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Constructing a Successful Cross-National Virtual Learning Environment in Primary and Secondary Education

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Educational virtual environments have great potential to foster collaboration among schools located in different countries. This article shows a virtual learning environment where four Italian and three Dutch primary and secondary school classrooms collaborate on multidisciplinary content. Theoretically the project is inspired by the concepts of learning as knowledge building, the community of learners, and computer-supported collaborative learning. The virtual world that was created, called Euroland, is composed of several different “cultural houses.” The qualitative description of the building process of the cultural houses proves virtual environments can be introduced in educational settings to foster cognitive and social skills. Several features of this virtual learning environment affected its success: the playful dimension of the software, the development of meaningful content, and cross-national collaboration. Main conditions for this are the well-designed tasks, and the strong scaffolding from teachers and, if possible, researchers (Ligorio, Talamo, & Simons, 2002). The article ends with a reflection on some structural conditions that are necessary at the school level for such projects to succeed.

In the last few decades there has been a growing interest in primary and secondary education for educational virtual environments. In particular, the creation of virtual environments was envisioned by the European Commission (EC) as a means to foster a European culture. Facilitating exchanges and collaboration among European educational agencies was foreseen to be one of the strategies to consolidate Europe as a geo-political unit. Many projects funded by the EC sought international collaboration between all levels of participants (researchers, teachers, students). These projects have been based on different types of computer software, ranging from web-based forums to environments that resemble videogames.

The experience of working with such European projects has taught us that collaboration among schools located in different countries is difficult to achieve. It is necessary to have well-designed tasks, strong scaffolding for students by teachers, and if possible, scaffolding for teachers by researchers and educational experts. This article describes a virtual educational environment called Euroland, which we consider a successful example of how to implement substantial collaboration in a virtual environment among classrooms from different schools, even from different countries.

Euroland is explicitly based on collaborative tasks to be performed in Italian and Dutch classrooms. The project's multidisciplinary focus necessitates teachers working in teams. This means that teachers have to work together to overcome both disciplinary divisions and the tendency to encapsulate school subjects (Engeström, 1991), given recent national curricula regulations. Furthermore, these types of project represent not only an occasion to collaborate cross-nationally, but also a new occasion to make connections between out of school and classroom activities.

Euroland involves creating a three-dimensional virtual world that is completely empty at the outset and gradually becomes populated with "cultural houses" (Ligorio, 2001a). For teachers and researchers, Euroland represents an opportunity to reflect upon the type of competencies required to implement virtual environments in the curricula, as well as to study its impact on the classrooms in which it is implemented.

Before presenting Euroland in detail, we will first discuss some theoretical notions underlying the project. Thereafter, examples of the planning and building strategies will be reported. The article will end with a discussion in light of the successful implementation.

THEORETICAL REFERENCES

The project is based on three theoretical approaches: (a) theories envisioning learning as knowledge building (Scardamalia & Bereiter, 1994); (b) the community of “learners” (Brown & Campione, 1990); and (c) computer-supported collaborative learning (Lehtinen, Hakkarainen, Lipponen, Rahikainen, & Muukkonen, 1999)

These approaches share a view of learning as socialized, collaborative, and “situated” in a specific context (Brown, Collins, & Duguid, 1989), which is in contrast to a view of knowledge transfer from an expert to a novice. Knowledge is assumed to be actively built: learning means reconstructing knowledge rather than simply acquiring it by being exposed, through listening or reading, to expert sources such as teachers and books. The concept of *knowledge building* (Scardamalia & Bereiter, 1994) is closely related to the notion of *constructivism* (Papert, 1991). Both concepts assume that learners construct knowledge by interpreting their perceptual experiences in terms of prior knowledge, current mental structures, and existing beliefs (Duffy, Jonassen, & Lowyck, 1993). Collaboration is used to encourage knowledge construction and understanding from multiple viewpoints. Learning is promoted from a physical perspective (e.g., through the building of virtual world) as well as from a cultural perspective (e.g., through the generation, exchange, and discussion of ideas, knowledge, and specific content for the virtual houses).

The *community of learners* approach focuses on the social dimension of learning and considers collaboration to be the engine of learning. Students and teachers, as well as researchers and experts, are expected to be active participants. This implies a profound change in the traditional roles: all “agents” are required to actively and explicitly learn from each other, not only by simply exchanging information, but with “appropriation” of information and others’ points of view. In regards to teachers’ attitudes, in addition to their role of facilitating students’ learning processes, they are also expected to acquire both a research stance (by formulating problems and hypotheses) and a learners’ stance (by appreciating students’ knowledge and expertise as stimuli for exploring new fields and perspectives).

The *community of learners* approach assumes that cognition is *distributed* among diverse participants who need to be genuinely *interdependent* (Salomon, 1993, 1998). This implies that communities are organized into

teams composed of members with different competencies, where each team takes charge of different subtasks. In this case, adults have the responsibility of reminding the community of the overall purposes of the joint venture.

The *computer-supported collaborative learning* approach refers to the use of computers as cognitive “artifacts,” which are able to promote active and collaborative knowledge building. This approach focuses on the role computers can play in student learning, ranging from mediating face-to-face learning to providing virtual learning environments (Lehtinen, Hakkarainen, Lipponen, Rahikainen, & Muukkonen, 1999). Virtual educational environments foster the establishment and expansion of a community by offering a “real” context for interaction and communication among distant partners, and providing the opportunity to actually build one’s own environment (Kommers & Zhao, 1998). Virtual environments support virtual communities, with no physical walls defining the borders of the place where the community resides and works.

Features obvious in face-to-face interaction—such as age, gender, or physical appearance—are no longer relevant and can only be inferred from the interactions and actions in the virtual space (Rheingold, 1993; Steuer, 1992). Elements that reveal the users’ identity are nicknames, avatars (three-dimensional human or animal shaped objects), and written texts to tell about themselves (Talamo & Ligorio, 2001). Furthermore, the general roles of interaction and communication are, to some extent, different and innovative in virtual environments than in a face-to-face community. At the same time, some general features are the same: people tend to establish meaningful relationships; they share a common purpose, in the form of a shared interest, need, or task; policies are set in the form of rituals, protocols, rules, and laws to guide interactions; and a sense of togetherness is reached once the virtual space becomes more and more inhabited (Preece, 2001; Preece, Abras, & Maloney-Krichmar, 2004).

Based on these three theoretical approaches, a successful virtual learning environment can be described as an environment in which students:

1. are able and challenged to construct their own knowledge (learning as knowledge building);
2. are all challenged to be active agents who are interdependent on each other (community of learners); and

3. perceive and experience the virtual learning environment as supportive for their collaborative learning (computer-supported collaborative learning).

Given its educational nature, a further criterion of success for this project is that students demonstrate cognitive and social skills as they participate in the community. In particular, based upon the aims of the project, we should see evidence that students learn about the culture of the partner-country, improve their English as a second language (because all cross-national interaction is conducted in English), and appreciate the collaboration with others—both within their own classroom and with other classrooms. Before presenting the data, first the project itself and the method will be described in the following section.

THE PROJECT

The project was funded by the European Community and involved Italian and Dutch partners. It was named Euroland to stress the cross-national dimension. The procedure through which Euroland was designed and implemented is strictly aligned with to the aforementioned theoretical approaches. The following section describes the technology, the design, the procedures for realizing the virtual community, the data collection, and the analysis.

The Technology Used

The software used is called Active Worlds (AW) (www.activeworlds.com). The AW software is internet-based, user-oriented, and belongs to the nonimmersive type of virtual reality. Within the virtual worlds built with AW, users can walk through, navigate, and fly over three-dimensional (3D) objects. The 3D nature of this software makes the virtual environments look like videogames, where users can “enter” spaces such as houses and rooms, and may manipulate, rotate, and interact with objects such as pieces of furniture, panels, water, trees, and so forth. The presence of a user is made visible through “Avatars,” which are animated 3D objects that may range from a puppet to a penguin or some other animal. AW supports mainly

synchronous communication through text-based chat and visual Avatars and 3D objects interaction and manipulation.

AW allows for easy and fruitful integration with other internet-based software (Ligorio, 2001b), such as the Web Knowledge Forum (WKF), developed by Scardamalia and Bereiter (1992), which is the internet-based version of the Computer Supported Intentional Learning Environments. WKF promotes asynchronous communication and interaction, and is designed based on the collaborative knowledge building principles (Scardamalia & Bereiter, 1994) (Figure 1). At the center of the software is a communal database for posting “notes” from students, teachers and researchers. “Note threads” show the development of questions and responses during the project.



Figure 1. Active Worlds and Web Knowledge Forum integrated

For students and teachers at primary and secondary schools, the program is easy to use. Very little training is required to work with EuroLand, although its use may imply a need for reorganization of school settings, changes in teachers' attitude, and teachers' time investment. Learning takes place by entering, “populating,” planning, and building a virtual world, using three-dimensional objects, and interacting online with other users.

The Virtual Community

The virtual community involved in this project was created by seven researchers, three of whom acted as online tutors, 13 teachers active online, 40 students with “citizenship” (rights to build), and 27 occasional guests. Activities online alternated with tasks performed in the classroom, and with visits and explorations outside the schools (Talamo, Zuccheromaglio, & Ligorio, 2001).

Seven schools participated in the project. Four schools were Italian: one 8th grade (13-14 years old) classroom from a middle high school in Rome, one 8th grade from a middle high school in Modena, one 6th grade (11-12 years old) from a primary school in Milan, and four 4th grade (9-10 years old) classrooms from a primary school in Bari. The other three participating schools were Dutch: one 3rd grade (14-15 years old) from a secondary school in The Hague, and two 2nd grade (13-14 years old) classrooms from two different secondary schools in Amsterdam¹.

These classrooms were selected on the basis of teachers and students who demonstrated interest in participating in the project after researchers presented its scope and procedures. In general, the researchers attempted to keep the local settings as “natural” as possible, leaving teachers and students free to select the part of the project they preferred to work on and to organize their own schedule. This is coherent with the “ecological” approach emerging from the concepts of information ecology (Nardi & O’Day, 1999), learning ecology (Brown, 2000; Frielick, 2004), communities of practice (Barab, Cherkes-Julkowski, Swenson, Garrett, Shaw, & Young, 1999; Wenger, 1998), and networks as ecosystems (Kelly, 1994), all of which are relevant in contexts where technology plays a fundamental role in learning (Garrison & Anderson, 2003; Weigel, 2001). Nevertheless, some theoretical and methodological guide-lines were set by the researchers and all participants were required to follow the general theoretical framework, which was explained prior the start of the project.

For technical reasons, only a restricted number of users (20) could log into the virtual world at anyone time. For this reason, a “citizen group” was selected in each classroom, based on criteria decided by the teachers. In many cases students volunteered to participate; in some other cases teachers selected the students with the highest grades (for example the school from Bari); and in a few cases students with learning problems and social impairments were invited (Van der Meijden & Ligorio, 2005).

Each of the seven classrooms pursued different learning goals, pertaining to a specific part of the virtual world, though they were all committed to the general task of building Euroland. It was decided to fill the virtual world with a set of cultural houses. Each of these virtual houses contained different content, such as art, music, food, travel, or sport.

A common goal for all schools was to improve students' ability to use English to enhance the social and communicative abilities, and to use collaborative strategies to create and maintain communities both within the classroom and cross-nationally.

The Procedure

A procedure called "situated curricula" was used to create the virtual world of Euroland. This procedure consists of several steps. First, the project manager provided general guidelines meant to maintain a shared sense of the project and, at the same time, to guide each participant in the design of specific activities in line with the available resources and constraints of the particular classroom. This step is fundamental to ground the theoretical framework that inspires the project. Secondly, the teachers were asked to "situate" the community within their classrooms and therefore to apply the guidelines, provided by the researchers, to their specific context. Each classroom brainstormed about the possible content of the virtual houses. A first online meeting was dedicated to decide the content of Euroland, to assign responsibilities, and start thinking about collaborative strategies. During this phase, the teachers also had to sustain the community within their classrooms and initiate collaboration with other teachers from their school, other teachers online, and the research team. In addition to this, they were asked to stimulate and support the transfer of students' ideas from the classroom to the virtual world and vice versa. Finally, collective assessment activities were performed, such as guided visits to the virtual houses and discussion about the value of the project.

Following the *distributed cognition* principle (Salomon, 1993), each classroom participated on the basis of its own interests. The *interdependence* principle (Salomon) was applied by asking the students from one country to build the cultural houses for the other country. All classrooms were required to search for information, answer questions, provide help, and

comment on all of the 3D-buildings, also when another classroom was responsible for the construction.

Three synchronous meetings were scheduled per week, during which at least two groups of citizens from different schools would be online and at least two researchers provided pedagogical and technical guidance. Further connections from groups of students or individual students either at home or at school were encouraged, but no synchronous meetings with other classrooms were expected and no adult-guidance was guaranteed.

Data Collection and Analysis

An enormous amount of data was collected during eight months of activity in Euroland (from October 1999 to May 2000): text-based chats; photos from the computer screen; notes and materials stored in the WKF; and teachers' and students' reports about the classroom's activities.

According to the "ecological" approach, pre-and posttests were not conducted, and we avoided to consider the classroom as a laboratory. Instead we interviewed teachers and students, asking them to assess the project and their own participation. During the interviews (done by a researcher face to face in the classrooms) we asked teachers and students to complete the following sentences:

1. During this project I learned ...
2. Working with partners cross-nationally in a virtual space was ...
3. In general this experience was ...

A qualitative method has been used to analyze the data. All results were discussed within the research groups.

RESULTS

In total seven cultural houses were built by the Euroland community. Three of these houses will be shown in the following with the aim of understanding

the success and educational strength of such a virtual learning environment. The success of each house will be discussed using the four criteria. Furthermore, general results will be displayed with regard to students' learning.

The Dutch House of Art

The students from Rome were responsible for the construction of the Dutch house of art. This group of ten 8th grade middle school students had requested special coursework as preparation for the first year of high school the following year. They were supported by three teachers (English, Art, and Computer Instruction) and collaborated with the students from Modena, Amsterdam, and The Hague.

From the students from Modena, three 8th grade middle school students participated on behalf of the others in the construction of the Dutch house of art. Their teacher initially invested considerable time in the organization and supervision of the activities. During the project, he stimulated students to work independently.

Six 2nd grade secondary school students from Amsterdam joined the construction of the Dutch house of art, while supported by the other students of their class. Three of them had social and learning problems and the teacher wanted to verify the impact on them of interacting in a virtual environment. This group was facilitated by their computer technology teacher.

The 3rd grade secondary school students from The Hague had previous experience with AW. None of their teachers were available to supervise the project. So, two students, who were both very skilled in AW, decided to participate without any help of their own teachers but with the support of the tutors and the other teachers online. Those students also acted as online peer tutors for the inexperienced students.

The students from Rome started the planning of the external structure with very original ideas: a house in the shape of a snake or a big mushroom. However, soon they understood that their creative ideas did not correspond with the content of their house: Dutch art. A great insight came from a special event. The art teacher planned the yearly school outing to Venice to

visit an exhibition called “The Renaissance and the painters from the North.” Students learned that the Renaissance was a cultural movement with rich exchanges between Italian and Flemish artists. In fact, there is the case of a famous painting—named “Saint Girolamo”—for a long time attributed to a Flemish artist and later it was discovered that the author was actually Italian. After this visit, the students decided to examine the artistic differences between Flemish and Italian painters, such as the study of light. For such a topic, the best metaphor for the virtual house was that of a museum. They decided to have a modern museum and they chose a picture of a museum designed by a Japanese architect.

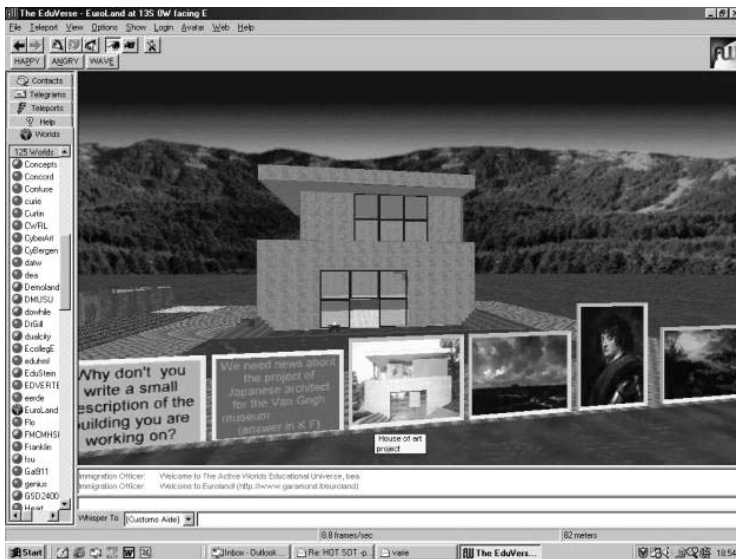


Figure 2. A panel with the photo of the museum guiding the construction and the Dutch virtual house of Art

Based on the photo, a similar structure was made in the virtual space. In the meantime, the WKF was used to discuss the educational content with the other students. The Italian students posed questions to their Dutch friends about the relationship between Flemish and Dutch and whether the study of light was a good topic for the Dutch house of Art. The students from Modena actively contributed by pointing out that the study of light had a close relationship with the portraits. A special section in the house was dedicated to that topic. So, the students from Rome were mainly responsible

for the external structure of the house, and the educational content was inspired by the discussion with the students from Modena and the Dutch students.

With regard to the success of the construction of this cultural house, the students were challenged and able to construct their own knowledge about Flemish and Italian renaissance painters (criterion no. 1). Facilitated by their teachers, the students showed many initiatives to gain more knowledge about the topic, for example, the visit to an art exhibition. Furthermore, with regard to the second criterion, all the groups actively collaborated, perceiving each other's contribution as helpful. With regard to the third criterion, the virtual environment was actively used as a tool to communicate and to "place" the products. The students perceived the environment as a challenging and supportive place. Finally, with regard to the last criterion, students showed an increased awareness of the renaissance painters, their English as second language improved during the project, and their ability to collaborate and to make use of each other also increased. These aspects are illustrated by the final results of the virtual house that contains paintings and comments incorporating data provided by various partners. Furthermore, the length and the frequency of the chats in English improved during the project.

The Travel Agency

The students from Bari were responsible for the travel agency house. The citizen group in Bari consisted of four 4th-grade primary school students, each of them belonging to a different classroom. The travel agency house proposed a virtual trip to all of the towns involved in the project. The interest of these students for travel agencies was strongly related to this school's special focus on the environment and the region. So, constructing a travel agency corresponded with their previous curricula experiences. The work was divided into four subtasks and each of the four Bari classrooms was responsible for one of them. The sub-tasks were: (a) visiting real travel agencies, taking photos of the offices, interviewing the travel agents; (b) and (c) collecting information respectively about the Italian and the Dutch towns by consulting books, web sites, and other sources; and (d) answering any questions posed by the cross-national and preparing questions for them. The project was shared with all students from the school by "broadcasting" Euroland using an overhead projector. The computer technology coordinator and two other teachers (one responsible for special projects and the English language teacher) facilitated the project.

The construction of the house was guided by the information collected during the visits to the travel agencies in the region. The information was discussed in the classrooms and integrated with other material. The students discovered the strong relation of such an agency with the local region and the crucial importance of communication strategies—that is, the relevance of using slogans. The requests to the cross-national partners (placed in WKF) became more and more complex, reflecting the development of the construction of the virtual house.

As with the previous house, the external structure guided the content of this house too. The external structure was mainly designed by the students from Bari, while the internal structure was decided based on the online discussion and the information offered by the other students (photos, pictures, drawings, historical and geographical information, information about entertainment and traditions, links to web sites) (Figure 3).

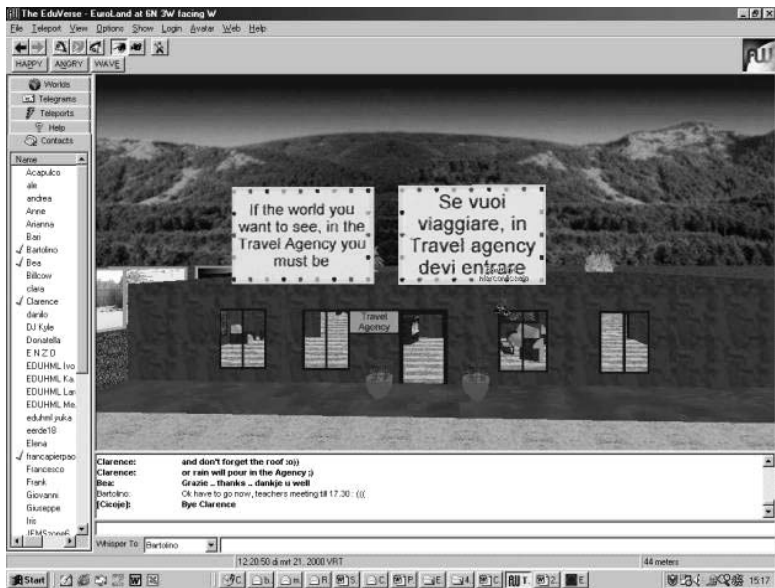


Figure 3. The virtual travel agency

The final travel agency house was a rich virtual environment where visitors were offered a journey covering all the cities involved in the project. All students were actively involved in constructing the content of the house and experienced fun finding slogans and creating objects able to attract new visitors (criterion no. 1). The travel agency house was “furnished” with

many objects containing relevant information about, for example, distances between places recommended to visit, typical products of each city, and information about historical and attractive sites. This information could only be collected with the help of the other participants (criterion no. 2). The aim of constructing a virtual house worked as a stimulus to explore “the field”: they visited travel agencies in the region and interviewed real travel agents to obtain information about the structures needed to run a travel agency. The computer was perceived as a tool to support and trigger all these activities (criterion no. 3). Along with the information about travel agencies, students learned about history, geography, and tradition of the other cities as well (criterion no. 4).

The Dutch House of Food

All students from Milan were responsible for the Dutch house of food, although only six of them were citizens of Euroland. The two teachers involved, one who taught English and one who taught Italian, initially assigned students to study how real houses are built, and then had students explore the software to see if it would allow building a “virtual house” in the same way. After this step, the students decided to construct a big house, able to welcome the whole community. It was decided to construct a picnic house, with a large outdoor space where a pound and a small cascade would make the atmosphere very relaxing. A LEGO model was built in the classroom to guide the construction (Figure 4).

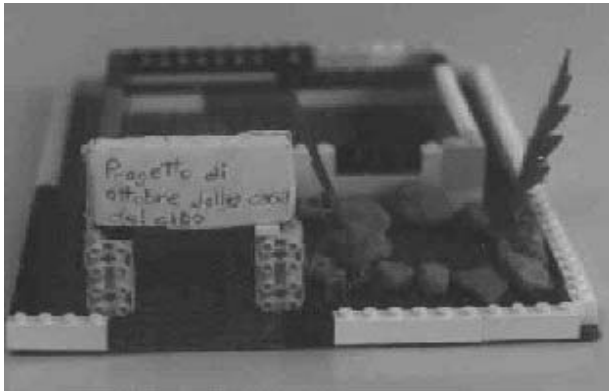


Figure 4. Picture of the LEGO simulation for the house of food

Once the external structure was ready, the students collected information about traditional food and cooking from the other countries. A playful strategy was used to include the information in the virtual house. Some virtual objects hid the information (either in text or picture format) and the whole community was challenged to search for it by playing a treasure hunt (Figure 5).

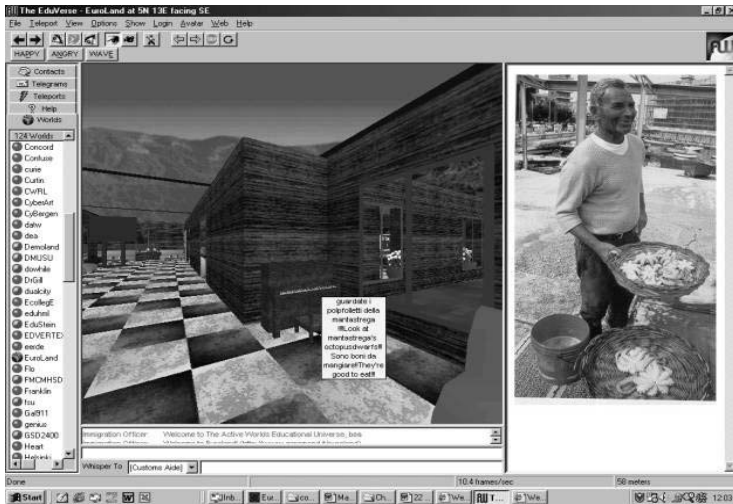


Figure 5. A photo hidden inside the virtual house of food

In this way everybody was forced to read and look at all the material available about food. At the same time they had fun interacting with the 3D objects and with each other. Each player had to fill out a list of the material found, e-mail the list to the group from Milan, and they sent a certificate to all the winners.

The process of constructing the virtual house and the cross-national collaboration was documented by displaying the process on posters in the classroom. The way the house was constructed was similar to the other houses: first the external structure was created and then the content was discussed. This strategy forced the students to pay attention to aesthetical elements such as the pound in front of the house, as illustrated in the following chat (recorded on February, 2nd, 2000). Bea and Clarence are two researchers tutoring the online session, Danilo and Arianna are students from Milan (Table 1).

Table 1
Student Chat

Bea	scusate questa é la casa del cibo??	Sorry, is this the house of food?
Daniilo	si bea	Yes bea
Bea	e che c'entra la piscina??	And what does a swimming pool has got to do with it?
Arianna	si è la casa del cibo	Yes, this is the house of food
Bea	va benissimo é bellissima solo voglio capire perché la costruite	It is great and it is very nice I only want to know why are you building it?
	quale é la relazione con il cibo??	What is the relationship with food??
Arianna	ma davanti alla casa del cibo abbiamo previsto di costruire un boschetto con un laghetto naturale	But we planned to build a small wood and a natural pound
	è nel nostro progetto col lego!!!	It is in our LEGO project!!!
Bea	cosi tanto per o c'e un motivo speciale??	Just for the sake of it or is there a special reason??
Arianna	non capiamo la tua domanda..	We don't understand your question.
Bea	voglio dire: la piscina ha uno scopo??	I mean: has the swimming pool a purpose?
Arianna	è solo per fare più bello l'ambiente intorno	It is only to make the environment nicer
Bea	o serve solo per fare più bella la casa??	or it is meant only to make the house nicer?
Arianna	non è una piscina..è un laghetto naturale..lo facciamo per bellezza	Is not a swimming pool... it is a natural pound.. we do it because it is pretty
Bea	ahh scusa un laghetto naturale	Ahh sorry a natural pound ...
Arianna	serve solo per fare più bella la casa..uffi...	It is only meant to make the house nicer.
Bea	bello molto rilassante ...	Nice, very relaxing ..
Arianna	oh---!!!	Oh ---!!
Bea	magari ci si può fare un pick nick ;)	We could even have a picnic ;)
Arianna	appunto----	That's right ----
Bea	:)))	:)))
Arianna	ci metteremo dei tavolini.:))	We will put some tables... :))
Clarence	allora chi vuole sentire altri rumori disponibili oltre la cascata ?	Now who wants to listen to some more sounds available beside the cascade?
Arianna	per degli incontri ..con gli olandesi..	For the meetings .. with the Dutch ...
Bea	che meraviglia ...	That is wonderful ...

The questions of the two tutors Bea and Clarence make clear that the students themselves thought of creating a nice environment to attract visitors, and that they had an eye for the aesthetical dimension, which supports the social interaction (criterion no. 1).

The need of attracting other users was not only based on a social dimension. The students from Milan also needed the help of the cross-national partners to “furnish” their house: they planned to hang on the walls, recipes they were unknown to them and they needed to make sure that those recipes were really representative of Dutch food (criterion no. 2). In addition to providing a place for students to meet and interact, the virtual environment allowed students to construct a meaningful and attractive space, while developing and applying a variety of computer skills. For example, the question-answer interaction possibility in WKF was really useful in gathering information about each other’s recipes. Initially they posed many 3D panels close to the house to leave questions for their partners about the recipes. Soon they understood that the 3D panels did not allow them to follow a thread of a discussion and so they switch to WKF. At the same time, AW, with its tools in the format of videogames, provided an aesthetical and playful dimension. Students reported having a rich environment fostering many types of interactions (criterion no. 3).

The students learned about all kinds of cultural issues of others and themselves by trying out recipes, reflecting upon the ingredients used, and comparing how Dutch and Italian families organize meals (who cooks, how does the shopping, who does the dishes, etc.) (criterion no. 4).

Students’ Learning in General

The overall reaction to the project from both students and teachers was positive. They reported that they learned about specific contents as well as about new ways of interacting online. They appreciate the collaboration with students and teachers from different cultures and different cities. As a general consequence of the experience of being part of a virtual community, they experienced also new types of collaboration within the classroom, such as collaboratively planning of their tasks and self-assessing the whole project. Furthermore, participants reported that they experienced the combination of online events, activities undertaken in the classrooms, and the activities outside the school as a stimulating learning environment.

To illustrate what the different participants (students, teachers, and researchers) learned during the project, the following transcript gives a representative example of how the participants reacted in general (Table 2). The excerpt is from a discussion in the classroom in Rome with students, teachers and one of the researchers. This discussion was guided by the request to complete the sentence:

Table 2
During This Project, I Learned...

Martina	Allora anche per me è stata un'esperienza nuova. Anche perché parlare con dei ragazzi via computer, non l'avevo mai fatto. E poi ho conosciuto anche con la professoressa l'arte olandese ...	This was a very new experience for me. I never before talked with other teens through the computers. And also I got to know the teacher of the Dutch art ...
Researcher	ah! Una persona nomina l'arte	Ah! Finally someone talks about art
Art Teacher	Grazie, grazie	Thank you, thank you
Researcher	finalmente qualcuno dice ho imparato qualcosa di arte!	Finally someone who says she has learned something about art
Martina	perché a scuola non è che trattiamo l'arte olandese più che altro, parliamo dell'arte italiana. Quindi è stata una bella esperienza!	Usually we do not treat Dutch art in school, we rather talk about Italian art. Thus, this was a great experience!
Francesco	sicuramente è stata un'esperienza che matura. Poi ho imparato anche a confrontare le idee, a costruire in un mondo virtuale, e a cercare ... intanto ad usare la videocamera ed è un passo avanti	For sure it was an experience and made us more mature. I learned to compare ideas, how to build a virtual world, to look for.. and in the mid time I learned how to use the video camera and that is a progress
Researcher	Certo questo	That's for sure
Art Teacher	Questo è importantissimo	This is really important
Andrea	Ho imparato a costruire!	I learned how to construct!
Francesco	E ha imparato lui a costruire!	Did you learn how to construct?
Researcher	lui pensa di si. Ognuno ha la percezione di quello che ha imparato. Te hai imparato qualcosa di arte olandese. Tu hai imparato ad usare la videocamera, a costruire	He thinks he did it! Each of us has his own perception about what we learned. You learned about Flemish art, you about using a video camera and how to construct.

Table 2 (continued)
During This Project, I Learned...

Andrea	lo và beh, ho imparato a costruire poi mi sono divertito a fare nuove amicizie. Ho imparato a fare meno errori in inglese anche se ne faccio tanti	Oh well, I did learn how to construct and also I had fun making new friends. I learned how to do less mistakes in English, although I still make many mistakes
Researcher	Hai imparato qualcosa di inglese	So, you learned something in English
Andrea	ah si! Ho imparato a non farmi prendere dal panico quando mi riprende la telecamera.	I learned not to panic in front of a video camera
English teacher	dai Paolo!	You're up Paolo!
Paolo	ho imparato ad usare Internet, ho imparato qualcosa d'inglese e qualcosa anche sull'arte ... e basta poi più o meno come gli altri	I learned how to use Internet, something about English and about art... that's it, for the rest more or less like the others
English teacher	Andrea, tu?	Andrea, what about you?
Researcher	lo aspetta tocca a me.	Hold on, it's my turn!
Researcher	eh! E poi tocca a lei	Eh! And later is her turn (referring to the teacher)
Researcher	allora ho imparato prima di tutto nuovi modi di fare scuola,	I learned first of all new way to do school
English teacher	Oh, non vi interessa che cosa ha imparato?	Oh, aren't you interested on what she learned?
Researcher	Ho imparato cose che non sapevo, adesso vi dico le cose che non sapevo. Ho imparato i modi di .. che si usano per parlare chattando. Ecco un altro linguaggio. Ho imparato come si fa a parlare quando si chatta. Cioè che si deve parlare molto più rapidamente, si deve sintetizzare, ho imparato questo modo di parlare. Ho imparato nuovi modi di fare scuola, che mi sembrano molto interessanti. Ho conosciuto altre persone ugualmente interessanti, i professori, nel senso di voi non quelli di altre scuole e ho imparato anche che un programma come Active Word può essere utile per fare scuola. Prego!	I learned things I did not know before, let me tell you what I did not know. I learned how to chat. That's it. A new language. I learned how to talk when we chat. We have to be faster, more synthetic, I learned this way of talking. I learned ways of doing school which I found interesting. I met new very interesting people, teachers, I mean teachers from other schools and I also learned that a software like Active World may be useful at school. Your turn!

Table 2 (continued)
During This Project, I Learned...

Art Teacher	Ma io penso, ecco, quello che invece mi è piaciuto tanto è il fatto di aver potuto sperimentare con l'apprendistato, cioè di imparare facendo. E quindi, secondo me, è quello che poi, è più attinente alla disciplina che io insegno. Ecco, vorrei poter insegnare sempre in una condizione di apprendistato.	I think that, well, what I liked most is that I could experiment the apprenticeship, learning by doing. This is, in my opinion, what is more relevant for the discipline I teach. I would like to teach always under the condition of an apprenticeship.
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All members of the community were equally involved in the discussion, since it was assumed that learning concerns all of them, and not only students. Any type of learning was appreciated: from conceptual (about Flemish art) to practical (how to use a video camera). The learning in this project involved both the cognitive dimension (specific content and skills), and the social dimension (making new friends and being able to talk to people over the computer).

In general, students were strongly involved and experienced a huge amount of pleasure while learning, as our daily observations and the teachers' and students' report showed. One illustrative example of an observation is the following excerpt that shows that students invested time and energy in choosing their avatar. The avatar was the main object representing themselves, and although it looked like a puppet in a videogame, students were aware of the social relevance of this tool. Valentina is a student and Bea one of the tutors online.

Valentina: can you give me an advice about the avatar

Bea:.. sure .. tell me

Valentina: is this one better.....

Bea: this one is a bit as a vamp

Valentina: or this one?:

Bea: this is kind of classy

Valentina: you think so .. I cannot make up my mind

Bea: if you like we can do this

Bea: I can try them on so you can see also the face

Valentina: I listen to you

Valentina: actually ... I look at you
[8 Feb. 2000]

Valentina actively involves one of the tutors online to select her avatar. The tutor perceives that this is important for her so she wears the avatar to let her see the effect it may have on the viewer. This resembles to the process of selecting the right outfit for a happening, and we know for teenagers this may be very critical.

During the final interviews (Talamo & Ligorio, 2001), we also noticed that the process of selecting the avatar was much more relevant for students than for adults. Students liked to try out all of them and to change them according to the situation; whereas adults preferred a stable identification to an avatar, to allow students to easily recognize them. The difference in the avatar selection strategy may also reflect deeper differences in dealing with such a project: students were more inclined to experiment and play with the novelties, whereas adults were more concerned with keeping a consistent thread throughout the project.

CONCLUSIONS

This article aimed to present a successful virtual learning environment in primary and secondary education with a strong cross-national and cross-domain nature, called Euroland. The virtual environment used was composed by Active Worlds (software meant to generate three-dimensional objects and supporting synchronous chats), and by Knowledge Forum (a web-based asynchronous discussion forum, designed to support progressive inquiry). Students were assigned to construct so called cultural houses, in which knowledge about aspects of each other culture was placed.

The educational approach was based on three theoretical approaches: learning as knowledge building, the community of “learners,” and computer-supported collaborative learning. Four criteria were formulated to evaluate the program’s success: three were based on the theoretical underpinnings and one on the educational content of the project. The results showed that Euroland was successful because it enabled students to construct their own knowledge; it challenged them to be active agents; and students experienced it as supportive for their learning. With regard to the last point, the virtual space available was not only used as a “window” to show the “products” manufactured in the classrooms or to allow for cross-national communication, but also as a space to display products and gather feedback from the partners about how to complete the products, to discuss and plan the task, and to reflect upon the project. Finally, regarding the educational content, the students reported that they learned about the culture of the other country, that the project improved their English as a second language, and their social skills. Moreover, learning in the project was strongly perceived as having fun.

As the results showed, virtual learning environments can be successfully introduced in educational settings, stimulating cognitive and social skills. The success of this virtual learning environment is related to the capability to conjugate a playful dimension, the development of meaningful content, and cross-national collaboration. Main conditions for this are the well-designed tasks, and the strong scaffolding from teachers and, if possible, researchers (Ligorio, Talamo, & Simons). Together it created a learning environment that the students experienced as challenging and meaningful with lots of space for their initiatives. Furthermore, the project also stimulated many different activities in and outside the classroom, crossing subject boundaries.

Using virtual learning environments is still not a normal practice in European schools (Ligorio & Veermans, 2005). Although computers are considerably present in schools, effective educational projects involving innovative technology are still very rare. A considerable gap between theoretical development and school practice is recorded in most of the European countries (Lakkala, Rahikainen, & Hakkarainen, 2001).

One of the main reasons for this gap, as we experienced in working with Euroland, is not so much teachers’ attitudes or expertise, but is related to structural conditions at the level of the school organization. In a project such

as Euroland, teachers are expected to facilitate their students, to create the space and time in their classrooms and curricula, and also to be active participants online. In other words, they are asked to invest a huge amount of time in such a project, and time is a scarce resource in schools nowadays. As innovative literature shows (Hargreaves, Lieberman, Fullan, & Hopkins, 1998), teachers are faced with many divergent demands towards the way they should work due to current educational reforms in Western countries. Those changes refer to issues as their teaching, student assessment, teacher involvement in school policy, which are all time consuming, and often are implemented simultaneously. Moreover, during the implementation process teachers are often supported in a limited, more symbolical than material manner. Because of this lack of support of the school administration, especially reform enthusiast teachers are becoming disappointed and lose their enthusiasm to change their teaching (Little, 1996; van Veen, Slegers, & van de Ven, 2005).

All the teachers involved showed great enthusiasm for the project and invested their personal time to introduce efficiently the project in their classrooms. This was somehow a consequence of the enthusiasm shown by students and teachers. Teachers could not believe their students were using their free time to work on the project. In general, we think that the main key element of the success of this project was having a meaningful and realist content: students could be involved in something they really liked and they could see their plans (made in the classrooms) actually implemented in the virtual space and genuinely appreciated by the others, peers, and adults. However, depending only on teachers' personal time is not recommendable. It should not be underestimated that projects like Euroland that have the potential to be successful learning environments because of its characteristics and content, require a substantial investment in time by schools.

Finally, the project Euroland did not have a follow up. But all the schools involved developed a solid attitude towards planning new virtual learning projects based on the principles we outlined for Euroland. For examples, new project flourished, still using AW and web-based forums, focusing on constructing virtual worlds about cultural diversity and tolerance, or trying to reproduce pieces of art or narratives relevant for education purposes. In all the cases, teachers seem to be able to practice the planning and tutoring skills as performed in Euroland by the researchers. This is a "cascade" effect that, in our opinion, proves the sustainability of a project.

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Note

1. The structure in grades differs between the Italy and the Netherlands. In Italy, primary school contains 5 years, and students are 6-7 years old when they go to the 1st grade, and are 10-11 years when they are in 5th grade, the last year of primary school. Then they go to middle school, which contains 3 years: 6th grade to 8th grade (13-14 years old). In the Netherlands primary school includes kindergarten and starts when students are 4-5 years old (1st grade) and ends with students are 11-12 (8th grade). Then they go to secondary education, which takes 4 to 6 years (1st grade to 4th, 5th or 6th grade).