

cMinds Project Newsletter

Special points of interest:

- cMinds deploys inquiry-based and problem based learning methodologies through the deployment of virtual experimentation as an educational tool
- Pilot educational applications will be developed as proof of concept of the cMinds methodologies and proposed technology
- The project aims to develop a school network for the exchange of good practice recommendations on analytical and algorithmic way of thinking
- The consortium involves technology provides, didactical process design experts, teachers, and schools
- The cMinds project is partly funded by the Life Long Learning Programme

Teaching Programming towards the Development of Early Analytical Structural and Critical Minds

Analytical thinking is a transversal learning skill that can help an individual develop experience and excel in wide areas, academic, social, civic, and professional.

Despite the applicability of analytical thinking throughout an individual's lifetime, development of the skill in early life in the context of school curricula in primary schools is not representative of its importance. Current teaching practices fail to leverage the inherent link

between technology education and creativity, which emerges when children are encouraged to find innovative solutions through brainstorming and problem solving sessions.

Information technology provides a new medium for developing analytical thinking through programming concepts: it is precise, structured, step-wise, and requires the setting of goals, exploration of alternatives, and evaluation of implementation approaches in a typical prob-

lem solving, project-based methodological structure

The technology offers additional advantages, such as the option of visual solutions that can be tailored to inspire children's curiosity, promote creativity, and increase motivation.

cMinds aims to deal with this need through the development of methodologies that exploit new technologies towards the development of early analytical, structural and critical minds.

Our Goals

cMinds aims to deploy information technology, and specifically visual programming concepts, as an avenue for developing analytical, structural, and creative thinking among elementary school children. Activities will encourage children to analytically break down selected themes and visually demonstrate solutions that are the result of collective, creative problem solving and will take into account computer literacy levels in the selected age group.

Our goals more specifically are:

- To develop age-appropriate inquiry and project-based didactical methodologies promoting analytical and structural thinking and the development of independent minds

in wider inclusive, collaborative educational environments

- To develop proof of concept learning activities on the deployment of programming as an educational tool that motivates analytical thinking. The activities will encourage children to set goals, explore alternatives, evaluate solutions, and iterate for optimization. Learning design will ensure quick early results instilling a sense of success and encouraging further engagement. Individual work and class collaboration will demonstrate how different solutions may work better for different individuals

- To build a collaborative school network through which children and teachers can share ideas, findings,

know-how, and good practice recommendations

- To validate methodologies and learning activities through their deployment in real school settings in several countries, including Greece, the Czech Republic, Romania, and Sweden
- Finally, to reach a wide range of stakeholders and to promote the integration of proposed methodologies and learning design into school curricula through targeted dissemination and adoption strategies.



Inside this issue:

About the Project Partners	2
Expected Impact on The Targeted Sector	2
Innovation	3
On-going Dissemination	3

About the Project Partners

cMinds is a multidisciplinary project whose implementation requires expertise in a wide range of areas including didactical process design, learning scenarios development,, teaching programming methods awareness, integration of ICT into educational settings, internet application development, and Web 2.0 social networking services design and implementation.

Furthermore, the international nature of the project activities calls for the development of a European school network. Through this network it is aimed to give students opportunities to broaden their perspectives and teachers to develop their collective knowledge on good practices towards the development of analytical, structural and critical thinking through programming concepts.



cMinds promotes the involvement of a wider group of experts from the educational community (pedagogical activity designers, software engineer, educators and teachers)

The cMinds consortium consists of:

The University of Thessaly, located in Volos, Greece, offering expertise on Web 2.0 services.

The Centre for Research and Technology Thessaly, located in Volos, Greece offering expertise on internet application development.

The Centre for Flexible Learning, located in Soderhamn, Sweden, offering expertise on didactical process design.

HiST Contract Research, located in Trondheim, Norway, offering expertise on application development.

The 1st Elementary School of Volos, located in Greece, offering expertise on educational application development requirements.

ZS Kolin Elementary School, located in Czech Republic, offering expertise on educational application development requirements.

Economic College of Transilvania, located in Romania, offering expertise on educational application development requirements.



Expected Impact on the Targeted Sector

cMinds introduces early analytical skills development by taking advantage of visual programming concepts built on project- and inquiry-based pedagogy targeting children up to 12 years of age.

To ensure maximum impact, the consortium aims to collaborate with the primary school education system. The deployment of proposed methodologies, learning activities, and services through formal education channels is critical for a number of reasons: most importantly for ensuring post project adoption and exploitation of results; for accurate learning needs analysis based on gaps in current

curricula; and for the establishment of a school network for collaborative knowledge development.

cMinds addresses all stakeholders in primary school education, and specifically:

- Learners, who will benefit from enhanced learning activities on building fundamental learning to learn skills applicable in the long term
- Teachers, who will gain from good practice recommendations on the deployment of ICT in education and its integration into blended learning activities
- Policy makers, who will benefit from evaluation results on the relevance, applicability, acceptance, and effectiveness of proposed methodologies and technology
- Teacher-trainers, who will benefit for longer term professional skill development methodologies on ICT in education
- Parents, who stand to gain from improved education of their children
- The general public, through enhanced educational processes for the next generation

Innovation

cMinds's multidisciplinary nature offers inherent innovation that can be identified in the following:

- Bringing focus on skills currently under-exploited in primary school, and specifically analytical and creative thinking, and proposing didactical methods for enhancing existing activities on the development of basic learning skills
- Introducing an innovative combination of didactical methodologies and supporting technology for building analytical skills among the targeted age group, increasing motivation, and tying education to future professional needs.



Learning activities will help children to engage in analytical thinking and problem solving practices

An analysis of school programs in a number of European countries shows that analytical thinking development lags behind needs in elementary school. Only later in life does analytical thinking begin to come into play in certain subject areas in high school. .

Among young children, the teaching of subject areas that could contribute to analytical thinking, such as math, mostly focuses on necessary processing skills, e.g. performing arithmetic operations, and much less on developing a critical mind. Similarly, in the rare cases that programming is used in elementary school education, the children are involved with “how to” skills on specific operations.

cMinds is innovative in not only on bringing to the foreground analytical thinking skills learning activities early in life, but in introducing specific, innovative didactical approaches

On-going Dissemination

Particular attention is paid to the dissemination and adoption of proposed methodologies and technology by reaching all stakeholders in primary education, including teachers, learners, didactical process designers, the educational software services industry, and policy makers through the exploitation of existing partner links. Targeted activities and a variety of channels will be deployed for reaching each group: publications, presentations, the internet, local media, etc.

cMinds, its vision, and its objectives are going to be presented in The Future of Education Conference, which will take place in Florence, Germany on 16th-17th of June .

cMinds is further presented at the eLearningEuropa portal, which promotes innovation on life long learning. The portal has a large audience with interests in life long learning, pedagogics, ICT in the area of education, learning

and society, professional skill development, etc. The presentation aims to reach the life long learning community in a targeted manner.

cMinds is further presented at project partner web sites.

Additional presentations to conferences, on-line thematic databases, and teacher networks will be aggressively pursued throughout the project implementation period.

Pilot Applications

Proof of concepts pilot applications are being developed at the moment aiming at offering students opportunities for critical, structural and analytical thinking.

A pilot application that demonstrate significant programming concepts, such as loops, conditional statement, cases will be developed.

Students will also given the opportunity to interact with multiple puzzles and logical problems aiming at addressing solutions. A virtual place for experimentation will be available. This experimentation step will be followed by another interface where students will be called to control and program a robot in order to solve the same problems and puzzles.

The features of ‘immediate feedback’ will be embodied in the interface.

Students will also given opportunities for reflection upon their solutions and the optimal ones.

The discussion upon solution will be encouraged through the school network.