

Participatory Design and ICT for Fostering ADHD Students' Inclusion

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ABSTRACT

This paper illustrates a project proposal focused on adopting participatory design of ICT-based educational activities for improving the inclusion of ADHD students in classrooms.

Author Keywords

ADHD, Participatory Design, ICT-based learning activities, education, teaching.

ACM Classification Keywords

H.5.m. Information interfaces and presentation (e.g., HCI): Miscellaneous; K.4.2. Social Issues: Handicapped persons/special needs.

CONTEXT

Attempts at adopting Information and Communication Technology (ICT) to change and evolve educational practice has proven challenging to developers and researchers, and the results are often unimpressive. One plausible explanation for this distance between vision and outcome is that in studies with focus on technology and learning, the stakeholders (students and teachers) are rarely involved. The active participation of teachers and students in such projects is of paramount importance, especially if there are students with Attention Deficit Hyperactivity Disorder (ADHD). Students with ADHD cannot focus for long periods and, by comparison with their classmates, they could become less motivated to participate in the educational activities. In order to help these students, but also to improve the quality of the

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teaching process for all students in general, we want to investigate how to combine traditional educational activities with more engaging and cooperative ICT-based ones. We are not exclusively interested in what is taught or learned using ICT, but rather in how the students can employ these tools in practice.

ICT is adopted in education to overcome the idea of learning as something “boring” and “unimaginative”; students are effectively lured into studying through digital aids, which provide a perfect blend of fun and learning. The learning technologies we aim at designing and developing will be oriented to the transformation of classic frontal instruction activities, toward an actively approach involving the students. The idea is to involve them in challenges or mission-based learning models and organize lessons by using Design Thinking concepts. Students will engage in workshops involving problem solving and design processes. They will plan, design, and co-create solutions that focus around practical problems. Students will use a variety of collaborative tools (face-to-face and online) and will be challenged to think creatively.

A possible scenario is the one in which students (with and without ADHD) collaboratively design and build their own ICT solution to a problem following these steps: Step 1: Teacher poses the question. Team of students (mixing normal and ADHD pupils) are asked to build and create stories in response to a question. The question should be clear, yet very openended. Step 2: Teams build a model. Each team builds a real or virtual model in response to the question that has been posed. Participants work with the different digital tools designed to inspire the use of metaphors and story making. Step 3: Teams tell their story. Each team shares the model's meaning and story with the rest of the classmates. It is absolutely critical that every teams shares their story. This enables 100% participation during the session which builds commitment to shared action. Step 4:

Questions and reflections. The facilitator and participants crystallize key insights, and ask clarification questions of the models. The facilitator sums up surprises and connections.

The use of ICT in learning activities can greatly help in bridging the gap between students with and without ADHD by making the education processes more accessible. In this context we want to investigate how the learning process for students in general and students with ADHD, can improve both in terms of acquired competences and in integration among classmates.

CONTRIBUTION

The overall impact of the project is expected to be at four different levels: Students with ADHD; Classes and Teachers; Parents of ADHD students; Community of Interest.

Students with ADHD

The specific objectives concern the psychological, cognitive, and behavioral areas. The validation indexes for our experimentations are: Increasing concentration during tasks; Increasing tolerance and avoid irritability and loss of patience; Stabilizing mood; Decreasing body excitement; Teaching to wait their turn; Improving the ability to follow instructions; Decreasing impulsiveness; Increasing individual learning performance; Improving relationship with classmates; Increasing self-esteem; Assuming responsibility for taking care of personal items.

Classes and Teachers

Unfortunately, the presence in the classroom of a student with ADHD, if not correctly managed by the teachers, leads to problems in relationship building between the students and sometimes causes a consequent deterioration of the psychological overall well-being. We aim at providing the tools for improving the integration among all classmates, helping them to consider the student with ADHD as a peer. Other expected outcomes are: Increasing overall learning performance; Increasing overall well-being; Increasing teachers' teaching skills; Optimization of school resources.

Parents of Students with ADHD

The parents of students with ADHD have often associated problems such as increasing of the levels of stress, depression, and marital disagreements [1,2]. The project includes training in ICT use in both school and non-school environments. The objectives in this case are to decrease stress level related to difficulty of managing their child and to improve family harmony.

Community of Interest

The last level is connected to the system as a whole and how the actions of the Project can produce effects not only at local level but also at a regional, national and European level. Community of Interest [3] is a concept that defines the collaboration of different groups of stakeholders (Communities of Practice [4]) for reaching a common goal related to a shared interest. Expected results are: Creating a stable network of stakeholders; Involving specialists in education and ADHD. To some extents, the Community that

we aim at building could be defined as a refinement of the concept of Community of Practice, called Epistemic Community [5].

EXPECTED OUTCOMES

The Project activities will be carried out by the synergic collaboration between the Department of Computer Science of Università degli Studi di Milano (UMIL) and the AIAS – Milano, a non-profit organization that works with children and teenagers (from 0 to 18 years) affected by different psycho-motor disorders. UMIL researchers have great knowledge and expertise [6,7,8] in devising participatory design strategies to support the analysis and development of design creative processes in technological environments. For this reason, the UMIL researchers' contributions will focus on the design and development of the ICT task-based learning models. Moreover, they will be involved during the training phases, execution of the experimentations, the monitoring activities, and development of the best practices. These activities will be carry out in collaboration with AIAS' professional educators and psychologists who currently work in schools as referents of the educational school assistance services for children with disabilities. Moreover, the AIAS' neuropsychiatrists are expert in certification of children with ADHD. This expertise will be useful in the project for involving ADHD students in the phase of test definition, for the identification of minors to be involved in the project and its evaluation.

The proposed experimentation methodology has many innovative aspects with respect to the panorama of the traditional learning models adopted in Italian schools.

First, a methodology based on the computational thinking learning models allows student with ADHD (but also the other students) to "see and touch" what are the visual effects of programming. Starting from a thought the students switch to an action that supports and consolidates the acquisition of notions. Through the generalization technique, borrowed from Feuerstein method [9], students will be able to apply what they learned in real life.

The second aspect is the opportunity to extend this methodology to the whole class. The underlying principle is that if a tool is useful and functional for a student with ADHD it can be used for other classmates too. The method changes from being a support to a difficulty/impairment to an instrument useful for including all students.

The third aspect is the definition of a low-cost methodology. In fact, most of the ICT strategies to use are freeware or based on affordable equipment and software licenses.

Finally, the methodology can be replicated. The proposed methodology can be exported and customized without the need for those who will use it to have extensive technological knowledge and skills. Moreover, it can be adapted to different topics and situations.

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