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# Can ICT Support Inclusion?

## Evidence from Multi-User Edutainment Experiences Based on 3D Worlds

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**Abstract**

Can ICT support inclusion? This paper presents some evidences collected during a 6-years experience with multi-users virtual worlds based educational programs, involving more than 9,000 students from 20 different countries across 3 continents. Eloquent anecdotes, supported by quantitative data, tell us that, under some conditions, ICT *can* be a powerful tool to involve disaffected students, raise interest, promote socialization and trigger important habit-changes of attitude.

**Keywords**

Multi-users virtual worlds, social inclusion.

**ACM Classification Keywords**

K.3.1 [Computers and Education]: Collaborative Learning, Distance Learning; General term: human factors.

**Introduction**

Can ICT support inclusion? In our experience, the answer is "yes". Since 2001, the Hypermedia Open Center of Politecnico di Milano has been developing edutainment experiences based on shared online 3D

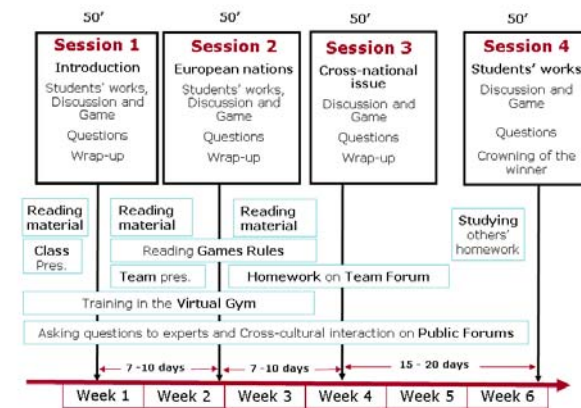
virtual worlds, that have involved so far more than 9,000 students (aged between 13 and 19) from 18 European countries, plus Israel and the USA. Our edutainment experiences have all been carefully planned in order to achieve a set of educational benefits, related to knowledge, skills and attitude. But from the very beginning we noticed, to our own surprise, that together with the expected and looked-for benefits (that were actually being achieved, in a remarkable way: see [2]), other “benefits” seemed to be there. Evidences came from questionnaires (to teachers and students), focus groups (with teachers), e-mail messages, reports from online tutors, etc. These unexpected benefits were about what we may call “inclusion”: marginalized students being re-integrated in the social context of the class, disaffected students being “rescued” through an unusual activity, etc. In this paper, after briefly sketching how our edutainment experiences are organized, we wish to share with the reader a sample of these evidences (supported, when possible, also by quantitative data). In the conclusions we try to draw some lessons about which elements of our experiences were apparently crucial with respect to the achievement of inclusion, well aware that a full light on the “why” and “how” is still to be shed.

### Our blended-learning experiences

All the 3D-world-based edutainment experiences developed by our laboratory [1] [2] [3] are structured according to the same format. Basically, 3D worlds are used as virtual meeting points for students from different countries, geographical areas, cultural backgrounds: they meet each other, interact, play games and discuss some theme of common interest, about which they learn not only the content provided

by the program, but also the different perspectives brought in by their remote peers.

Interaction in the 3D world follows a carefully structured sequence of activities (figure 1): students connect to the virtual environment from their school lab or classroom at appointed times, meet their remote peers, discuss via chat educational material previously read, answer the questions of online tutors, present and compare their works (research assignments that they prepare in the intervals between online meetings), and play games (e.g. a treasure hunt in a labyrinth). A playful competition goes through the whole length of the experience, based mainly on cultural quizzes and ability games.



**figure 1.** Typical sequence of activities of an edutainment experience (in this case, Learning@Europe, about European history [4]).

### Benefits related to inclusion

A complex apparatus of tools [1] is used in order to monitor the results, including focus groups and surveys to teachers and students, reports by online tutors, chat

transcripts, forum posts, etc. Evidence collected during the deployment of our edutainment experiences shows they can support inclusion in many ways.

*Social inclusion for marginalized kids in the classroom*

During online sessions students are asked to play ability games (e.g. flying through circles, moving through a path full of obstacles, etc.). In more than 75% of cases the students most skilled in video games are selected to perform these activities and thus become the “champions” of their class. *“One of my students is the only boy in a class of girls and was never among the high-achieving ones. However, being good at using computers, he was chosen to supervise any activity involving the use of technologies, and to play all the games. He worked with great commitment, and his classmates began to rely on him so much that he practically became the ‘hero’ of the class. I also gave him a good mark in my subject to reward his active participation.”*



**figures 2-3.** On the left, one of the environments of the 3D worlds where the educational experiences take place: a labyrinth where “cultural” objects are to be found. On the right: a class of participants; the only boy (top-left) became the girls’ hero for his ability in the online games.

During an online session, while talking about each other’s hobbies and interests, the students learned that

there was a boy in one class, named Riccardo, who liked fishing. His teacher told us in a focus group that Riccardo was the most introverted student in her class, shy, and with not many friends. However, during online meetings, the students from the other schools would always ask whether “fisherman Riccardo” was there, and sent special greetings to “fisherman Riccardo” at the end of each session. The boy got unusually engaged in the activity, and also his relationships with his classmates improved.

*Engaging difficult, low-achieving students*

Teachers reported in surveys and focus groups many cases of difficult, unmotivated students, getting involved in this unusual activity. *“We selected our least motivated students, as we thought that, if the project worked, we had a chance of ‘rescuing’ them. And so it happened”* (French teacher, 2004-05).

An interesting anecdote was reported by an Italian teacher, in year 2006, regarding a young foreign student in her class, who was not very proficient in any school subject but was very skilled with technology and was thus selected to play the ability games, while his mates had full command on the chat. During an online session, he was by chance left alone in front of the PC when the online tutor asked a cultural quiz. To his own surprise, he answered correctly! This little success highly motivated him: he started studying the background material of the project, and his motivation for school activities did not fade even after the end of the project. Teachers agree that difficult students, dragged by the enthusiasm, seem to find “a way to express themselves”: *“All of them participated with enthusiasm. Even two kids with comprehension problems had studied well and knew everything”*.

### *Unusual or unexpected interest and motivation*

The experience raised unexpected interest towards new subject-matters: a middle school teacher said in a focus group: *“Teaching the Dead Sea Scrolls<sup>1</sup> seemed an absurd idea at the beginning [because of its complexity for eight-graders], but the kids got eager to study the community of Qumran. [...] At the final State exam, everybody wanted to talk about the Dead Sea Scrolls”*. Enthusiasm for the experience was generally high and this increased motivation for school activities: *“Students were more than usually engaged. They were enthusiastically engaged”*. (Polish teacher, 2006-07); *“The majority of students are more motivated at school. They get higher marks in History, English and Information Technology”*. (Polish teacher, 2005-06). Quantitative data fully support the hypothesis that these experiences increase students' engagement. Between 85 and 97% of teachers (N=220) participating in Learning@Europe from 2004 to 2008 consistently rated their students' improvements in motivation either good, very good, or excellent.

### **Conclusions**

Our experiences were not designed in order to achieve “social” benefits in terms of inclusions; we discovered that nonetheless we *did* help achieving them, and we tried to understand *how*, although identifying one or more design elements “responsible” for a given benefit is quite hard in complex experiences such as these. People reach higher levels of achievement when deeply involved in an activity [5]. Our guess is that 3

motivation-related elements play a crucial role into fostering social inclusion:

- The overall experience is as new for the students as for the teacher; this unusual situation determines a shift in roles that is very stimulating for the students. Students become actively responsible for a learning experience in which the teacher is a facilitator.
- Skills are valorized that are usually overlooked in the school environment (like the ability in videogames). Less proficient students get a chance to be praised by their teacher and “taste the flavor” of success at school, thus increasing their motivation.
- Interaction and playful competition with remote peers are powerful motivators to do one's best and develop unexpected abilities and attitudes.

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<sup>1</sup> The subject of the first of our blended learning experiences: SEE (Shrine Educational Experiences), in cooperation with the Israel Museum of Jerusalem.