	Diehl, S., Goerg, C. (2003). Experiencing Natural Phenomena with Virtual, Constructed and Mathematical Models. In Proceedings of Winter Simulation'2003, New Orleans, USA.
18 – 19 Dec2003	Metadata workshop, Madrid, Spain	COLDEX Metadata workshop in December in Madrid. Presentations and minutes of the discussion are included in the COLDEX BSCW archive. Attendance: VXU: Marcelo Milrad, Philipp Rossmanith UDUI: Maria Oelinger, Niels Pinkwart UNED: B.Barros, J.Velez, J.I.Mayorga, A.Ruiz, E.Ruiz, T.Sastre, T.Read, F.Verdejo
26 – 27 Jan 2004	CEN/ISSS workshop, Madrid, Spain	Presentation at the session: LT applied research in Spain, 26th January 2004. At the occasion of the 17th CEN/ISSS workshop on learning technologies, held jointly with IEEE LTCS, UNED, Madrid. (CEN/ISSS – Comité Européen de Normalisation / Information Society Standardization System
4 Feb2004	Invited Talk, Ludwigsburg, Germany	Lernen mit komplementären Modellen, Stephan Diehl, invited talk at the Pädagogische Hochschule Ludwigsburg, February 2004
10 – 13 Feb 2004	LearnTec, Karlsruhe, Germany	Hoeksema, K., Oelinger, M. (2004). Presentation and stand "COLDEX – Collaborative Learning and Distributed Experimentation", 12th European Conference and Specialist Trade Fair for Educational and Information Technology, Karlsruhe, Germany.

Date	Event	Author(s) and title
23-25 Mar 2004	WMTE 2003, Taiwan	2nd IEEE International Workshop on Wireless and Mobile Technologies in Education • Milrad, M., Hoppe, U., Gottdenker, J., & Jansen, M. (2003). Exploring the Use of Mobile Devices to Facilitate Educational Interoperability around Digitally Enhanced Experiments. Proceedings of The 2nd IEEE International Workshop on Wireless and Mobile Technologies in Education, WMTE 2004, Los Alamitos, California (USA) • Jansen, M., Oelinger, M., Hoeksema, K., Hoppe, U. (2004). An Interactive Maze Scenario with Physical Robots and Other Smart Devices. In: Jeremy Rochelle, Tak-Wai Chan, Kinshuk, Stephen J. H. Yang (eds). Proceedings of the 2nd IEEE International Workshop on Wireless and Mobile Technologies in Education, WMTE 2004, Los Alamitos, California (USA)
31 Mar 2004	Technical trade fair, Germany	Presentation and Demonstration of COLDEX scenarios at a technical trade fair for pupils in Bottrop, Germany
31 March 2004	Technical trade fair, Germany	Oelinger, M., Ritzenhoff, J., Schmidt, P. Presentation and demonstration of COLDEX scenarios at a technical trade fair for pupils in Bottrop, Germany
1 April 2004	Araby school, Växjö, Sweden	Initial presentations and further discussions
20 April 2004	Xperiment Huset, Växjö, Sweden	Araby school at the Xperiment house Presentations of the COLDEX project for teachers
22 April 2004	Girl's Day, Germany	Oelinger, M. Presentation and demonstration of COLDEX scenarios for girls and women at the University of Duisburg-Essen, Germany.
27 April 2004	Katedral school, Växjö, Sweden	Initial presentations and further discussions.
30 Apr 2004	Human Centred Technology Group seminars	Human Centred Technology Group seminars. Presentation of the BeLife project at the Human Centred Technology Group seminars, University of Sussex.
3 – 5 May 2004	Workshop on Agent-Based Simulation, Lisbon, Portugal	Presentation of the paper "BeLife: Teaching Greenhouse Management using an Agent based simulator" at the 5th Workshop on Agent-Based Simulation, SCS Press, in Lisbon.
3 – 6 May 2004	Edumat, Chivilcoy, Argentina	Two plenary talks: • Milrad, M. (2004): "Uso del Modelaje y las Simulaciones en forma computacional como soporte de procesos cognitivos en Educación Matemática" • Hoppe, U. (2004): "Medios Computacionales Interactivos-Colaborativos para el modelado en clases de ciencias y matemáticas" (math education symposium in Chivilcoy with around 150 participants)
5 May 2004	Araby school, Växjö, Sweden	Software presentation Initial presentations and further discussions.

Date	Event	Author(s) and title
10 – 11 May 2004	OUS Workshop Buenes Aires, Argentina	23 persons, participants representing nine different institutions from six Latin American countries (Venzuela, Colombia, Brazil, Paraguay, Argentina and Chile; please see attached list of participants) Presentations of the COLDEX project and demonstration and presentation of the COLDEX LOR and Archiving; • Hoppe, U.: "Proyecto Europeo COLDEX – Collaborative Learning and Distributed Experimentation – Visión y Enfoque Principal" • Milrad, M.: "COLDEX OUS - El enfoque pedagógico de COLDEX" • Oelinger, M.: "Educational Networking and Archiving: the LOR" Material (mainly in Spanish, minutes, Cool Modes examples and HowTos, tools, images, presentation) available at www.coldex.info/OUS/materials/ Invitation, press material, agenda and OUS brochure (most in Spanish) available at www.coldex.info/OUS/ Invitation, press release, participant list, agenda and OUS brochure are also enclosed as attachements
15 May 2004	Master course, Lisbon, Portugal	Presentation of the BeLife project integrated on a seminar of a Master course in Faculdade de Motricidade Humana, Universidade Técnica
18 May 2004	Xperiment Huset, Växjö, Sweden	Katedral school at the Xperiment house Presentations of the COLDEX project for teachers
2 – 4 Jun 2004	The Challenge of Integrating ICT in Teacher Education, Jönköping, Sweden	Milrad, M. Presentation of COLDEX. The conference took place at the School of Education and Communication, Jönköping University, Sweden.
18 Jun 2004	Scenario discussion, Borken, Germany	Hoeksema, K., Sachdeva, K. Presentation of the astronomy scenario and contacts with telescope experts
4 – 6 Jul 2004	ATE, Kefalonia, Greece	Hoeksema, K., Baloian, N. "Collaborative Learning in Class Room Scenarios", international symposion on advanced technologies in education.
23 Jul 2004	Riesmuseum, Nördlingen, Germany	Diehl, S., presentation of the CRATER prototype
10 Aug 2004	Katedral school, Växjö, Sweden	Workshop for teachers conducted in the Kronoberg region
13 Aug 2004	Araby school, Växjö, Sweden	Workshop for teachers conducted in the Kronoberg region
23 Aug 2004	SW-EL 2004, Eindhoven, Netherlands	Pinkwart, N., Jansen, M., Oelinger, M., Hoppe, U., Korchounova, L. "Partial Generation of Contextualized Metadata in a Collaborative Modeling Environment".

Date	Event	Author(s) and title
6 – 17 Sep 2004	informatica feminale, Bremen, Germany	Oelinger, M. COLDEX Presentation; discussion of COLDEX results and exchange of ideas with members of the Waikato University, Hamilton, New Zealand
8 – 9 Sep 2004	CRIWG 2004, San Carlos, Costa Rica	Baloian, N. Presentation of "A model for a Collaborative Recommender system for Multimedia Learning Material"
6 – 9 Oct 2004	GHC 2004, Chicago, USA	Oelinger, M. Dissemination of the COLDEX project at the Grace Hopper Celebration of Women in Computing: transfer of ideas and results to the community of women in computing
7 – 9 Oct 2004	"Eichstätter Bildungsfest", Eichstätt, Germany	Diehl, S. Presentation of the CRATER prototype and learning material at the "Eichstätter Bildungsfest" (Festival of education)
8 – 14 Nov 2004	School Foresight, Athens, Greece	COLDEX exhibition at the school foresight exhibition (European Science Week 2004)
15 – 17 Nov 2004	IST event, The Hague, Netherlands	Hoppe, U., Jansen, M., Hoeksema, K. COLDEX dissemination: exhibition booth at the Exhibition "People and Economy"
18 – 21 Nov 2004	Year of technology, Germany	Oelinger, M., Bollen, L., Jansen, M. Final event of the national "Year of technology 2004" in Germany: workshop "Mission possible – where no wo/man has gone before…" for students from schools throughout the Ruhr area at the University of Duisburg-Essen, taking place at the "day of technology" (18 November 2004)
22 – 23 Nov 2004	NCWS 04, Växjö, Sweden	Jansen, M., Gottdenker, J., Rossmanith, P., Milrad, M. "Exploring the Use of WebServices for the Design and Implementation of Innovative Collaborative Technologies" and presentation
14 – 18 Dez 2004	CELDA, Lisbon, Portugal	Cognition and Exploratory Learning in Digital Age (IADIS International Conference) • Hoeksema, K., Hoppe, U. "Combining Interactive Modelling and Scientific Discovery in the classroom" • Kuhn, M., Hoppe, U., Lingnau, A., Fendrich, M. "Evaluation of exploratory approaches in learning probability based on computational modelling and simulation" • Kuhn, M.: Presentation of results from didactic sequences according to COLDEX scenarios • Nuno Otero, Andé Vala, Ana Paiva, Marcelo Milrad. Poster "Learning with the BeLife simulation tool: the effects of Manipulating the time scale of events and Collaboration mode"
7 Jan 2005	MPUS, Hamilton, New Zealand	Seminar on Metadata and Personalised User Services. Oelinger, M. Invited Talk at the University of Waikato "Handling of Metadata in a Collaborative Modelling Environment"

Date	Event	Author(s) and title
22 – 25 Feb 2005	IADIS 2005, Portugal	A metamodel for defining and managing learning web communities. – IADIS International Conference on Web Based Communities, February 2005
30 May – 4 Jun 2005	CSCL 2005, Taipei, Taiwan	Computer Supported Collaborative Learning 2005 Hoppe, U., Pinkwart, N., Oelinger, M., Zeini, S., Verdejo, F., Barros, B., Mayorga, J. I. "Building bridges within Learning Communities through thematic objects and navigation support"
18 – 22 Jul 2005	AI-Ed 2005, Amsterdam, Netherlands	submitted to AI-Ed 2005 Otero, N.; Vala, A.; Paiva, A.; Milrad, M. "BeLife: a simulation tool to support teaching and learning about photosynthesis and greenhouse management"

The table below shows the press coverage, newspaper and online articles.

Date and Type	Details
26/07/2003 - Regional newspaper	Article in the "Rheinische Post" about the school project scenario "Escape the Maze" (german) www.coldex.info/maze/rheinischepost20030726.pdf
May or June 2004 Paper in proceedings	F.Verdejo, B.Barros, J.I.Mayorga, T.Read. Designing a semantic portal for collaborative learning communities. To appear in a LNAI volume 3040. Springer.
8 May 2004 – La Razon de Chivilcoy	Newspaper article "Finalizó anoche el VI Simposio de Educación Matemática" (see also 4.1 Conferences)
22/07/2004 – Regional newspaper	Newspaper article about a workshop Die Flucht aus dem Labyrinth (german) www.collide.info/~oelinger/coldex/mazeRP20040622.jpg
17/06/2004 – Online information service for science	Press report about a workshop Uni DuE: Schüler gesucht für Informatikprojekt "Flucht aus dem Labyrinth" (german) http://idw-online.de/public/zeige_pm.html?pmid=81910
17/06/2004 – Online service and information platform for schools and teachers	Press report about a workshop in the maze scenario Uni Duisburg sucht Schülergruppen. Dass man Roboter so programmieren kann, dass sie aus Labyrinthen freikommen, haben jetzt Weseler Gymnasiasten an der Universität Duisburg-Essen erfahren. (german) http://www.lehrer-online.de/dyn/9.asp?url=411128.htm
23/06/2004 – Regional newspaper	Newspaper article about a workshop in the maze scenario Dem Roboter sagen, wo es lang geht (german)
03/11/2004 – Online article	COLDEX at IST Results: Features:Using technology for learning & teaching science http://istresults.cordis.lu/index.cfm/section/news/Tpl/article/BrowsingType/Long%20Feature/ID/70609/highlights/COLDEX
04/11/2004 – Online article	Website announcement Year of technology: Mission possible (german) http://entdecke.uni-duisburg-essen.de/mission15.shtml
MSc thesis	Vala, A. (2005) BeLife: A Collaborative Learning Tool. Instituto Superior Técnico, Lisboa.

9.3. Print and electronic material illustrating the results

Teachers' wishlist

During the second OUS workshop, a group of teachers and other users of the LOR and COLDEX scenarios discussed the usability and usage of the learning objects repository via the web portal and via the Cool Modes tool. The workgroup's results for the Teachers' wishlist are the following. (Note: The list has not been commented, but inserted here "as it is".)

Proposals

- Deeper look into the LOR
    - always using "MyGroups" instead of Social / Project Browser
    - changing filename is impossible
    - "view" makes no sense for MXL-files
    - Marker / Corrector / Reviewer: Who's who?
    - Trying to find document of other teacher
        - searching for author: nor result
        - looking for "BioDiversity", could not find
    - "privacy / publicity" problems
- Proposals
    - "one-click-search" (like Google)
    - set of pre-defined keywords / topics (think of kids)
    - easy browsing
      Meaning fo society / community / project ??
      Explain!
    - easier user / student management for teachers
    - making it user-friendly for teacher s/ students
- inconsistent structure
- preview images for models / screenshots
- enlarge language list (at least we need Swedish, Portugese and German as option)
- teachers / students should have been asked in beginning of COLDEX
- Character problem for Swedish letters, German Umlauts etc.
    - models are not downloable even because of replacement of the characters
    - inform user that they can not be used / replace them: search fields must be robust in this problem
- How long will the LOR be running and supported?
- Cool Modes – LOR – interface
    - fuzzy search (with ranking)
    - formats for entering dates e.g.
    - feedback in waiting times
- Cool Modes
    - edges can be drawn twice without boticing (e.g. calcad)
    - edgemode / nodemode
    - calcad: entering decimals (3 desimals, dot?)
    - stochasti s: relative Häufigkeiten (relative frequencies) combine with calcad
    - calcad: repaint problems with context menu
    - edge removing: right click