New Perspectives in Analytical and Computational Thinking through the cMinds Virtual Learning Suite

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The cMinds Virtual Learning Suite introduces an environment in which students are invited to solve problems through exploration and the use of programming concepts towards the development of analytical and computational thinking skills among primary school learners. cMinds exploits the structural nature of programming towards the development of algorithmic thinking capacity among young learners. Such skills are important as in this fast-changing world, it is crucial that people work on unexpected problems critically and deal fruitfully with the multiple needs in their perspective workplaces [**Errore. L'origine riferimento non è stata trovata.**].The cMinds proof-of-concept demonstrator takes a top-down approach that guides learners through the step-wise solution of a problem from the beginning to the end. To achieve this objective, the demonstrator starts by introducing children to basic programming concepts, then allows them to explore the solution to a wide range of logical problems through visual programming and concludes by enabling children to compare their solution to an 'optimal' one. Briefly, the cMinds learning suite consists of the following learning areas: (a) a tutoring environment, which corresponds to hands-on practical training with the function of specific programming constructs (b) a hands-on virtual exploration environment which is followed by the robot phase environment; these are the actual virtual places for exploring programming concepts, addressing solutions and practicing analytical thinking skills (c) a visualization and comparison of solutions environment, where results of a child's programming efforts towards solving a logical problem are visualized and compared triggering mechanisms for reflection. Educational content and collaboration faciltiies are introduced to support the teaching process and to facilitate smooth integration of cMinds outcomes into classrooms. Teacher support services and content contribute to the enhancement of teachers' skills and encourage them to take an active role in designing similar learning interventions in the classroom. Early feedback from the deployment of the cMinds learning methodologies, tools, and activities in classrooms in Greece, Sweden, Romania, and the Czech Republic is positive and demonstrate a high level of engagement by teachers and learners.