Hybrid Spaces for the socio-educational inclusion

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Abstract

The article deals with aspects of educational inclusion for students who are unable to attend school regularly due to physical and/or health problems (homebound students). The aim of this contribution is to present the TRIS project, a research project based on the use of mobile and network technologies to create "hybrid learning spaces" which can favour the socio-educational inclusion of homebound students. One of the main results which emerged from the research is that teaching/learning situations which are developed in hybrid learning spaces due to the force of circumstance may also act as incubators of general educational innovation for the class/school involved, fostering experimentations in the didactic use of mobile and network technologies which can also be used as models for "normal" teaching.

1. Introduction

Physical or health problems often prevent students from participating in normal education, sometimes permanently [1][2].

For these students, new models of schooling based on the regular and methodical use of the new information and communication technologies need to be worked out [3][4][5] in order to improve (a) the management of the teaching/learning process [6] and (b) the communication among both the subjects who are in contact with the disadvantaged students (teachers, classmates, parents, health workers) and the teachers who will be following their studies over the various school years [7].

Thus the variables of the problem need to be examined scientifically and experimentally in order to define a sustainable model of inclusive education which takes into account both the student's status, and the role of the social networks (Figure 1) involving him/her [8].

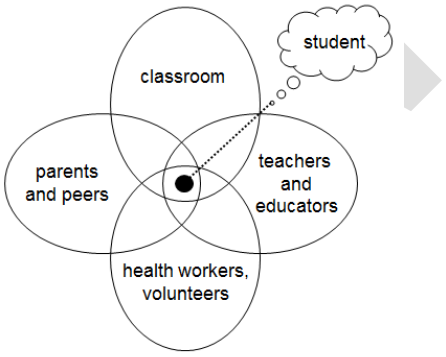

Figure 1. The complex of social networks involving the student.

2. The TRIS project

In 2013, an important three-year framework agreement was signed between the MIUR (Italian Ministry of University and Research), the National Research Council and the Telecom Italia (telephone company) Foundation for promotion of an experiment on the educational inclusion of students who have difficulty in attending school regularly due to specific invalidating illnesses or social problems.

The aim of the agreement is to try out new educational models for students who are either temporarily or permanently unable to follow normal educational paths due to psycho-physical problems, long-term hospitalisation, special treatment programmes (e.g. multiple chemical sensitivity), or particularly disadvantaged geographical situations (e.g. students residing on small islands or in mountain areas).

The operational development of the framework agreement is the TRIS (Tecnologie di Rete e Inclusione Socio-educativa - Network Technologies and Socio-educational Inclusion) project, coordinated by the Institute for Educational Technology of the Italian National Research Council (ITD-CNR).

2.1. Aims and objectives of the project

The aims of the project regard two levels, that of the *student* and that of the *social networks* dedicated to him/her.

In the former (student's) level, the specific aims regard (a) the acceptance and full insertion of the homebound student into class social life (social inclusion) [9], and (b) the working out of collaborative learning methods by which the student can be actively involved in the lessons and the study with his/her peers (educational inclusion), despite being based at home.

On the social network level, the project aims at strengthening self-help dynamics among all those directly and indirectly involved in the socio-educational inclusion of the disadvantaged students (teachers, parents, friends, volunteers, social workers) by exploiting network and mobile technologies (NMTs). Advantage is also taken of the connection to the extra-scholastic educational resources of the territory and of the mutual/informal learning processes within the online community (trainers, researchers, sociologists, social-cultural workers), whose purpose is the sharing of knowledge and good practices on socio-educational inclusion themes. The project involves 4 Comprehensive Institutes (Primary School and Lower Secondary School) and 3 Upper Secondary Schools of the Campania, Lazio, Sardinia and Sicily Regions.

A three-year duration was decided on for the project, to allow the experimentation to be conducted both within the single two/three-year study cycle and also straddling two cycles, i.e. the last years of one and at least the first year of the next. This was calculated to facilitate the transition between the end-of-course teaching board and the following beginning-of-course one, with a harmonious transfer of methods.

2.2. General methodological approach

Methodologically speaking, the research develops along three closely complementary main lines (Figure 2): (a) the study and experimentation of educational/methodological approaches aimed at socio-educational inclusion and centred on the use of a hybrid learning space (HLS) [10][11]; (b) the study and experimentation of sustainable technological settings for application of the aforesaid educational/methodological approaches; (c) the planning and experimentation of teacher training actions regarding planning, application and assessment of inclusive activities.

Hybrid spaces are dynamic and characterised by constant connectedness, which integrates remote contexts with the space/time dimensions of the present moment. The concept of "hybrid space" is thus seen to be particularly interesting for those daily tackling the problem of the socio-educational inclusion of students who are homebound due to physical, health or other problems [11].

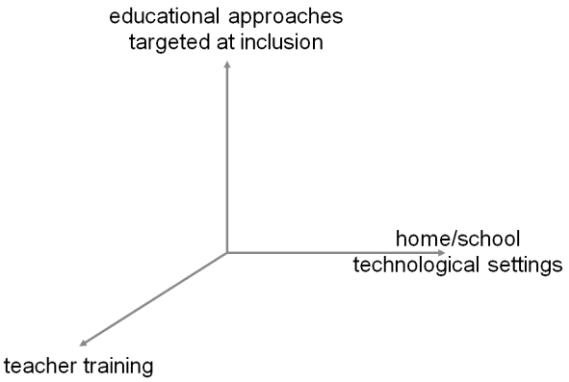

Figure 2. The three main lines of the experimentation.

A monitoring system was created for the project, whereby data and information were collected to evaluate the progress of the experimental activities and the methodological and technological results achieved. A diagram of its structure is shown in Figure 3.

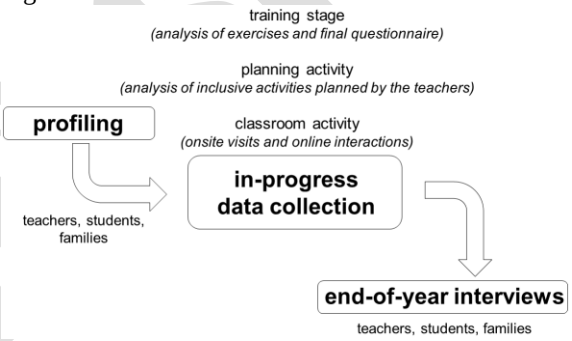

Figure 3. Development of the monitoring activity for one year of the project.

3. The study of educational approaches

One of the main aims of the project is to work out educational/methodological solutions which are sustainable, i.e. specifically functional to the socio-educational inclusion of the homebound student and at the same time in harmony with the class teachers' teaching style. Thus for each experimental stage we based ourselves on the synergic, complementary action of a broadly-based research-action group, i.e. a group which included both the ITD-CNR researchers and the teachers involved in the project. Figure 4 shows the cycle of a typical activity targeted at the study, experimentation and evaluation of inclusive solutions.

The figure clearly shows how each experimental activity is co-constructed with the contribution of the teachers in order to find a reasonable compromise between normal teaching methods and class needs and to introduce new tools and methods for the inclusion of the young homebound student.

Figure 4. Typical cycle of a TRIS experimental action.

4. The study of technological settings

The second line of development of the project concerns the identification of a minimum set of technologies and online resources for creating an HLS within which the educational processes actively involving the non-attending student can be conducted, both during lessons and school activities and during homework or extra-school study (Figure 5) [12].

Figure 5. A full-spectrum process of socio-educational inclusion.

Again with a view to sustainability, both in the study and the installation of the technological settings (student side and classroom/school side) we tended to choose hardware and software solutions which are already widely used both at school and at home, espousing the BYOD (Bring Your Own Device) philosophy [13][14].

For this reason, in the initial stages of the experimentation we carried out an inventory of the tools already available to teachers, students and parents and of their habits regarding NMT use, as far as possible adapting the chosen solutions to these considerations.

5. Teacher training

The third main line of experimentation is teacher training. Besides being a further means for increasing the sustainability of the methodological solutions adopted, teacher training is a vital stage for actively involving teachers in the experimental activities. The main aim of the training is in fact to bring about a kind of conceptual levelling as regards the research methods and tools proposed in TRIS, seeking to optimise the dialogue between teachers and researchers during the planning and carrying out of the research-action activities. Thus the training course was conceived as a continuous process, i.e. a process which can accompany the teachers throughout their participation in TRIS.

After an initial (formal) basic training stage lasting 5 weeks and conducted wholly online, the course proceeds in the learning-on-the-job mode (informal learning mode), addressing teachers' specific needs for training in new technologies and seeking new educational solutions for the inclusion of their non-attending students.

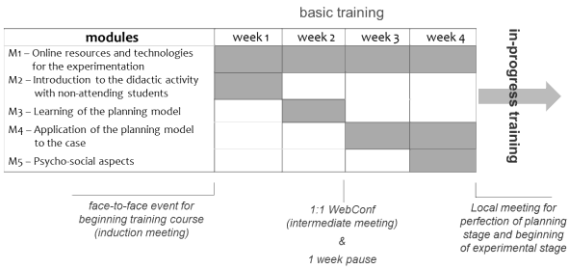

Figure 6. Development of teacher training in a formal/non-formal/informal continuum.

6. Results achieved

Although the project is only at a half-way stage, it has already produced important results.

From the educational/pedagogical point of view, the model of analysis of both the students' difficulties and the family context was found to be particularly effective in planning the (individual and group) study activities which can actually be potentiated by NMTs. On the other hand, the planning of activities for training teachers to use network technologies and resources to support the teaching/learning process in a more decisive and widespread way still needs to be perfected, in the sense of simplified.

On the whole, however, the most important result is undoubtedly the chance given to homebound students to interrupt their isolation and participate with more continuity in class life, both inside and outside school times. This result also depends on a

more regular use of both synchronous communication, for active participation in the lessons, and asynchronous communication, in study and the homework assigned by teachers. In the first case (active participation in lessons) the standard solution adopted is the one shown in Figure 7.

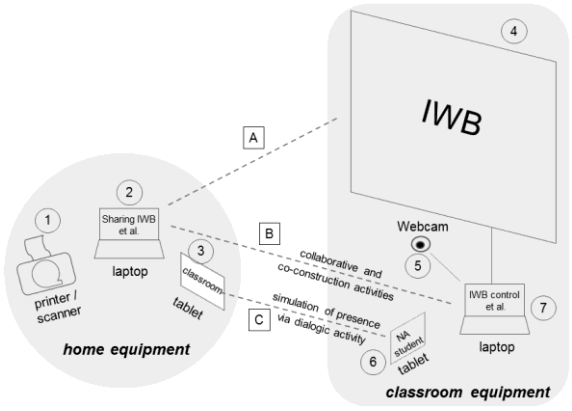

Figure 7. Technological settings for active involvement of the homebound student.

Table 1 shows some situations using technological tools which, coupled with specific online services, served to create the desired HLS.

Table 1. Examples of the use of the selected technological tools.

A	Use of home laptop for sharing IWB (Interactive White Board) screen (and for collaborative interaction with the class.	Typical situation: while teacher and/or classmates act locally on the IWB (4), the student does the same at home using his/her own laptop (2).
B	Use of home laptop for collaborative work with a group of classmates.	Typical situation: the class is divided into small work groups who are asked to develop a document (a text, a wiki, a conceptual map etc.); the homebound student is assigned to one of the groups; the local group uses the class laptop (7) to interact collaboratively with the homebound classmate, who participates in the group work with his/her own laptop (2).
C	Use of tablets to simulate the presence of the student in the classroom and at the same time to open up a window onto the class which is visible from home.	Typical situation: the tablet (3) acts as a window onto the class and at the same time shows (if he/she wishes) the student at home; the tablet (6) reproduces the image of the student at home (if he/she wishes) and at the same time shows what is happening in the classroom (e.g. teacher's lesson)

As can be seen in Figure 7, classroom equipment includes a PTZ webcam (5), so that the student at home can independently vary the image angle of the class, without depending on classmates or teacher. Moreover it is interesting to note that the class tablet (6) was also used on school trips (e.g. museum visits) or in laboratory activities to allow the distance classmate to participate in the group, at least virtually.

Regarding the collaborative work inside and outside school time, a virtual reference space was worked out using (a) Moodle as the Learning Management System and (b) Google Drive tools for the collaborative homework exercises and construction of specific artefacts.

Finally, regarding the training course proposed to the teachers, a very positive reaction was recorded to the general approach adopted (online learning followed by situational learning-on-the-job). The participants, who had generally been used to total solitude in their attempt to apply what had been learned in a training course, greatly appreciated the chance to get support from the ITD-CNR researchers, both during the online participation in the initial basic course and during the first experience of applying what they had learnt. But above all they appreciated the chance to continue learning in informal mode during the active, pro-active participation in the research-action part of the project.

7. Conclusion

One of the important results achieved by the TRIS project is that it is already offering a new perspective on how to deal with "extreme" educational needs like those of students who cannot attend lessons regularly (or at all).

Aside from the primary goal of the socio-educational inclusion of homebound students, these experiences offer the school and research worlds a unique context within which new forms of schooling and teaching, which take advantage of the potential of the new technologies, can be generated [15].

In this context let us consider Table 2, which compares the features of a "normal" type of teaching with those of inclusive education for homebound students.

The last point in the table is particularly interesting, since it is often just those problematic situations which act as a kind of Trojan horse for wider reflection on the introduction of NMTs into teaching [15][16].

Undoubtedly, the proposal even to partially re-programme teaching activities in order to facilitate a remote student's normal school attendance always provokes great perplexity within the class teaching board, even more so if this implies the introduction/ "intrusion" of technologies. This perplexity is even more marked when the disproportionate overall effort required for managing what actually amounts to a single case is taken into account.

Table 2 – "Normal" teaching and teaching in the presence of problematic situations [15].

a) "Normal" teaching	*b) Teaching in the presence of problematic situations*
School space and didactic organisation inadequate for the development of pedagogical approaches exploiting the potential of the new technologies.	The school space is anywhere where study is possible (home, hospital), preferably offering the chance to do it in collaboration with other, even remote, students, and with teachers' support even if they are not always present.
Teachers hesitant in considering teaching activity which extends outside school time.	Most (sometimes all) teaching activity is developed outside the school spaces.
Teachers generally unmotivated to change their teaching style when they perceive no real need for them to do so.	Teachers' strong motivation to seek solutions which allow the disadvantaged student to take part in class lessons, helping their study through personalised paths potentiated by technologies and making them actively participate in collaborative study activities in class as well as in extramural ones.
On the one hand, strong perception of students' need to acquire soft skills in using technologies to enhance their scholastic and lifetime learning process. On the other hand, since these skills are not "assessable" for school credits (except for ECDL - European Computer Driving Licence courses), technologies at school are seen as cumbersome and their use is often a forced one, sometimes not understood by students' families (a teacher who uses Facebook? Pure heresy!).	Awareness that only through a systematic and programmed educational use of NMTs can disadvantaged students enjoy both equal opportunities in following educational courses and total autonomy also thereafter in tackling their lifetime knowledge needs. It does not matter that these skills are not recognised in scholastic assessment. It is a non-problem, since those skills are not an extra but a fundamental. And their fundamental nature is recognised and requested by students' families themselves.
The above circumstances lead to great difficulty in involving the whole of a class teaching board in re-planning the teaching process in order to include NMTs.	It is often precisely these problematic situations which convince even the most sceptical teachers to give it a go, and which thus unite the various members of a class teaching board.

These resistances can often be broken down if teachers can be made to take a positive view of what is certainly not a positive situation (especially for the disadvantaged student). That is to say, if it can be demonstrated to them that the management of that problematic situation may become an opportunity for acquiring knowledge and skills on the educational use of NMTs, which can then be extended to the whole class (and more generally to the whole school), also for other future purposes. So, not only for solving a (hopefully occasional) emergency situation, but also for innovating and potentiating the learning/teaching process throughout the class/school.

In this sense the situations tackled in the TRIS project, in which teachers', head teachers', parents' and classmates' interest in finding solutions to include disadvantaged learners are evident, are revealing themselves to be incubators of educational innovation for the class/school involved, fostering exemplary experimentations in the didactic use of NMTs which can be used as models also for "normal" teaching.

In other words, a teaching/learning situation which by force of circumstances is developed in non-circumscribed spaces (defined here as HLS) may act as an example and a guide for the enrichment of the everyday life of a school that is still firmly anchored to schemes and practices which increasingly clash with students' expectations and the need for innovation.

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