

Chapter IX

Microcultures, Local Communities, and Virtual Networks

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ABSTRACT

Through a case study, we will exemplify how information communication technology (ICT) can be used in a collaborative way to constitute the foundations of intercultural projects in local and global communities. First, we present a local learning community based on the fifth dimension model where, adopting a collaborative model, each of its activities departed from the traditional teaching–learning form based on transmission. Collaboration mediated by ICT in local computer-supported learning communities, understood to be borderer zones that are not the exclusive property of any one specific cultural group, has the potential to generate genuine neocultures in which participants can share meanings and appropriate artefacts. Second, the same approach is adopted to analyse the dialogue established between educational researchers and technologists. Setting out with different goals, both groups engaged in a borderer activity involving the development of educational artefacts that could be accessed via the Internet. Common participation in those activities gave rise to a set of shared beliefs, knowledge, behaviours, and customs, that is, a network of meanings that crystallised into a common microculture.

INTERCULTURALITY THROUGH TRANSMISSION

In an earlier study (Crespo & Lalueza, 2003), we analysed a group of schools in Barcelona where all of the pupils belong to minority groups (gypsies and immigrants) in social contexts involving the risk of exclusion. Analysis of school practices allowed us to identify two main obstacles for the inclusion of pupils: The implicit representation of cultural differences as deficits which undervalues pupils in their role as legitimate interlocutors; The use of an educational model based on transmission which impoverishes the role of pupils as agents. The first impediment can be found in the teachers' discourses, where children's difficulties are represented as an individual handicap whose origin would reside in a deficient family context. Children and families are thus defined as lacking, for example, knowledge, so that the school is presented as the supplier of knowledge in a monopolistic regime, without recognising the role of the family as a generator of useful knowledge, and lacking habits and norms of behaviour, so that the school needs to discipline both the pupils and the parents, in such a way that controlling their behaviour is the principal objective, and making recourse to the authorities when the school cannot cope.

Furthermore, the consideration of cultures as essential traits leads to the negation of the joint construction of meanings. Differences are interpreted as the distance they must cover to change or adapt to our setting. Therefore, the responsibility lies only with them. This perception of cultural differences leads us to a fundamental issue: the failure to recognise the other as a legitimate interlocutor. In this way, the relations maintained with the children and their families occur in absence of dialogue and collaboration. For these children, school seems a hostile environment that is imposed upon them. Without sharing goals, it is more difficult to construct shared meanings and, therefore, meaningful learning.

The second of the obstacles consists of the predominance of an instructional model based on a theory of transmission (Rogoff, Matusov, & White, 1996), in which schoolchildren learn information and show that it has been codified and retained through certain evaluation tests that reproduce what was learned "piece by piece." The transmission model is based on a series of implicit beliefs. It is supposed that there are a number of prior agreements between the teacher and the pupils. These are never made explicit as they are considered obvious. On top of this supposedly intersubjective basis, new knowledge is deposited. Actually, a whole series of implicit negotiations occur, which are mediated by the teacher's authority. As the explicit goal is the correct codification of knowledge, whether teachers and pupils share meanings or not is of secondary importance. Indeed the meanings originating from the behaviour of the community of schoolchildren count for nothing, and are even considered a disturbance if they contradict or hinder the reception of formal knowledge. Pupils are not considered interlocutors, and in the absence of active participation; the appropriation of tools and contents becomes an arduous task.

To conclude, the combination of an ethnocentric representation in which differences are considered deficit and the transmission model of learning leaves no place for interculturality, beyond folkloric and noncontextualized actions. In the following section, we are going to describe a practical experience with an alternative model, mediated using ICT tools, and a collaborative approach that recognises the existence of a range of sociohistorical contexts that provide different sets of meanings. As opposed to the transmission model, this model is based on participation, in which the process of teaching and learning involves the creation of a new context, or a *microculture*, in which each new meaning has to be explicitly negotiated.

LOCAL COMMUNITIES FOR INTERCULTURAL EDUCATION

The Fifth Dimension Model

The assumption that minority children are at risk of being involved in nonmeaningful learning through school practices is based on the fifth dimension (5D), a model of activity developed by the Laboratory of Compared Human Cognition at the University of California, San Diego under the leadership of Michael Cole (1996). The foundation of the 5D approach is the creation of a reciprocal exchange relation between universities on the one hand, and community institutions and schools on the other. Activities mix play, learning, and involvement with university students (older peers) using a set of activities based on computers, video games, digital video, a variety of software and virtual communications including chat, e-mail and publication in blogs and photo galleries. It includes a system of rules and divisions of labour designed to facilitate the development in local communities of practices that emphasize written and oral communication in an environment saturated with different forms of culturally valued knowledge.

The 5D model responds to the need to match the objectives and methods of learning systems with the characteristics and needs of the sociocultural context. The theoretical foundations of the 5D model are based on the research findings of Michael Cole and Sylvia Scribner at the Laboratory of Comparative Human Cognition (1983). They indicate the failure of educational models that pay little attention to the role of the cultural environment in the construction of meaning. In common with other authors whose lines of research have been developed within the framework of a sociocultural paradigm (Lave, 1988; Rogoff, 1991; Wertsch, 1985), they argue that, above all, learning cannot be considered in isolation of the setting in which it takes place, given that it is a situated process.

Every 5D site is developed as a cultural microsystem that arises from the appropriation of certain artefacts by members of a learning community. Subjects participating collectively in practices organised by material and symbolic artefacts generate a *microculture*, that is, “a system of knowledge, beliefs, behaviours, and customs shared by the members of an interacting group to which the members can refer and which serves as the foundations for new interactions. Members recognise that they share experiences and that these can be alluded with the expectation that they will be understood by the other members, using them in this way to construct a reality for the participants” (Fine, quoted by Cole, 1996).

The 5D, therefore, seeks to generate *microcultures* or systems of activity whose use, based on a set of artefacts, is flexibly adapted to their local sociocultural situation and context, as well as to the needs of the community, understood here not only as the local context, but also as a complex reality in which there must be objects that are readily identifiable both by the adult members and the children in the local community, as well as by the educators and the researchers involved. In this *borderer activity*, the use of artefacts provides shared meanings, while at the same time these artefacts are modified in accordance with the goals and interests of the members of the learning community. This is possible because the 5D presents a *low level of institutionalisation* which allows this system of activity to be appropriated by very different communities, generating systems of meaning that come to form part of the network constituted by the local culture.

A LOCAL CASE

This *low level of institutionalisation* hinders the abstract description of what a 5D site is exactly. We describe one such site, set up by our team, in detail. There are 5D sites in USA, Mexico, Brazil, Sweden, Denmark, Finland, Spain, and

Australia. Our team has developed eight after-school and inner-school sites in the Barcelona Area. The oldest is “la Casa de Shere Rom” (CSR), an after-school learning community where we test new instructional uses of information and communication technologies. It is located on the premises of a Gypsy Association, in the Metropolitan Area of Barcelona, where a high percentage of the inhabitants are gypsies. Each week an average of 40 children, aged between 5 and 14, take part. In general, this group remains stable throughout the school year. Since 1998, more than 200 children have participated. Students of psychology and psychopedagogy are also involved and attend once a week for a whole semester. In total, more than 300 students have taken part to date. Finally, 18 research workers have become involved in the project for periods of more than a year, while a similar number have been involved for shorter periods.

The CSR was gradually designed through a process of negotiation between agents with different objectives, including members of the community, researchers, and educators (Crespo, Lalueza, & Pallí, 2002). The need for an educational project of this type was supported by statistics: 9.4% of the population was illiterate, to which should be added the fact that 28.7% had not completed primary education and only 3.1% had completed the higher levels of secondary education. Against this background, various interests were at stake: An association of gypsies whose members believed that the children in their community were the recipients of a poor formal education, a research team interested in accounting for the worrying rate of school drop-outs in this ethnic group, a large number of children loitering in the streets that were ready to try anything that promised to provide some fun, an equally high number of university students keen to gain some practical experience of dealing with real world problems. So, a *borderer activity* was set up, that is, a set of practices for groups of participants with different objectives, an intersection where various actors

might seek to attain different goals with a certain degree of collaboration.

The CSR space is equipped with computers and peripherals connected to the Internet, in which tasks are undertaken collaboratively. These activities are presented in the form of a labyrinth with various rooms containing tasks (a computer game, a suggestion for collaborative writing, recording, and editing of a digital story, writing an article for a local newspaper, the chance to talk with children from other countries via the Internet, etc.). A set of task cards organises each task into different levels, and once a level has been successfully completed, the child can enter other rooms. Each child has the support of a university student, who brings his or her knowledge of the real world and formal language. Both interchange roles in order to cooperate and reach certain targets that have been negotiated beforehand. To do this, they challenge, provoke, and guide each other; they ask questions, respond, and make suggestions, sometimes getting it right and sometimes making mistakes. In short, they collaborate to reach their shared targets.

The most remarkable aspects of this activity are that: Attendance is voluntary and the atmosphere is like that of a playground; The path to be followed from one task to another is entirely flexible so the subject can choose between different rooms and taking different paths; Various forms of collaboration are encouraged. Here we can find several examples: Directly between the children themselves or by using e-mail and chat rooms; students helping the children; children helping the students; children and students asking a fictitious figure for help by e-mail or in a chat room; children in delayed time, via the clues that they leave on completing a game; and so on.

Nine years later, the management of the activity, in the beginning responsibility of the university, is now in the hands of the gypsy community, who maintain the students' participation. And we can see that children whose schools have traditionally considered them to be lacking in mo-

tivation, and largely inefficient and ill-disciplined pupils that are unlikely to succeed, continue to voluntarily attend a learning activity that requires them to reach targets in order to progress. In other words, they show discipline and use appropriate cognitive skills.

How can this be explained? We consider the CSR to have created a private universe of shared meanings between the various participants which has risen from a *borderer activity* (a space in which actors with different objectives converge) to a *microculture* (a space of shared meanings). That is to say that a learning space has been created that is centred around reading and writing activities using computers, a space that is considerably more flexible than the school and less dependent on the scripts laid down by the dominant culture. But it is by no means only a space for gypsy culture. On the contrary, it is a *microculture* which, starting out as a meeting point between actors (children, students, adult members of the gypsy community, and researchers) with very different goals, has gradually established the foundations for a private universe of meanings, shared by the participants.

An essential element in this process is that all actors are considered valid interlocutors, which is manifest in the constant explicit negotiation (from finding one's way around the labyrinth to the discussion of new games and activities) and in the collaborative set up of the activities. To belong to the same community drawn from various origins implies a mutual commitment and responsibility as regards the common undertaking, so much so that all parties are considered interlocutors. This issue takes us onto the role of intersubjectivity covered by the next section.

In the last three years, we have adapted this model of activity to other sites including six elementary schools considered to be at risk of becoming ghettos, with all pupils belonging to minority groups. In those schools, teachers collaborate with university researchers, students, and children in a set of tasks based on digital media, in

the same way experienced at the CSR, but here as part of their in-school activity. Results show that children are increasingly motivated to do literacy tasks and use ICT. The main transformation resides in the fact that the introduction of 5D artefacts to schools supposes a strong adaptation of curricula considering the wide diversity of participants with different goals and motives. In this kind of *borderer activity*, teachers, students, and pupils are apprentices that collaborate and negotiate the meanings of the new practices, leading to the appropriation of these new artefacts. The role of artefacts in transforming the activity and *transforming subjects through their appropriation*, is the second issue to be examined.

Having reached this point, we can explain why 5D is a model for an inclusive intercultural education. We will discuss two basic assumptions. First, a meaningful activity requires intersubjective agreement, and participants need to see each other as valid interlocutors. Second, active participation supposes the creation of a local *microculture*, where participants appropriate the artefacts by mediating actions.

LEARNING AS INTERSUBJECTIVE AGREEMENT

It is interesting to note that authors who analyse the origins of intersubjectivity from markedly different perspectives emphasise this recognition of the role of interlocutor (i.e., the consideration of the other as a participant) as being fundamental to the establishment of intersubjectivity. Thus, for Rommetveit (quoted by Valsiner, 2003, p. 191), “we need to believe that the other understands us in order to construct this level of understanding in reality.” In other words, only by considering (even foolishly) the other to be an interlocutor, can we achieve a shared understanding. Similarly, for Trevarthen (1982) before we can achieve a shared understanding, we must recognise one another as interlocutors. He speaks of the establishment of a

primary intersubjectivity between the baby and those who take care of it, involving the construction of a communication channel, a state of joint attention, emotional in origin, which is manifest through protodialogues, or turns of intervention. Thus, it is a prerequisite of intersubjectivity to consider the other an interlocutor, recognising their capacity to take on this role and acting as if they were in this role. However, once the other is seen to be an interlocutor, the question is how we go about achieving intersubjective agreements.

Each culture represents a particular way of establishing its reality. This process is initiated by the family, and the other institutions of the culture are coherent with this basic objectification (Berger & Luckmann, 1966). Thus, when the child starts school, he or she encounters a universe in which they share the essential elements of this objectified world, in which there are no major contradictions, and where, therefore, it is possible to establish intersubjective agreements. The schooling of a child from a middle class, autochthonous environment is experienced by their family as an act that is performed within the community. The choice of school is generally related to the fact that the child belongs to a particular social group organised around ideological, religious, or class values. These families are part of a community in which various scripts organise their day-to-day experiences in a largely similar way. As a result, these people share a certain way of understanding the world. Belonging to the same cultural community means the possibility of sharing implicit beliefs, that is, ways of categorising reality that do not have to be explained, as they are taken for granted. The school is a piece of this universe. Its structure and the way in which it works are known, and what is more, these aspects are internalised and form part of the cultural framework. What the school seeks to impart, what a child should be, when their behaviour is appropriate, and so forth, are all questions on which there is implicit agreement.

Shweder (1986) refers to these as “constitutive suppositions,” preconceived ideas that do not have to be debated or made explicit, and which each cultural community establishes as the basis for understanding. Moghadam (2003) coins the term *interobjectivity* to refer to the set of objectifications of reality that are common to the members of a given culture. Only by sharing this *interobjectivity* (or knowing and granting legitimacy to the different *interobjectivities* in a multicultural space) is intersubjectivity possible. For Moghadam, this connection between the objective world and intersubjectivity is simple to understand in isolated societies such as that of the Tasmanians before they were exterminated, the Yanomami whose Amazon home has yet to be devastated or the Amish communities in the USA, who shun all contact with the outside world. But the problem is more complex when we look at multicultural societies, in which different power relations exist between majority and minority groups. When the members of these minorities and majorities do not share the same *interobjectivity*, and especially when diametrically opposed objectivities are constructed in each community, intersubjectivity is extremely difficult to achieve.

The objectivities of a multicultural society are not static, since they are subject to processes of acculturation (Berry, 2001) and also, though operating in the opposite direction, to the generation of new differences (Ogbu, 1994). Thus, the way in which a minority group objectifies the world may gradually become more similar to, or more distinct from, the “objectivity” shared by the majority, according to the dynamics of the power relations. Clearly, this dynamic operates in the school in such a way that when dealing with the difficulties of the inclusion of a cultural group, we need to examine the barriers that stand in the way of the establishment of intersubjective agreements. When the members of a minority ethnic group with little power attend a school, they find themselves in a world in which the

rules, language, relationships, and objectives of the activity are far removed from their own or they might even find that the former contradict the rules, the norms of language use, the types of relationship and objectives, established with varying degrees of explicitness, of their own family and cultural group.

The key question in education lies in how the school, here understood as an institution which shares the interobjectivity of the dominant culture, can create spaces of intersubjectivity with members of minority groups who hold different, if not diametrically opposed, objectifications of the world. The 5D model is addressed at generating shared objects that are meaningful for all participants by means of the collaborative use of ICT tools. Through playing games, editing a video, or developing a blog, participants must discuss goals and strategies at every stage. By collaborating, adults and children develop a common language referring to meanings that make full sense in the storm of the activity. So, the community is not predefined, but rather is “under construction,” and each participant contributes to the design through the appropriation, that is, interiorisation and mastering of activity artefacts.

APPROPRIATION OF ARTEFACTS

Cole (1996) defines culture as a medium in which human life unfolds, and which comprises a set of interrelated instruments, shared by the members of the group and passed down from one generation to another. These artefacts include physical and symbolic instruments, the behaviours associated with the latter, knowledge, beliefs, and forms of social organisation. Taking his lead from Leont’ev, Cole presents activity as the indivisible element in the study of human behaviour. We can understand activity as being the system of complex relations between the subject, objects, and artefacts that mediate between one and the other, in a specific

context of social relations. These artefacts or mechanisms of cultural mediation (tools or signs) are supplied by the culture in the contexts of a specific activity, and the subject takes up (appropriates) these cultural media, reconstructing them in the process of the activity.

In this way, activity defines the objects and identity of subjects. The objects to be transformed are defined by the tools used, but the subject is transformed in accordance with the goals the latter sets him or herself and the artefacts he or she uses to achieve them. This is well illustrated by the classic example of the poacher who on becoming a farmer transforms his way of thinking, his way of life, and his social organisation, thanks to his new goals and tools. Learning and development can be understood to mean the appropriation of the artefacts that mediate the activity. As the “external” artefacts become internalised, the internal representations become externalised in the discourse, gestures, writing, and manipulation of the material in the environment (Engeström, 1999). That is, every activity involves a process of teaching and learning.

Formal education is a particular type of activity, where this process of appropriation constitutes the object in its own right, the main goal, albeit that the set of artefacts to be handled is decidedly complex. It should be stressed that it is not only a matter of physical tools and symbols which Cole calls primary artefacts, but also secondary artefacts or scripts that are pre-established by beliefs, ways of categorising, mental schema, and forms of social relationships. In general, the latter are understood to have been acquired by the time a child starts school, or it is supposed that they will be acquired in parallel, in other contexts of activity, such as those provided by the family. Thus, for example, the acquisition of the correct language for school is not possible if it is not articulated with extremely clear representations of its contexts of use, its appropriateness, its goals, and so forth. The same is true of read-

ing and writing, and of mathematics, which only become meaningful in relation to a network of artefacts operating on different levels and which are supplied in various institutional settings like school or family that maintain a minimum degree of coherence between each other. So, the school is not only an institution adapted to a specific culture, but also its history has deposited within it a set of artefacts that are only meaningful in a similar culture.

The challenge facing an intercultural, inclusive education system, involves the real appropriation of its artefacts by all participating groups. In other words, an activity system whose particular culture or microculture is based in the shared construction of rules, goals, scripts, procedures for using tools, and every mediating artefact. So, the intersubjectivity and appropriation of artefacts are the two sides of the way the construction of a *microculture* share meanings through participation. The 5D model provides this kind of activity system by means of three main properties:

First, the educational institution is considered to be something that can be transformed. It is not only the children that should change, but also the educational institution. New artefacts change practices and new practices provide new identities to participants. The introduction of ICT tools is not only about primary artefacts, but also about new scripts, rituals, and narratives. Computers, digital cameras, blogs, and so forth, are mediating new forms of relationships between teachers and pupils and between pupils.

Second, participation leads to transformations in the dynamics of the institution. Negotiation is now explicit. This is a challenge for the high level of institutionalisation of the classic school, because daily practices must be constructed anew, so that activity can be redesigned starting from the actual participants. Fifth dimension activity involves very little institutionalisation, and new practices could be negotiated to introduce new and explicit goals and rules.

Third, the flexibility of roles as regards teaching/learning is legitimated, and the participants are recognised as actors. All participants play the role of learning about new artefacts, and all personal, formal, and community knowledge is legitimated. Development of a transmission model, characteristic of the classical school, a new definition of roles, led to a collaborative model as explained in Rogoff et al. (1996).

LOOKING FOR A MODEL OF VIRTUAL ARTEFACTS

Network Construction

Teams involved in the development of 5D sites in Ronneby (SE), Copenhagen (DK), and Barcelona (ES) tackled the project of constructing tools that could create a sustainable international network of researchers, educators, students, and children. We sought to design a technological artefact that could provide a new channel of communication and collaboration between plural groups, but which at the same time could be a useful tool in the day-to-day activities of local groups, since without such a tool it would be difficult to guarantee success. Intercultural issues was a fundamental feature as it meant bringing together groups from the north and south of Europe, and both sides of the Atlantic. The intercultural nature of the 5D therefore provided us with the basis for the development of a virtual model.

The consolidation of this network had been shown in the past to be a significant factor for the sustainability and support of local activities, but now this new virtual tool could be a resource centre in which to store and share field notes, stories, articles, and so forth, concerning the whole basis of the 5D method: artefacts like the labyrinth, its magician, games, task guides, clues, logbooks, and rules. In other words, we sought to pass on artefacts and thereby facilitate the collective

memory and recycling of experiences. But such a tool would have to satisfy even greater demands: It would have to be useful for those familiar with the 5D method, while allowing those without this knowledge to quickly acquire a minimum understanding so as to participate and enrich the whole group through its impartial perspective.

Therefore, it was a question of designing an artefact that could operate in a virtual environment, enabling the creation of a *microculture* which, while respecting the essential characteristics of the 5D flexibility, adaptability, intersubjectivity, laboratory for practical experiences, would provide insights into the educational model as in traditional unidirectional Webs. But above all, it should allow bidirectionality between the visitor and the Web site in a nonhierarchical environment so as to facilitate communication, collaboration, appropriation, and the recycling of experiences. In short, we sought to take the 5D community onto the network. With these aims in mind and in an effort to avoid reinventing the wheel, we sought out similar projects. We found educational Web sites, news groups, mailing lists, directories of links, resource centres, chat rooms, and so on, that had some of these characteristics, but none of these projects met all the requisites of the artefact we wished to create.

It was at this juncture, thanks to the suggestions of the technicians in our research team, that we discovered a line of well-developed research that struck us as being similar to the methods of the 5D. This line of research went by the name of the somewhat cryptic, recursive acronym of GNU. The GNU project, set up by Richard Stallman in the early 1980s and developed by the Free Software Foundation, sought the cooperative development of technological artefacts and rejected the then incipient tendency to privatise the source code of the computer programs. Stallman defended the creation of software in the community, in a similar way to that adopted in the world of gastronomy, where recipes are shared and even sometimes cre-

ated in collaboration. Stallman argues in favour of the defence of the basic liberties of any software user (Cornec, 1999; Stallman, 1996) and over the last two decades he has provided an ideological umbrella that has allowed hundreds of thousands of programmers, translators, testers, and users to organise themselves in a virtual space, drawing on the diversity of its members and creating networks of shared meaning, in short, constructing *microcultures* for the development of an almost interminable stream of technological artefacts. By sharing and adapting the same rights between equals and cooperating in the creation of artefacts, the affinity was undoubtedly, in this case, clear. To all intents and purposes, it appeared to be the reference point we had been seeking in order to build our virtual learning community (portal 5D.ORG), and so we decided to continue our search by concentrating on the work of these collectives.

APPROPRIATING ARTEFACTS

Here we present several examples of GNU projects that have similar characteristics to those that we were seeking for the 5D.ORG educational portal. Nearly all the projects we examined respected, to a greater or lesser degree, these attributes, but for the sake of maximum clarity, we shall comment in each case on the project that best exemplifies the properties we wish to highlight. One of our first discoveries was the GNU project directories such as Free Software Foundation–Savannah site (2004), SourceForge.net site (2004), and Open Source Technology Group (2004) where thousands of working groups, SourceForge boasts 80,000 projects and 800,000 users adhere to Stallman's philosophy.

Most of the GNU initiatives, and these projects are no exception, were built to meet their members' day-to-day needs by participative design, in groups in which the roles become blurred.

The creator is in turn a user of the artefact that is built and the apprentice is for short periods the expert in a similar way to that experienced in the 5D. Particularly interesting was the way in which the technological tools that made up these network directories (discussion groups, loading and downloading tools for the storage of projects, tools for collaboration, Web browsers, personalisation of the portal, etc.) facilitated communication between the members, but also the accumulation and subsequent recycling of artefacts, in a very similar way to the resource-knowledge centre we wished to create. What were particularly common in these directories are key developments, where new creators adapt existing projects to their particular needs. Thus, the passing on, refining and appropriation of the artefacts that we so much wanted to achieve was also possible in the virtual world, and even it was made more simple thanks to the digital character, and hence greater flexibility, of the artefacts being used.

If we accept that knowledge should be accessible to all and free of charge, access to these communities and the use of the artefacts that are stored in them should be and was free of charge, allowing new members an unrestricted access to the portal. With just one exception, the creation of new project spaces (new communities) was filtered to guarantee responsibility for the contents. Collaboration in groups seemed to establish itself as a borderer activity, where individuals from distant settings and cultures, sharing very few objectives, found a comfortable space for virtual collaboration to satisfy their local needs, all of this in an atmosphere that we perceive as being fun and carefree, similar in many respects to that of a game. These communities were, without doubt, *the* model for the development of our 5D.ORG tool. But in our desire to eradicate all hierarchies, we continued to seek collectives in which collaboration was indeed between equals and in which no veto could be imposed, at least in terms of the tool, thereby allowing the com-

munity to organise itself as it felt fit mediated by the artefact, in order to construct a *microculture* with its own social order.

It was at this juncture that we became aware of the Wikis (The Wiki Community, 2002), another GNU project centred around the collaborative creation of Web page content that allows anybody, without any need to register or without imposing restrictions of any kind, to edit texts that are then published at the site. The Wikis had constructed, among other artefacts, an encyclopaedia with more than 1,700,000 entries, a dictionary with more than 300,000 terms and a library with 3,500 volumes in a collaborative space par excellence that broke with all hierarchies, and surprising as it might seem it was not subject to constant acts of vandalism. The texts were written in the form of brief contributions by anyone who could provide information about the subject and they were revised in the same way, guaranteeing the continuity of the project against possible attacks by making a simple security copy. It was the best example of collaboration between peers to be found on the Web.

What remained for us to do was to translate to the virtual world an important element of the 5D: the activity as a laboratory for conducting tests. While we had seen how in various GNU project directories developments were subject to constant scrutiny, such practices were never as explicit as in the HackLabs. These laboratories, set up by the faithful disciples of hacker ethics (Himanen, Torvalds, & Castells, 2001), can be defined as uncontrolled virtual learning communities that seek to break with the traditional hierarchies of learning in order to share knowledge and resources in a space for collaboration and experimentation. All these sources of tried and tested experimentation were taken into consideration when constructing our virtual educational community (5D.ORG) as a new *microculture* on the network. Furthermore, if the results were what we hoped for, 5D.ORG might come to form a network of *microcultures*

that could lend support to both local and global groups.

THE DESIGN OF A VIRTUAL COMMUNITY

Due to its particular, and often highly technical nature, we shall not detain the reader with a lengthy description of the portal design process, although we would like to briefly outline some ideas and situations that derive, as expected, from what we have said up to this point. When designing the tool, we were convinced that the projects we had studied had provided us with valuable insights, and for this reason, we chose to develop an educational portal in three blocks. We took into consideration the possibility of providing: (i) information about the 5D model using the traditional tools provided on the Web, but we knew we needed to pay special attention to the Web tools that facilitated (ii) collaboration and (iii) online training.

The block providing information needed to be dynamic, since the contents were to be subject to frequent modifications. We therefore opted to use a content management system: a technical development which would allow content experts with little technological expertise to maintain in as straightforward a fashion as possible, that is, editing directly in the Web site itself without the need of complex publishing tools, all the texts, links, and images that we wished to present there.

Based on our own experience, and as in the examined GNU projects, we considered it essential to make our artefact bidirectional. Therefore, in addition to the forums which are essential for guaranteeing the off-line communication of our future users and the field notes, narratives, and articles that we considered of great use for researchers, students, and educators, we also created a tool that would allow the user to add, make comments

about, download, and eliminate, and in short automate the administration of a repository of 5D artefacts. Our study of the GNU projects showed us that in this way it would be possible to ensure the exchange of traditional 5D artefacts, which could then be tested in the many local activities-laboratories, as well as improved or adapted by any user who should wish to do so.

Convinced of the importance of local groups for the success of global collaboration, we designed another tool (My5DCommunities) in order to coordinate local activities from the virtual dimension. This tool enabled us to establish free and automated private forums, and to create picture galleries (particularly useful in the case of activities for children), activity calendars, and a local selection of traditional 5D artefacts. The tool can also be used simply as a showcase for the activity carried out.

Finally, in order to make interaction with the portal as straightforward as possible for the many different collectives visiting the site, we designed a tool that would ensure the creation of dynamic, mutable, and nonconstrictive profiles, but which in turn might offer contents and links adapted to the roles of researcher, educator, student, and child, at the same time allowing the visitor to change role, in line with the basics of the 5D principles.

When we wrote this text, 5D.ORG was no more than a recently constructed educational portal on the network in need of a number of modifications. It seeks to be a frontier space that can attract a wide range of different subjects. As it becomes more widely used, it will become possible to begin weaving a Web of meanings that are shared by the members of a large, interacting group. If this occurs, we will have developed a *microculture* that is shared by subjects from many different backgrounds, in which new knowledge can be created and interactions can take place in relation to the subjects of teaching and learning.

CONCLUSION

The collaboration established between researchers in the fields of education and technologies is characteristic of an intercultural dialogue. Setting out with different goals, both groups were engaged in a *borderer activity* involving the development of educational artefacts that could be accessed via Internet. As long as they recognised each other as valid interlocutors in spite of each group's obvious lack of competence in the other's field, the dialogue, understood as a process of constant negotiations, was developed. The assumption of shared goals, in turn, gave rise to a set of shared beliefs, knowledge, behaviours, and customs, that is, to a network of meanings that crystallised into a common *microculture*. In achieving this, no collective should renounce its respective professional cultures, even though the result was not something that belonged specifically to either. Rather, the result was a new hybrid product, in the same way as the identities involved and the objectives that were generated were new.

The shared identity between the process of creating knowledge in local 5D sites and the process for designing new artefacts on the Internet resides in the facilities for developing a particular microculture founded in participation, a low level of institutionalisation and the legitimisation of different kinds of knowledge. Both processes are examples that collaborative learning is possible as long as active participation is encouraged without calling into question the identity of any of the participants. The collaboration between legitimate interlocutors in this process has been shown to be an excellent platform for the appropriation of new artefacts by apprentices. And in a setting that shows few signs of being institutionalised and in which the roles adopted are flexible, all participants take on the role of apprentices. In these new microcultures, no one culture or group is dominant, but rather what we find is a universe of meanings accessible to the participants, who

enter into explicit negotiations to collaborate in attaining their shared goals.

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KEY TERMS

Activity: Psychological analysis unit in the frame of the cultural–historical activity theory. It is an indivisible set of situated practices where we could identify subject actions oriented to goals and mediated by artifacts. All activities are articulated in a cultural framework of meanings. The perspectives introduce rules, community bonds, and division of labor as elements that must also be identified in activity analysis. Activity theory helps explain how social artifacts and social organization mediate social action.

Artifacts: Tools and symbols that, mediating the actions between subject and object, transform both. An artifact is an aspect of the material world that has changed during the history of its incorporation into human action aimed at targets. They are the basic constituent of a culture and are the constituents of its “possible” worlds and realities.

Borderer Activity: Spaces where exchange and dialogue is possible between cultures. In such activities, each participant arrives with his or her particular goals and motives, but different actors and institutions can negotiate and try to construct common goals.

Collaborative Learning: Methodologies and environments in which learners engage in a common task in which each individual depends on and is accountable to each other. Groups of students work together in searching for understanding, meaning, or solutions or in creating an artifact of their learning, such as a product.

Copyleft: The Free Software Foundation and some other associations created this concept to label a set of licenses that defend different kinds of freedom in cultural creations. Those licenses are the legal base that allows the construction of a common repository of knowledge free to reach and adapt by everybody interested. Wikipedia (2007) says: “Copyleft is a form of licensing and may be used to modify copyrights for works such as computer software, documents, music, and art. In general, copyright law allows an author to prohibit others from reproducing, adapting, or distributing copies of the author’s work. In contrast, an author may, through a copyleft licensing scheme, give every person who receives a copy of a work permission to reproduce, adapt or distribute the work as long as any resulting copies or adaptations are also bound by the same copyleft licensing scheme.”

Content Management System (CMS): When organizations realized that a Webmaster could be a “bottleneck” for their presence in the net, new applications were developed thought to make easier to publish digital creations (texts, images, video, audio, documents, etc.) in Web pages. Those systems that define user’s roles, assist during the publication workflows, and introduce a lot of automatism to administrate content, allow authors to publish their content directly without the need of any intermediary.

Intersubjectivity: Shared meanings constructed by people in their interactions with each other and used as an every day resource to interpret the meaning of elements of social and cultural life. Intersubjectivity allows people to share a definition of the situation and is the basis for a meaningful collaboration.

Microculture: Here in the sense of ideoculture, or a system of knowledge, beliefs, behaviors, and customs shared by the members of an interacting group to which the members can refer and which serves as the foundations for new interactions. Members recognize that they share experiences and that these can be alluded to with the expectation that they will be understood by the other members, thus using them to construct a reality for the participants.

Wiki: A classical wiki is a subtype of CMS without any publication workflow (creations are directly published, without any revision), without any role (every user of the system get the same rights), and with a strong version system (that guarantee that any data will be lost). Those kind of systems that allow a kind of collaboration where every user is equal to others (so modifications could be done in a fast and easy way) become popular with “wikipedia” that is also a good example of a wiki.