

A first experience with learners with Special Educational Needs: lesson learnt for participatory - design activities

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Abstract. The paper reports on a project developed under the Regional call “*Action 1. Friendly school – Activity A*” in P.O FSE 2007-2013, CRO Objective Axis 4, Human capital - Special Project “*Friendly and inclusive school*”, focused on learners with special educational needs. In particular, the paper discusses how the project – through brainstorming and debriefing activities – stimulated several verbal and non-verbal social skills of learners with special educational needs, that the literature suggests to be powerful pre-requirements for involving them into the process of participatory design.

Keywords: Children; Special Educational Needs; Teachers; Participatory Design

The Italian Ministerial Directive “*Instruments of intervention for students with special educational needs and territorial organization for school inclusion*” (27 December 2012) has recently defined that a “*special*” attention is needed for a large number of students, because of biological, social and/or environmental differences [1]. More precisely, children with “*Special Educational Needs*” (SENs) are either:

1. Children with handicap, Law 104/92 (“*Framework Law for assistance, social integration and rights of the handicapped*”);
2. Children with specific developmental disorders, e.g. specific learning disabilities, Law 107/10 (“*New rules concerning specific learning disabilities in schools*”), Attention Deficit Hyperactivity Disorder, language disorders, non-verbal skills deficit, motor skills disorder;
3. Children with difficulties related to cultural, linguistic and socio-economic factors, such as the difficulty of learning the Italian language in children of other mother tongue.

In such a context, together with the Comprehensive Institute “*G. Rodari*” (L'Aquila, Italy), we proposed a project, that was funded under the Regional call “*Action 1. Friendly school – Activity A*” in P.O FSE 2007-2013, CRO Objective Axis 4, Human capital - Special Project “*Friendly and inclusive school*” – “*Portfolio Project*” [2].

The project consisted in the use of a compensatory technological tool, i.e., the TERENCE software (“*An Adaptive Learning software for Reasoning about Story with Poor Comprehenders and their Educators*”) [3] for children with SENs. The TERENCE software was originally designed and developed for poor comprehenders, i.e., children that read words and sentences accurately, fluently and at age-appropriate

levels, but have serious difficulty understanding what they have read [4]. The TERENCE software is a web application designed by blending the “*User-Centered Design*” and “*Evidence-Based Design*” approaches. Currently, it contains 5 books, 31 stories, circa 350 games designed to stimulate the inferential and metacognitive skills (called smart games) and 8 games to enjoy and improve the computer skills needed to interact with TERENCE (called relaxing games).

The project was made up of 8 interactive sessions, for 2.5 hours/session, lead by a psychologist and a teacher. Each session consisted of two main activities:

1. **Playing with the TERENCE software.** The main tasks the learners performed were selecting an avatar, reading a story, resolving the related smart games (factual, time and causality games) and playing with the relaxing games. When a learner solved the smart games, he/she got some points, that in turns become tokens for the relaxing games (5 points for a token);
2. **Brainstorming and debriefing activities about the TERENCE software.** At the end of playing with the TERENCE software, learners were asked to give their feedback, their impressions, whether something could be improved and how to make these changes (brainstorming activities). Debriefing was the review and analysis of events that occurred in the games themselves. It included a description of events that occurred in the games, the analysis of why they occurred and the discussion of their mistakes and corrective actions. The need for adding brainstorming and debriefing activities to TERENCE is motivated by a threefold reason, related to:
 - Students learn and retain the most from what Salomon calls “*mindful*” engagement [5];
 - Learners cannot use a technological tool without thinking deeply about the content that they are learning [6];
 - A tool may facilitate the learning process more if it is accepted by the learners [6].

During brainstorming and debriefing activities, qualitative data were gathered via direct questions about graphic and textual components of TERENCE world and about their own experiences. Further children's behaviors, their performance and group interactions were systematically observed. Interviews and observations provided a descriptive report of the study. Thematic content analysis was used to analyze qualitative data and to identify themes and categories that emerged from the data (e.g. concerning reading activities, smart games, relaxing games, social skills, informatic abilities, motivation) [7].

The paper focuses on the feedback given by our learners during the brainstorming and debriefing activities, the effect of such activities on enforcing several verbal and non-verbal social skills, and how – in turns – these skills are helpful in the context of participatory design.

The enrolled sample was made up of 15 Italian students, from 9 to 13 years old, attending a public school in Central Italy, without handicap or specific developmental disorders, but only with difficulties related to cultural, linguistic and socio-economic factors, such as the difficulty of learning the Italian language in children of other mother tongue.

All learners gradually became proactive and interested in giving feedback concerning how to improve the TERENCE software. For instance, about reading activities, they reported that book titles appear to be too small and some words were too difficult for younger learner (since learners with SENs, some of them did not speak Italian very well). Learners generally liked the types of relaxing games, however all students reported frustration when unable to complete the games due to the timeout (fixed by the stimulation plan that underlies the TERENCE software). Learners also proposed to introduce the possibility to friendly compete each other, by directly comparing the scores obtained in the smart games. On the other hand, the use of friendly competitions provides a strong motivation for students, helping to increase their performance [8]. In particular, our observations suggested that, for learners with SENs, engaging friendly competitive motivations served to make their learning goals more meaningful. Learners also suggested including the option of customizing the avatar, giving it a name and using the points of the smart games to enrich the avatar's features, rather than to play with relaxing games.

A second interesting point is that, at the beginning of the project some students preferred to work alone. At the end, instead, all learners choose to work in groups. Therefore, the project offered the way for students to become more involved in learning and to develop improved interpersonal and cooperative skills. In particular, we observed an improvement in both verbal social skills (i.e., raising and accepting constructive critics, expressing the own viewpoint, team working, being assertive and problem-solving, active listening and good questioning, communicating accurately and unambiguously, and being able to resolve conflicts productively) and non-verbal social skills (i.e., gesturing, respecting physical space, ocular contact and para-linguistic communication).

A further note is that, at the beginning of the stimulation plan, the younger children appeared to be less skilled than the older ones, especially with respect to computer interaction (they shown a lower affordance with gestures, and mostly because many of them did not have any technological tools at home). However, at the end of the project they became more skilled.

Finally, learners were enthusiastic, focused, and engaged in the whole project, i.e., both TERENCE, brainstorming and debriefing activities. They were interested and enjoyed what they were doing, they were highly involved and motivated, absorbed and immersed in all activities, and shown a strong will to succeed. Their behavior was self-determined, driven by their own volition rather than by external forces. Furthermore, they requested access to TERENCE also outside the school setting. This is an important finding because:

- Motivation is a dimension that determines learning success, especially in complex e-learning environments [9];
- Individuals that are highly motivated are more likely to engage in, devote effort to, and persist longer at a particular activity [10].

Furthermore, according to the "*Social Interdependence Theory*" in participatory design [11], five principles mediate the effectiveness of cooperation: positive interdependence, individual accountability, group processing, promotive interaction patterns and appropriate use of social skills. In particular, team members need appropriate interpersonal skills as well as the motivation to use them. Social skills are essential to cope with the stresses and strains of working in a group and are a

precondition for promotive interactions to occur [11]. During our project, we noticed that the introduced brainstorming and debriefing activities established a virtuous circle that stimulated their social skills, that – as mentioned – represents a powerful pre-requirement for involving them into the process of participatory design.

Also from a psychological perspective, these preliminary activities may be essential for children with SENs, above all considering their interpersonal difficulties related to cultural, linguistic and socio-economic factors. Indeed, these activities represented practical means of creating exciting social and engaging classroom environment to help students to master traditional skills and knowledge as well as develop creative and interactive skills.

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