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Web 2.0 as a catalyst in training and education processes between school and local territory

The Didaduezero project in the province of Trento¹

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ABSTRACT

While students use social software outside school in informal contexts, it is still very rare that it is used in support of curricular activities. The research, in collaboration with IPRASE (Istituto Provinciale per la Ricerca e la Sperimentazione Educativa of Trento – Italy), developed a new *experimental model (SoSoFIN)* to investigate how Web 2.0 learning processes in informal and non-formal context can be mediated and successfully integrated within the formal school curriculum. The research activities covered a wide range of Web 2.0 learning projects where students and teachers collaborate with the local community creating digital artifacts highly contextualized in the real world, and making them available to all. This approach, stimulating social-cultural processes, increased students participation and motivation to learn as well as their digital skills.

Keywords: Web 2.0; social software; informal learning; local community; school.

¹ Corrado Petrucco wrote the following paragraphs: *Introduction; The Didaduezero project, objectives and theoretical background; Project Structure; Focus group and video interviews*. Marina De Rossi wrote: *Research Design; Method; The research; The actions; The tools; the questionnaires; Conclusion*.

Introduction

Siemens (Siemens, 2006) recent theory on connectivism states that with the revolution of Web 2.0 what is important on the network is not just the information, but also and especially those who generate the flow of information: it is no longer possible to think of the content as disconnected from the channels and contexts that allow for interaction and participation (Jenkins, 2010). In this respect, many authors point out that there is a strong dichotomy between the practice and use of technology that occurs at school as compared to outside this context, so the school experience becomes alien to the students compared to their everyday experience (McTavish, 2009; Ferri, 2011). It's as if students are participating in a double curriculum, one that is formal and one that is informal, the latter being a real «parallel hidden curriculum» (Jenkins et al., 2006; Ito et al., 2008), that is absorbed informally and daily through the practice and use of social technology and social networks. Trying to «sew» the two curriculum's together by adopting Web 2.0 also at school, means to rethink the educational subject content and make contact with professional and social informal daily contexts, and with the verbal processes that naturally underlie these.

The learning context that we operate in is that of *Project Based Learning* (Boss & Krauss, 2007), namely the possibility of offering students authentic real-world problems that require an effective solution. Most of the educational content and the assessment methods that are adopted in the school lack in fact what may be called a «frame of reality» (Castoldi, 2011; Lichtner, 2004): namely they are lacking a practical approach to real knowledge. The school also demands individual performance and reviews, while the social and work reality also demands the collaboration of others in order to successfully carry out any task that is professional, recreational or tied to personal interests.

The Didaduezero project: objectives and theoretical background

The «Didaduezero project – The development of digital skills in the school and in the local area: the opportunity of Web 2.0» was designed based on the theoretical framework described above and was carried out between 2009 and 2011 in collaboration with the Educational Research Institute of the Province of Trento (IPRASE). The objective of the study was to initiate inter and multidisciplinary educational courses using the Web 2.0 tools to:

- foster informal learning by integrating this type of learning into the formal type;
- improve the integration between school and local territory (institutions, organizations and community);
- increase the motivation to learn by creating an active participatory learning environment based on real contexts and processes;
- develop digital skills of students and teachers.

The pedagogical references made are those of Dewey, Lewin and Freire, and their interpretation of the school as a tool that allows the student to participate first-hand in the process of knowledge construction working within a concrete social reality. Therefore we created an innovative model called SoSoFIN (Figure 1) as a reference for building a teaching/learning

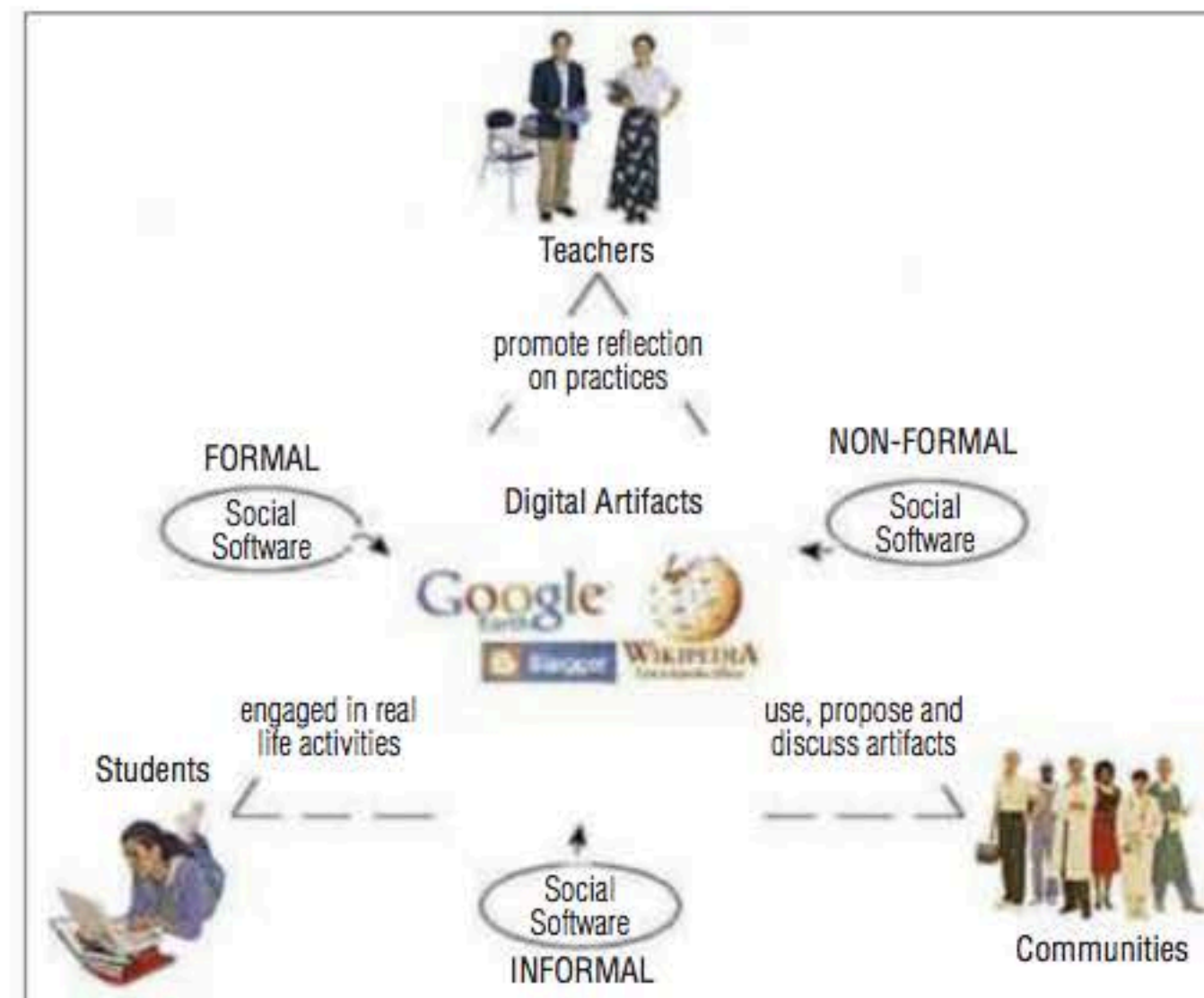


Figure 1 The SoSoFIN model (Social Software between formal, informal and non-formal) social software can be the tool committed to solving real problems and integrating the formal, informal and non-formal learning processes between students, teachers and the community (Petrucchio, 2010, p. 28).

environment in which Web 2.0 technology would help to meld together *formal, non-formal and informal* areas (Greenhow et al., 2009; Conole & Alevizou, 2010; Dabbagh & Kitsantas, 2012).

The challenge for the teachers was to offer projects based on concrete and real learning activities which require interaction with the community (online and in person) to create digital artefacts and share them in the local territory. We can consider a «rhizomatic» model (Cormier, 2008; Attwell, 2010) that re-discovers the involvement of Freire's teaching, in which the community can help to create a curriculum template («community as curriculum») that is no longer developed only by experts but also «negotiated» with people that are part of real contexts of work and life.

Our experience was successful, but it was not easy and the difficulties encountered confirm what is found in the literature (Bull et al., 2008): many teachers found that, along with the limiting factor in the time available, there was difficulty in managing the in-class on-line activities and planning online activities to be completed *outside the classroom*. In addition, from all the stakeholders of the school (teachers, parents and students) there was a strong perception that the use of social software and Web 2.0 was *distracting* compared to traditional school activities and for the purpose of measurable performance (Tan, 2009). Finally a typical criticism was voiced regarding the use of technology by teachers: often the skills are «practiced» at school but they are not experienced in daily life, like they are for students.

Project Structure

The project involved 9 schools in the province of Trento and a total of 21 teachers (5 from primary school, 13 from junior secondary school and 3 from senior high school) and approximately 300 students. The project took place during three years and involved various consecutive steps:

1. aimed to orient teachers towards a motivated and conscientious choice in relation to the objectives of the project;
2. aimed at providing guidance in the use of Web 2.0 tools within the various disciplinary areas;
3. directed towards engaging the local members of the community through the execution of specific projects using social software and other Web 2.0 tools.

During the second phase of the project we designed four training modules for the teachers on specific software suggested. At the end of the training the teachers developed an educational project chosen within the confines of the objectives of one or more modules (Table 1).

Module	Objectives	Tecnology
Build collaborative knowledge	<ul style="list-style-type: none"> • Reflection on the reliability of the sources • Participation as co-authors in the development of a paper 	Wiki and Wikipedia
Build reading community	<ul style="list-style-type: none"> • Training in the stand-alone player between the formal and informal (network between schools, local libraries and virtual libraries) 	aNobii and blog
Share local resources	<ul style="list-style-type: none"> • Development of analytical skills and interaction in the geo-physical, anthropological and environmental reality • Development of the ability to recognize and integrate cultural artefacts in the territory 	Google Maps and Google Earth
Create inter-cultural maps of the local territory	<ul style="list-style-type: none"> • Development of reading skills in the territory at the intercultural level with specific «mash-up» and interaction between schools and local associations 	Open Street Map

Table 1 The training models for the teachers.

Research Design

Reference was made to the participant research model (RP), according to which: the problem arises within the community that defines it, the model analyzes the problem and resolves it; the aim is the transformation of social reality and the change of behaviour in individuals that are part of this reality; the procedures tend to stimulate an increased awareness among the participants with respect to the activation of their own resources and the involvement of the researchers is continuous. The Didaduezero research follows this point-of-view, giving priority to the construction of new forms of cooperation in order to allow both a constant adherence to problems and concrete contexts for field testing, as well as provide rigorous procedures and results through the use of appropriate tools (Bogdan & Biklen, 1992). The dynamic between educational activities and scientific activities involved all the participants starting from assumptions made jointly and centred on the work of the operators (Portuoi, 1995; Orefice,

2006). Through the stimulation of the researchers, the participants were asked to think, to decide and to prepare plans of action (Trombetta & Rosiello, 2000).

Method

To summarize, from the methodological point of view, the three key moments were: a) planning the group work for designing the actions that refer to the modules; b) participation in the work in various contexts that were singled out for the implementation of the project; c) administering the survey that accompanied all stages of the field action for the evaluation of progress (Elliott, 1991).

The construction of a volunteer group took place during presentation stimulus meetings. The teachers and the school administrators had the means to reflect on the following:

- on the representations about the reality of the school-territory;
- on the conceptions of the role and function of the school in society;
- on their own perceptions of competence in relation to their own professional history;
- on the perceptions of the relationship between teaching and the use of technology;
- on their level of motivation to change.

Various sub-groups were then created for each module on the basis of the different territorial needs. Each group was put into the position of organizing a repertoire of strategies with the goal of *problem posing and problem solving* (Kemmis & McTaggart, 1988). The increasing involvement of regional partners came about as a result of *co-optation* from teachers. In this stage we carried out *focus groups* that revealed some key issues critical for the development of our project. The co-design model used for the actors involved enabled us to negotiate the needs that emerged in various contexts. In fact the needs and conditions were different; on the schools part, there was the need to qualify the local resources from an educational perspective. On the contrary, on the part of local agencies, there was little need felt and the supply was limited. Through the actions presented, focused on a continuous exchange-comparison, we saw significant influences between the different parties in the development of a community (Wenger, 2007).

The research

The research examined reality as a whole considering changes of relationships and behaviours (Cunningham, 1976, p. 216), in particular analyzing the technology variable. The purpose was to create a research community to develop an important critical task with the entirety of the methods and techniques used in practice. The action was set-up as a continuous verbal exchange between the scientific expertise of the researchers and the practical-reflexive skills of the operators. The aim of the research concerned the gradual spontaneous transformation of those habits and behaviors which constituted entrenched routines. But these routines did not include any co-design action and little or none, conscious real integration between school, territory and virtual community. In fact, even though a certain amount of technology use is widespread in schools for educational purposes and for informational purposes for the other partners, the use of the Web 2.0 tools was almost non-existent, apart from informal personal practice. Most of all process implications about communication and collaboration in the local and virtual community had not been considered criteria of *effectiveness* (the congruence between educational aims and means used in the path) and criteria of *efficiency* (the achievement of aims through the optimization of resources) were found.

The actions

Two variables that were important to the research-action were joint planning and the teaching laboratory. The planning stage was seen as a state of discovery that favoured an awareness of the problems so we adopted a heuristic approach, highly committed to investigation and based on dialogical-discursive factors (Kaneklin, Piccardo & Scaratti, 2010), as opposed to a linear mode (of design). Through the use of Web 2.0 technology we tried to avoid the risk of fragmentation within separate action contexts that are self-referenced by the use of devices for *facilitating the communication process, constructing shared meanings and creating exchange goods*.

The Indicators which allowed monitoring were: the action as a function of the aim/aims of the group; the central importance of individuals as actors for change; the managerial aspect of time and the duration of the work in reference to the aims; the institutional context as a juridical-political framework, within which the project took place; the social link that has structured

the process of socio-cultural animation both within the group and in relation to the outside community; the strategy, as the way to adapt the means to the aims of community development and the integration school-territory. The second important factor concerned the adoption of a laboratory methodology which represented a factor that can generate forms of reflective learning, aimed at constructing knowledge and skills in which subjects become involved in an ongoing dialogue between the generalization of theory and the specificity of practice (Bond & Walker, 1991). The laboratory methods enabled the emergence of the implicit, or hidden knowledge which determines efficacy within the professional realm regarding the solution of problems and the awareness of the processes underlying the experience (Polany, 1979; Reber, 1993). All the actions were conducted in the following manner: development of teaching-educational projects related to the four units and coordination among all the subjects involved and the activities performed directly with students. In every case the laboratories were set up as: a place of integration between theory and practice; a space for developing cognitive and reflective processes and a space for methodological framework of «situated research», that is still able to show significant generalizations according to transversal criteria (Gilbert, 2001).

The tools: the questionnaires

At the end of the second year of research three semi-structured questionnaires were prepared (open ended and closed ended questions) targeted to the various subjects belonging to the school context (teachers directly involved in the research, students in the classes considered in the research and teachers indirectly involved). The questionnaires aimed to measure the perception, from different points of view, of the processes of integration of learning between the formal and the informal through the use of social software and Web 2.0 tools (Table 2).

21 teachers answered the first questionnaire (Q1, F = 79%, M = 21%), 24% belonging to primary school, 62% to middle school and 14% to upper school. In summary it emerged from the answers that participation in the action-research had increased both the number and the type of social software utilized and the frequency of use within the informal context (Figure 2).

The majority of teachers (71,4%) later underlined the extremely positive influence of technology and social software, in particular because they represent a motivational source for students, an element of novelty and a

	Target	Dimensions	Tipology and number of questions
Q1	Teachers directly involved in the project	<ul style="list-style-type: none"> personal use of internet and social software (before and after the project) efficacy of projects based upon integrated educational settings both in the area of teaching and about the relationship between school and community 	20 closed ended questions of which 7 required the target to provide greater open-ended detail
Q2	Students involved in the project	<ul style="list-style-type: none"> satisfaction about the realized activities perception about efficacy of this innovative teaching modality 	12 closed ended questions (on a five-point Likert scale) 6 items asked for greater details (open ended)
Q3	Teachers directly or indirectly involved in the project	<ul style="list-style-type: none"> membership to a non-formal and informal group of socio-cultural animation perception of the relationship between his/her own membership to an interest group and predisposition to use technology in personal and teaching contexts perception of usefulness in the use of technology as a resource for teaching 	9 closed ended questions of which 6 asked for greater detail (open ended)

Table 2 Summary of the tools used.

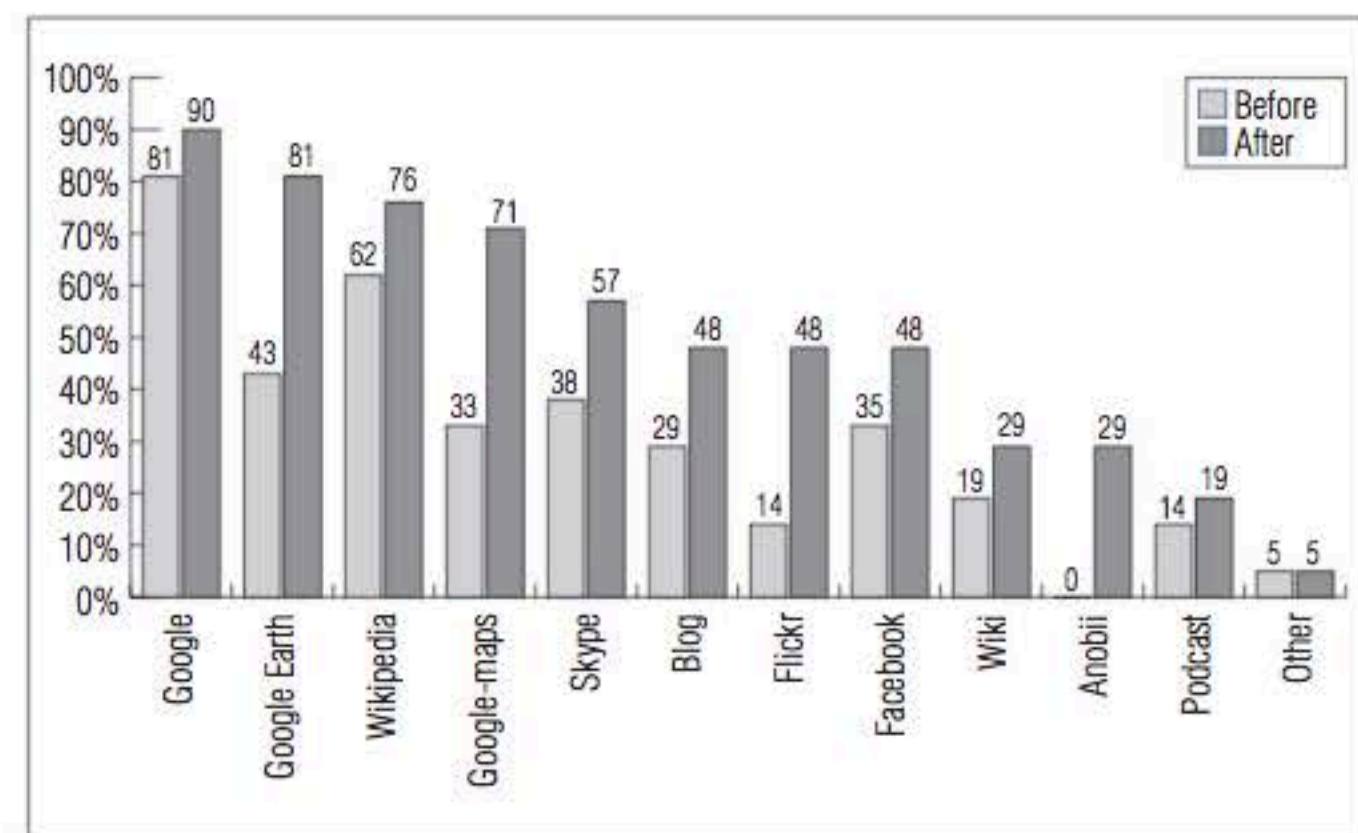


Figure 2 Social software used by the teachers in an informal environment.

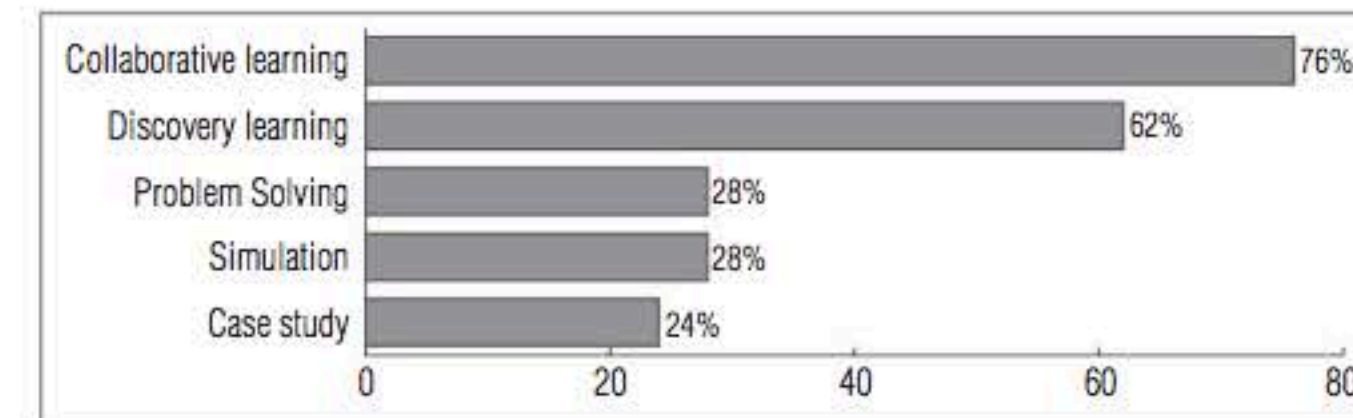


Figure 3 Learning strategies believed most effective.

source of interest especially when teaching is planned using the principles of collaborative learning and discovery (Figure 3).

With regard to the relationship between school-local area, we found no substantial changes. About half the teachers (54%), do not believe that the community, as a result of the project views the school institution differently after the project, and this is mainly due to the lack of time. In nearly all cases (87%) of teachers believe that the local areas could benefit from the creation of networks through the widespread use of social software in contexts of formal and informal education (Figure 4).

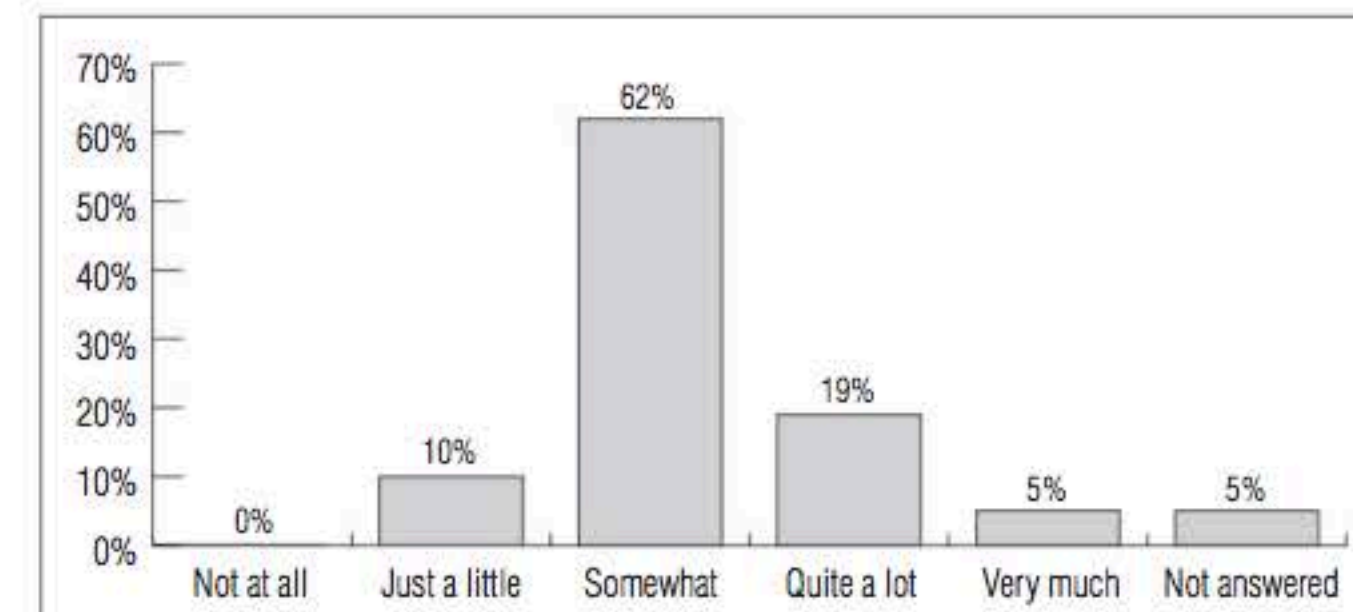


Figure 4 Assessment of the benefit for the community arising from the creation of networks through the widespread use of social software in formal and informal education contexts.

The second questionnaire (Q2), administered to the students, was a relatively simple tool given the wide age range target. In total 228 students (M

= 52%, F = 48%) answered, divided according to school grade (20% from primary school, 72% from junior secondary school and 8% from senior secondary school). From the data it emerged that the majority of students value the use of social software and of Web 2.0 tools in teaching. In fact, not only did they regard favorably the project but they would advise other teachers to use the same activity with their students (Figure 5).

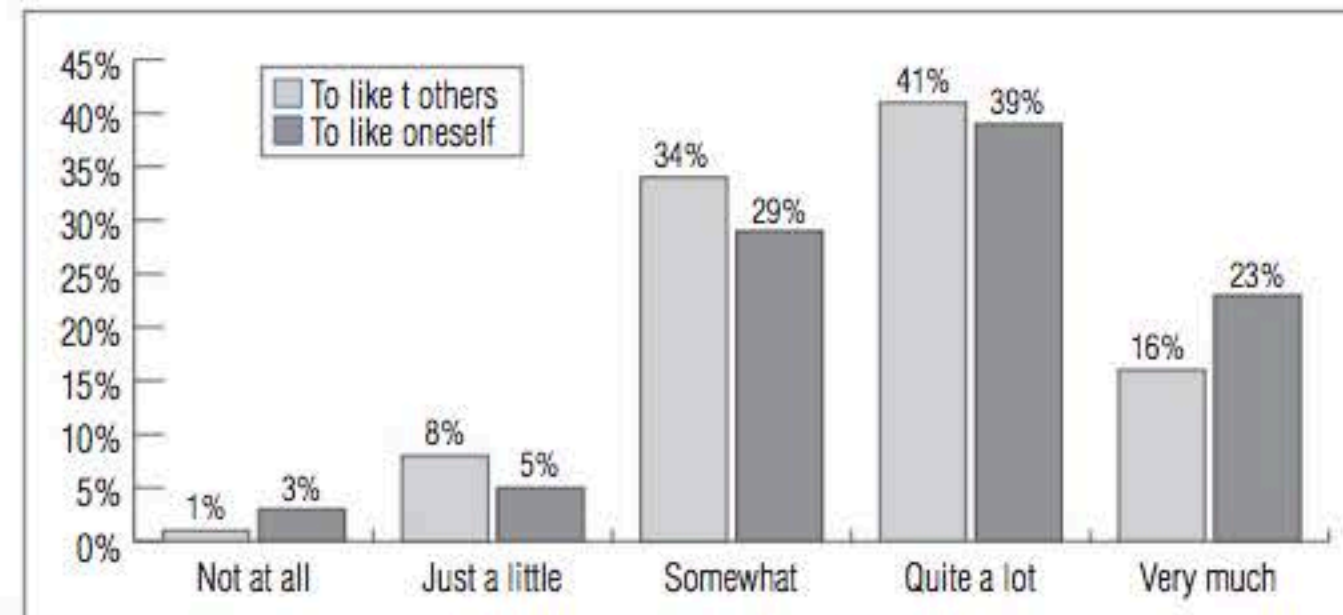


Figure 5 Comparison of answers regarding the appreciation of the use of social software for educational activities in relation to themselves and to other students.

There were no relevant differences by gender found, but they existed according to module and by school grade. Younger students took part in the project with enthusiasm and interest, but as the level of schooling and the age of the student increased, the judgment differs and the perception of the usefulness grows compared to simple liking. In conclusion, it seems that the introduction of Web 2.0 tools has had a positive impact in three main areas: 1) learning with personal and creative contributions; 2) collaboration and building strong relationships with teachers and fellow students; 3) building relationships with the community and external parties (Figure 6).

The third and last survey tool (Q3), administered to teachers that were directly or indirectly involved in the project, highlighted two important issues. The presence of a colleague that is a technology expert is still a decisive variable when introducing innovative teaching practices, because they can address any unforeseen issues that might occur during the lesson and suggests possible uses. Secondly, there is also a need to organize workgroups between teachers of the same subject (and at a later time, of different subjects) and technical

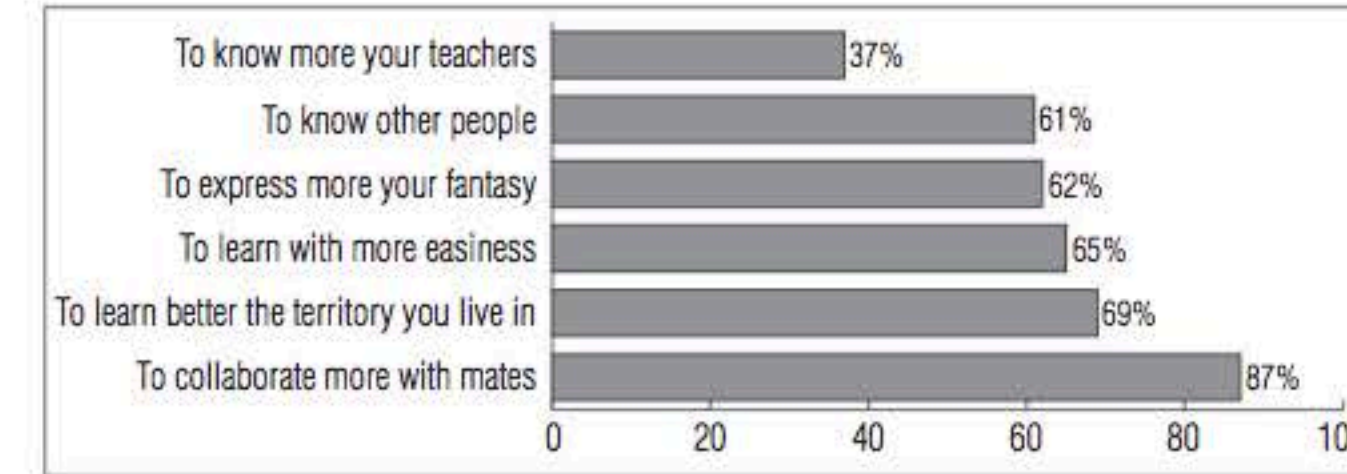


Figure 6 Effects perceived by students.

experts to co-design educational activities balanced both from the technological point of view and from the content point of view (76%) (Figure 7).

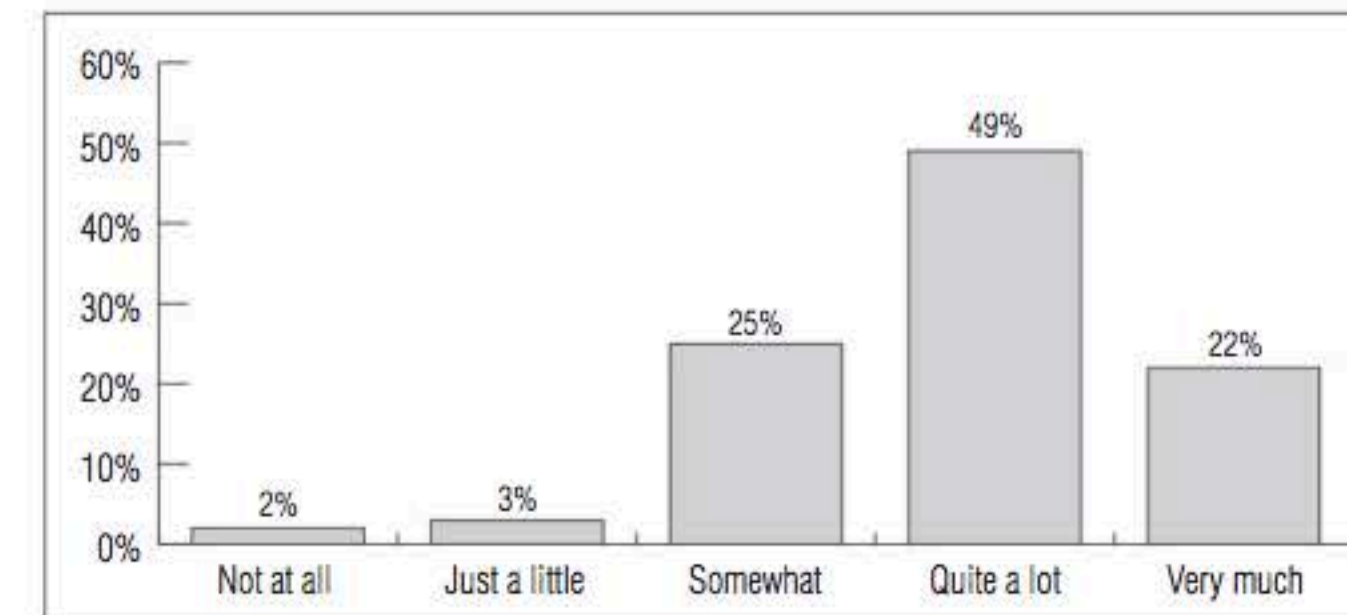


Figure 7 Importance of the presence of a technology expert for the introduction of new teaching practices and their application to other subjects.

Focus group and video interviews

The research group tried to show by means of 6 focus groups the main views on the relationship school-local area existing in the communities. In this way we can also co-plan a research-action intervention, according to specific local area characteristics. Group interviews with the various different social parties involved were held in schools. Meetings on average lasted one and a half hours. The 48 focus group participants came from formal contexts (teachers, managers), non-formal contexts (local authorities, libraries, museum,

document centers) and informal contexts (educational/entertainment agencies, cultural and intercultural associations, cooperatives promoting tourism, trade associations). The textual analysis of the different conversations (using Atlas.ti software) followed a top-down approach with regard to the dimensions that were investigated, and a bottom-up mainly for the project phase of the work. We identified 6 specific «families» in which 85 codes aggregated: school concept, (12) codes, local area (15 codes), new information technologies (15 codes), aims of the project (16 codes), how to carry out the project (10 codes) and the difficulty of the project (17 codes). Generally we noted a strong interest in the Didaduezero project, due to a proposal of cooperation between two types of subjects that already knew each other, but had not yet directly interacted with one another through a shared project (in Table 3 it is possible to look at the most significant ideas related to individual households).

School	Training agency
	Local area «glue»
	Knowledge maker
	Local area promoter
	Difficulty in realizing real part partnership
	Structural rigidity/Bureaucracy
	Lack of time and energy by teachers
Local area	Culture/Tradition
	Local economy/Tourism
	Environment/Nature
	Solidarity relations
Information technologies (Web and social network)	Publicity/Low cost visibility
	Futile and «distracting» mean
	Exchange and co-construction of knowledge environment
	Lack of critical content re-elaboration
	Motivational tool (teaching)
Aims of the project	Transversal lesson method
	Provide technology skills to students
	Increase minors knowledge of local area
	Make student s active producers
	Promote local area
	Increase social network

How to carry out the project	Computer and IT not intended as object of study, but as application tools
	Active and collaborative work
	Public visibility of artifact's made at school
	Time-consuming design/work times
	Synergy between local area and school in person and online
Project difficulties	Lack of collaboration
	Distrust of information technology
	Lack of time
	Intergenerational Gap (cultural and technological)
	Lack of technical computing performance tools
	Poor computer literacy

Table 3 Summary of the most significant concepts arising from the focus group textual analysis.

In addition to focus groups, we carried out video-interviews with the main representatives of various local offices, both during the actual implementation of the project and once we completed the products created in class. The aim was to monitor the work in progress and to understand if the thoughts of the subjects changed when moving from theory to practice. From the video-documentary one can observe that the initial fears, regarding the feasibility of the Didaduezero project and the use of new information technologies in teaching, have vanished.

Among the most important aspects that arose at the end of the project was that social software, when used conscientiously and with the proper scope and reason (according to Didaduezero's project methodology), is beneficial for integrating formal and informal learning and bringing kids closer to the potential of the web by making them creators of useful resources for the entire community. In particular, we observed that, on the one-hand there was an increase in motivation and involvement of minors (even those who usually have relationship and cognitive difficulties) in educational activities, and on the other hand, students felt like protagonists of what they were doing and therefore more responsible for the success of these projects. The learning process then becomes more significant. It seems that the use of web 2.0 for teaching purposes does not only increase IT and technology literacy in students, but it also activates new forms of creative intelligence and collaboration between peers and between teachers and students.

It is clear that computers, technology and the internet can be useful tools for any discipline and should not be relegated to mere computer laboratory activities in computer science.

Thanks to the products created in the Didaduezero project the connection between school and the local territory has become stronger, both in terms of knowledge of its characteristics and of the positive effects for the communities themselves. The communities have been enriched by new multimedia resources (created and shared online by kids) accessible to everyone and able to further enhance local area value and social networks.

It should also be noted that there was another important result achieved by this project; the involvement\contagion that occurred in the families of the students. Parents in fact supported school work, they facilitated the discovery of local resources and could monitor their own sons and daughters activities step by step by simply going online. The work of the various schools and the documentation of the entire project implementation process (with text contribution and video interviews) were collected together into a dedicated web space accessible by everyone.²

Conclusion

From the analysis of data collected, it's possible to state that the use of Web 2.0 according to the suggested model and applied in a school setting has the following effects:

- promotes the students' integration of formal and informal knowledge (students' perception of the creative component in the integration of formal and informal learning 62%; improved portion in the quality of their own learning 65%);
- increases the resources available to teachers (23,87% average increase perceived by the teachers on a personal level from the use of social software and Web 2.0 with favourable implications in the classroom);
- facilitates the realization of learning paths based on real issues (perception of teachers on the methodological innovation brought about by the use of 2.0 technology: 62%, learning through discovery, 80% introduction of problem solving methods for problem solving, simulation and case analysis);

² <http://www.iprase.tn.it/didaduezero/index.php>.

- characterizes the central role of learning with respect to the importance of teaching (students' perception of satisfaction and value of Web 2.0 and social software in relation to itself, 62% a lot-very much, in relation to the other 57% a lot-very-much);
- increases collaborative participation and motivation of the students (according to teachers 76%, according to students 87%);
- increases among teachers the integration between methodological and technological competences (although clearly the need for technology support by an experienced teacher is needed 71%, a lot very-much).

With respect to the research objectives of developing socio-cultural empowerment in the community, the planned introduction of 2.0 technology between the school and local territory highlights the following summary results:

- actively involves the various actors (fairly well for 62% of teachers, a lot-very much for 24%, improves knowledge about and the relationship with their own local community for 69% of all students);
- activates processes of participation and communication (according to the main categories that emerged from the focus groups in relation to culture and traditions, the environment, the economy and a network of solidarity);
- favours the co-planning process (the positive aspects that emerged from the focus groups: increased synergy between school-local territory, rates active and collaborative work between partners, increases visibility for the entire community; critical aspects: bureaucratic timetables that do not foresee these working arrangements, red tape);
- facilitates the processes of socio-cultural entertainment (according to the categories that emerged from the focus groups, improves participation, improves collective responsibility and improves communication between actors and different contexts).

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