Integrating computer-supported collaborative learning into the classroom: the anatomy of a failure

Michael Baker*
Centre National de la Recherche Scientifique & Telecom ParisTech, France
michael.baker@telecom-paristech.fr

François-Xavier Bernard
Paris Descartes University, France
francois-xavier.bernard@parisdescartes.fr

Isabelle Dumez Féroc
Poitiers University, France
isabelle.feroc.dumez@univ-poitiers.fr

ABSTRACT

We present an analysis of a longitudinal case study whose aim was to understand the processes of integration of a face-to-face and networked collaborative learning technology and pedagogy into a secondary school history-geography classroom. Students carried out a sequence of argumentative tasks relating to sustainable development, including argument generation, sharing and elaboration, debate using computer-mediated communication, and organisation of arguments in a shared diagram. Students’ interactions and diagrams were analysed in terms of degree and quality of argumentativity, as well as catachresis (‘getting round’ the software to perform a non-prescribed task). Results run counter to positive systems of ideas and values concerning collaborative learning and its technological mediation in that the scenario did not meet its pedagogical aims, having to be abandoned before its planned end. We discuss possible explanations for this ‘failure story’ in terms of the articulation between everyday, technology-related and educational discourse genres, with their associated social milieux, as well as the social structure of the classroom. The relevance of these aspects for future attempts to integrate such technologies is discussed. In conclusion we discuss a vision of learning that takes into account students who do not accept to play the educational game.

Keywords: educational technology appropriation, Computer-Supported Collaborative Learning, discourse genres, argumentation, adolescent culture, digital natives

* Contact details for first corresponding author: Michael Baker, LTCI, CNRS-Telecom ParisTech, 46 rue Barrault, 75634 Paris Cedex 13. FRANCE. Email: michael.baker@telecom-paristech.fr Tel: +33 (0)1 45 81 77 91 - Fax: +33 (0)1 45 65 95 15 Web: http://ses.telecom-paristech.fr/baker/
INTRODUCTION

A current tendency in educational research involves going beyond the study of learning effects of introducing educational technologies, in attempting to understand the processes by which they are appropriated, in relation to the transformation of educational practices (e.g. Overdijk & van Diggelen 2008, Ludvigsen et al. 2011). Research on the integration of educational technologies into the classroom has a history spanning several decades (Baron & Bruillard 2007). Since Computer-Supported Collaborative Learning (“CSCL”) technologies have only emerged relatively recently, with the increasingly widespread use of Internet in society, there have been relatively few studies of their appropriation in the classroom (cf. Chen, Looi & Tan 2010).

Given that internet-based and mobile technologies now pervade life in economically developed countries, they could be seen as highly relevant tools for education (e.g. Stahl 2005, Kemp 2011) that are adapted to the characteristics of ‘digital natives’ (Bennett, Maton & Kervin 2008, Crook in press). Moreover, although collaborative learning (Dillenbourg, Baker, Blaye & O’Malley 1996) is not always effective (Barron 2003), the very ideas of “collaboration” and “dialogue” are associated with strongly positive societal values, as vehicles of socialisation, democratisation, distant teamwork, and conflict resolution. A significant body of educational research is thus concerned with identifying ‘success stories’, the conditions under which educational innovations have led to improved learning. We propose that something can also be learned about the relevant conditions for educational integration of CSCL technologies from detailed analysis of a failed attempt to do this.

We analyse a long-term attempt to integrate a particular networked collaborative technology (“DREW”, Dialogical Reasoning Educational Webtool - Corbel et al. 2003; http://drew.emse.fr) into a secondary school history-geography classroom, for debates on sustainable development. This work was carried out within the EU-funded “LEAD” project, the overall aim of which was to develop pedagogical and software tools for small-group discussions (such as debates, group reflection or explanation) in the classroom, where students could discuss at the same time face-to-face, and via the network. Students were asked to debate questions such as “should production of genetically-modified organisms be allowed in France?”, in small groups or in a whole-class moderated discussion, to make argument diagrams and write texts together, using shared software over a local network, whilst discussing face-to-face.

This attempted CSCL technology integration failed in that pedagogical objective of the teaching sequence (elaborating knowledge of societal debates) was never achieved. The planned teaching sequence had to be continuously modified in the light of failure of preceding phases. The study was abandoned before its planned end, on the teacher’s decision, when the classroom degenerated into chaos and threats of physical violence between some students.

In the final sections of this paper we discuss possible explanations for this failure in terms of adolescents’ subcultures, articulation between discourse genres, and the social structure of the classroom. The relevance of these issues for CSCL technology redesign and educational integration is discussed, together with implications for theories of learning, once we include in the ‘sample’ students who do not accept to try to solve the problems set in schools.

RESEARCH AND DEVELOPMENT BACKGROUND

Technology appropriation and argumentation in education

The introduction of technologies into educational situations can be seen as an “expansive” process (Engeström 1999) that stimulates the elaboration of new practices, rather than a matter of adding to and rendering more efficient a pre-formed and unchanging activity. Technology appropriation is the set of processes by which an artefact becomes an instrument for subjects (Rabardel 1995), a hybrid technico-cognitive entity comprising the tangible features and affordances of the artefact with its associated usage schemas. Instrumentalisation can also include ways in which users of artefacts can try to creatively ‘get

---

1 The LEAD project (Technology-enhanced learning and problem-solving discussions: Networked learning environments in the classroom, www.lead2learning.org) was funded from 2005-2008 under the European Union IST programme (Information Society Technologies), 6th Framework Programme (project number IST-028027).
round’ their uses intended by designers, termed catachresis. In collaborative learning situations, appropriation of artefacts has been described as the set of transitions between individual mastery of the tools (knowing how to use the interface), personal utilisation (using the interface to perform educationally relevant tasks) and collective utilisation (learning to work together on the task) (Overdijk & van Diggelen 2008).

The initial aims of our work can therefore be described as attempting to favour the appropriation, by the system comprising the school, the teacher and the students, of a pedagogical approach termed computer-supported collaborative argumentation-based learning (Andriessen, Baker & Suthers 2003), with the pedagogical aim of enabling students to “broaden and deepen” their understanding of a “space of debate” (Baker et al. 2003). There is now a substantial research literature on the role of argumentation in collaborative learning (e.g. Andriessen & Coirier 1999, Andriessen 2006, Muller Mirza & Perret-Clermont 2009). An important issue here is the necessity to find school-based topics that are debateable (Golder 1996, Baker 2009). Another is the necessity for students to argue across a variety of argumentative tasks (teacher-led debates, argumentative text and diagram writing, small group discussions) in order to favour deep and stable argumentative knowledge reconstruction (Schwarz et al. 2002). There are two main interactive processes of knowledge creation associated with argumentative interactions: justification (the production of arguments or counter-arguments) and negotiation of meaning (Golder 1996, Leitão 2000). On a conceptual plane, argumentative interactions can function as processes of negotiation of meaning of the key concepts underlying the topic debated (e.g. “Nature”, “Freedom”), involving new dissipations or associations between concepts (Baker 2002).

On the side of educational practice, debates are presently strongly encouraged within the French National Curriculum (MJENR 2002), whether at primary or secondary school level. They are seen not only as methods for learning in specific disciplines (e.g. native language, citizenship, history-geography), but also as means for developing cross-disciplinary skills of argumentation and communication. It has, however, been claimed (Guerrini & Majcherzk 1999) that many teachers avoid organising debates, principally because it is not clear exactly what should be learned from them, whether this is an efficient method of learning, and how such learning should be evaluated.

The Computer-Supported Collaborative Learning situation

In the educational situations designed in the LEAD project (see footnote 1), secondary school students worked with CSCL software in small groups in the classroom, using concurrently both the communication and collaborative work software via the local network (partitioned for each group) and communicating (verbally, non-verbally) face-to-face. The guiding principle of the project as a whole was that students would be able to more easily coordinate their interface actions using speech (that can be produced in parallel to interface actions), and thus focus on collaborating to perform the educational task.

Within a design-implementation-evaluation iterative cycle, during the first year of the LEAD project we decided to experiment with existing software, similar in functionalities to what would subsequently be developed, in order to inform ongoing software design. The software that was used in our study was called DREW (Dialogical Reasoning Educational Webtool; Corbel et al. 2003; see http://drew.emse.fr); it was designed to support collaborative argumentation-based activities across Intranet or Internet.

Figure 1 shows one of the configurations of the shared workspace of DREW, with a CHAT in the top left corner, a collaborative writing tool in the top right, a whiteboard bottom left and an argumentation diagram tool in the bottom right.

---

2 The word “catachresis” means “the use of a word in a way which is not correct, for example the use of mitigate for militate” (Oxford English Dictionary). Within Rabardel’s (op. cit.) theory, the notion of “incorrect use” is extended from language use to artefactually-mediated action, in situations where it is possible to define prescribed tasks.
The argumentation diagram tool (bottom right in Figure 1) comprises boxes for arguments/theses, and only two types of argumentative links (“+” and “−”, or else undefined: “?”). Different colours are automatically assigned to each participant (up to 12). Opinions (for or against) can be expressed with respect to each element of the diagram. As a means of focussing students’ attention on conflicts of opinion, when for and against opinions are expressed by different users with respect to a given argument box, it becomes ‘scrunched’. The rationale of these features was to provide a simple tool in terms of types of links and boxes, which would thus enable students to focus on the domain of discourse, rather than the representational format (Suthers, Toth, & Weiner 1997), and to reify the difficult argument/opinion distinction.

The Internet version of DREW was reprogrammed to function in a local network, with individual CHAT rooms for each subgroup in the class (see Figure 2). Once the main application is launched, students input their names and enter chatrooms corresponding to their groups, as defined by the teacher.

Figure 1. Screen dump of the main shared workspace interface of DREW

Figure 2. The startup window of DREW

The teacher cannot control the information input by the students; the software does not prevent changing from one chat-room to another and performing interface actions within it. DREW allows the researcher to recuperate an automatic trace of all interface actions (including local server time of actions).
METHOD

The appropriation of tools is a long-term process (months or years), especially when their integration into the classroom also requires the elaboration of new learning and teaching practices. We thus carried out a longitudinal field study, in close collaboration with teachers and students. As with pedagogical design experiments (Brown 1992), our approach was interventionist (which distinguishes it partly from naturalistic observation) in that researchers collaborated with the teacher (and students) in designing and putting into practice the situation, within an iterative process (design-implement-evaluate) in the classroom itself.

Educational context

The study was carried out over a period of six months (from September 2006) in a “general, technological and professional” secondary school (here named “Lycée Renaud”) on the southern perimeter of Paris, that mostly prepares students for a professionally-oriented baccalauréat. History-geography was chosen as the subject matter in which to carry out the study, given that the organisation of debates is prescribed in the curriculum. In this baccalauréat, history-geography is an obligatory yet ancillary subject (the marks for it count for little in the baccalauréat examinations). Students receive four hours of history-geography teaching per week.

In sociological terms, the school had a student population that was “socio-economically mixed” (Pasquier 2005), comprising a majority of students from families who were recent immigrants and socio-economically disadvantaged, with some students (usually boys) who were from more well-off families, but who had engaged in educational training that was lower in societal status than that of their parents (e.g. the son of an engineer and a doctor who trains to be a technician).

Participants

The study was carried out in collaboration with a (female) teacher of history-geography, who had followed a special training course on the use of media in education. The teacher was experienced, and regularly took charge of trainees for teaching practice in her classroom. The classes took place in a “language laboratory”, equipped with 20 computers, as well as a teacher-computer at the front of the class, installed into desks around the room.

A class of 24 students took part in the study, 21 boys and 3 girls, aged 16-17 years old, with the exception of three boys who were 18 years old. These three were older since they had been obliged to repeat the previous school year, having failed its end-of-year exams. In some cases (described below) the class was divided into two half-classes of 12 students. Students worked in “friendship” groups of two, three or four (decided by themselves), depending on the task, using adjacent computers and tables, organised in an “L”, so that they could see and talk with each other whilst communicating and working across the partitioned local network. Written permission was obtained from the parents of all students to participate in the study, and for data to be collected and used exclusively for research purposes.

Procedure

Pedagogical design

The study began with two meetings with the teacher, during which we explained the objectives of the project, together with the types of activities that we wanted to carry out, and the software to be used. The teacher proposed sustainable development as a suitable subject matter for debates, given that she would be teaching this topic within the timing of our study.

We assisted as observers in two ‘regular’ lessons (i.e. with the teacher standing at the front of the class using the blackboard, and the students sitting in rows), each of 1 hour duration. After presenting the EU project to the class, we asked for (and received) the students’ participation, then placed ourselves (two researchers) at the back of the classroom to observe, without further intervention on our part. During the first lesson, the teacher asked the students to read the textbook on the topic of dealing with water shortages in the world, then to write, in pairs, a summary text. During the second, she returned their texts and commented on them to the class. During both lessons we observed many “control interventions” from
the teacher, of the type “be quiet please!”, “listen to me!”, “put your mobile phone back into your bag and switch it off.” The students generally disputed the teacher’s interventions. As well as generally chatting amongst themselves, several of the students were overtly using their mobile phones, or else listening to mp3 recording devices with headphones (which is forbidden by the school rules).

In a subsequent meeting with the teacher, she stated that she thought that, since this particular class was very difficult for her to control in regular teaching, perhaps working in groups with computers would be motivating for the students, and that it would be easier to control the class by supervision of group work.

It was decided to try to re-use and adapt a canonical teaching sequence involving use of DREW, that had already proved successful in French classrooms at the same level (Baker et al. 2003, Lund, Molinari, Séjourné & Baker 2007), as follows:

0. Training. Familiarisation with the software and with what it means to argue.
1. Preparation for debate. Studying teaching materials (texts, videos, websites) on specific debates, in order to identify the main social actors and (counter-)arguments;
2. Debate. In small groups, the students debate the question, using the CHAT (2.1) and organise arguments using the argumentation-diagram tools (2.2)\(^3\).
3. Consolidation. Students co-write a synthesis of the debate.

The pedagogical aims of this teaching sequence are that the students acquire and activate potential arguments, that they confront and refine them during interaction, and that they summarise and personally internalise what they have learned from the debate, with respect to their own prior ideas.

The teaching sequence actually implemented

In practice, we had to continually modify the planned pedagogical sequence, in collaboration with the teacher, in the light of the students’ work. For example, since the students’ small group CHAT debates were very poor in arguments (see results below), it was not feasible to ask them to subsequently organise those sparse arguments in a diagram: a moderated whole-class debate was tried instead. The actual teaching sequence that was implemented is shown in Table 1.

\(^3\) It had been shown that students who debated with the CHAT then attempted to represent their own CHAT debate using the argumentation diagram tool, had superior learning effects to students who used both tools concurrently to debate (Lund, Molinari, Séjourné & Baker 2007).
### Table 1 The actual teaching sequence implemented.

<table>
<thead>
<tr>
<th>Phase</th>
<th>Title</th>
<th>Subclass*</th>
<th>Students (N)</th>
<th>Groups**</th>
<th>Duration (mins)</th>
<th>Activities</th>
</tr>
</thead>
<tbody>
<tr>
<td>Phase 1</td>
<td>Training</td>
<td>2</td>
<td>11</td>
<td>$1 \times 3$</td>
<td>60</td>
<td>Familiarisation with DREW software; guided creation of argument diagram</td>
</tr>
<tr>
<td></td>
<td></td>
<td>1</td>
<td>11</td>
<td>$1 \times 3$</td>
<td>60</td>
<td></td>
</tr>
<tr>
<td>Phase 2</td>
<td>Small group CHAT debates</td>
<td>2</td>
<td>9</td>
<td>$3 \times 3$</td>
<td>60</td>
<td>Topic of GMOs previously taught in class. Debate in subgroups</td>
</tr>
<tr>
<td></td>
<td></td>
<td>1</td>
<td>13</td>
<td>$3 \times 3$</td>
<td>60</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>$1 \times 4$</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Phase 3</td>
<td>Whole subclass moderated CHAT debates</td>
<td>1</td>
<td>13</td>
<td>$1 \times 13$</td>
<td>60</td>
<td>Whole class connected to same CHAT room, teacher moderation, debate on GMOs</td>
</tr>
<tr>
<td>Phase 4</td>
<td>Retraining</td>
<td>2</td>
<td>11</td>
<td>$1 \times 11$</td>
<td>60</td>
<td>Students given rules on how to debate, and fictional debate to represent in argumentation diagram</td>
</tr>
<tr>
<td>Phase 5</td>
<td>Small group argumentation diagrams</td>
<td>1 &amp; 2</td>
<td>13</td>
<td>Individually</td>
<td>90</td>
<td>Debate on nuclear energy in France, using argument diagram tool, with supporting documents and videos</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Overall, the implemented teaching sequence comprised 11 hours and 5 minutes of time spent with the students and their teacher in the classroom. Details of the phases of the implemented teaching sequence are as follows:

- **Phase 1 (Training).** Students were introduced to the DREW software, focussing mainly on the argumentation diagram tool (the students had no problems at all with the CHAT and collaborative writing tools). They were guided in making a diagram corresponding to an argumentative text. The teacher prepared the students for debating the topic of Genetically-Modified Organisms (GMOs) by regular classroom teaching during two previous lessons.

- **Phase 2 (Small group CHAT debates).** Students, in small groups, were asked to debate the question (e.g. “Should France’s nuclear energy policy be pursued?”) via the CHAT of DREW. They were instructed to each present their points of view, with arguments for (possibly) against it, to listen and think about what the others said, and to similarly argue with respect to others’ points of view. They
were asked to try to come to a common statement, on what they (dis)agreed on, towards the end of the debate (during the last 10 minutes).

• **Phase 3 (Whole subclass moderated CHAT debates).** Students were presented with an example of a CHAT debate on the same topic that had been produced in another school (same level and type of class), which corresponded more closely to the pedagogical goals. The group debate was carried out with students all seated in a circle at their individual computers. The debates were moderated by the teacher.

• **Phase 4 (retraining).** Since three months had elapsed since the first training on argument diagrams (Phase 1), the students were retrained with the argument diagram tool (making a diagram, in groups, corresponding to a short written debate on the pros and cons of forbidding smoking in public places).

• **Phase 5 (Small group argumentation diagrams).** The teacher had previously prepared the students in the classroom teaching on the topic of nuclear energy in France. During a first lesson of two hours’ duration, the students read additional material on the debate concerning nuclear energy, and watched two videos on the web, one arguing in favour of nuclear energy, and the other against. Working individually, they were asked to identify the main arguments for and against. Students were then asked to create an argument diagram in small groups, to represent as fully as possible the space of arguments for and against nuclear energy. We had planned that this activity would be a preparation for co-writing a textual summary of the debate during a subsequent lesson (abandoned).

**Data and analysis method**

The data analysed comprised principally trace logs of CHAT interactions and shared argumentation diagram creation. Given the classroom situation, with often several groups discussing at the same time in the same room, it was not possible for us to video or audio record spoken interaction. Our results and discussion also draw on participant observation in the classroom and planning/review meetings with the teacher.

As stated in introduction, our initial research aim was to create a situation whereby the educational technology and its attendant pedagogy would be appropriated, and to focus analysis on this aspect. Throughout the study it became apparent that appropriation of the technology — at least for *pedagogical* ends — was not the dominant activity in which the students were engaged. We therefore focussed analysis primarily on the extent to which the students pursued the pedagogical goals, i.e. engaging in argumentation on the topic. Secondarily, we describe one aspect of appropriation, concerning ways in which the students ‘got round’ the software (“catachresis”: see above) for ends that were other than educational.

In pedagogical terms, we analysed the CHAT debates of all seven subgroups, using the “rainbow method” (Baker et al. 2007) that was specifically designed for understanding computer-mediated pedagogically-oriented debates. This method distinguishes functional categories of communicative interventions, concerned with the debating task (expressing opinion, argument; negotiation of meaning of what is being debated) from those that relate to interaction management. For our purposes here, we only used the following five “rainbow” categories:

- **category 123:** off-task, social talk, interaction management
- **category 4:** task management (topic shifts of the debate)
- **category 5:** expression of opinions concerning the debate
- **category 6:** arguments for or against a thesis;
- **category 7:** broadening and deepening the debate (discussing the meaning of related concepts, producing arguments on arguments, discussing the links between arguments).

All data was analysed by the three authors, who resolved any disagreements. The students’ interactions were so little elaborated in terms of argumentation that there was little space for disagreement between analysts.

Students’ argumentation diagrams were analysed with respect to their quality, in terms of the number of arguments, their degree of elaboration (number of propositions), number of links (together with their (in)correctness) and depth of the diagram (mean number of sublinks and arguments, moving outwards from the main thesis).
RESULTS

Results focus on the students’ tasks of phases 2, 3 and 5 of the teaching sequence (Table 1), since phases 1 and 4 involved (successful) training.

Phase 2 (Small group CHAT debates)
This phase comprised 120 minutes of time in the classroom with the students and their teacher. The general characteristics of all seven CHAT debates are shown in Figures 3 and 4, for each half-class, as percentages of the interactions in terms Rainbow categories (Baker et al. 2007).

Figure 3. Categories of interaction in CHAT debate (sub-class 1)

Figure 4. Categories of interaction in CHAT debate (sub-class 2)
The students’ interactions were dominated by non-argumentative categories of interaction (category 123: 64-79% on average). This is general socio-relational or interaction management talk, not directly related to the topic being debated. The second most frequent communication type was expression of opinions (category 5) concerning the topic debated (12-19% of communication, on average). Argumentation itself (the sum of categories 6 and 7) only constituted 5 to 8% of the students’ CHATs. In sum, the students’ interactions resembled more informal ‘chats’ and exchanges of opinion, rather than genuine argumentative debates centred on the topic.

In previous work (Baker et al. 2003), we had studied the same CHAT debate (on GMOs) in a different school, with students of the same age. In that case, the percentages of different interaction categories were as follows: Categories 123 (Off task, Social talk, Interaction management), 41%; Task management, 9%; Opinion, 17%; argumentation, 19%; Broaden and deepen, 14%. In that previous study, the “123” category was approximately half of that found above, and the argumentation categories comprise approximately double those observed in the present study.

Table 2 shows an extract from near the beginning of the CHAT debate of one group in the present study.

<table>
<thead>
<tr>
<th>Line</th>
<th>Student</th>
<th>Message</th>
</tr>
</thead>
<tbody>
<tr>
<td>16</td>
<td>&lt;Yiamine&gt;</td>
<td>what the boloss</td>
</tr>
<tr>
<td>17</td>
<td>&lt;oblanchard&gt;</td>
<td>clear off</td>
</tr>
<tr>
<td>18</td>
<td>&lt;oblanchard&gt;</td>
<td>syg</td>
</tr>
<tr>
<td>19</td>
<td>&lt;Yiamine&gt;</td>
<td>yer missed me</td>
</tr>
<tr>
<td>20</td>
<td>&lt;oblanchard&gt;</td>
<td>fat ...</td>
</tr>
<tr>
<td>21</td>
<td>&lt;vchambreuil&gt;</td>
<td>m tellin yer</td>
</tr>
<tr>
<td>22</td>
<td>&lt;vchambreuil&gt;</td>
<td>clear off</td>
</tr>
<tr>
<td>23</td>
<td>&lt;Yiamine&gt;</td>
<td>julie tells you to clear off</td>
</tr>
<tr>
<td>24</td>
<td>&lt;oblanchard&gt;</td>
<td>cool your life</td>
</tr>
<tr>
<td>25</td>
<td>&lt;Yiamine&gt;</td>
<td>yeh yvseen</td>
</tr>
<tr>
<td>26</td>
<td>&lt;vchambreuil&gt;</td>
<td>ts serious yacine...</td>
</tr>
<tr>
<td>27</td>
<td>&lt;oblanchard&gt;</td>
<td>well</td>
</tr>
<tr>
<td>28</td>
<td>&lt;vchambreuil&gt;</td>
<td>yes</td>
</tr>
<tr>
<td>29</td>
<td>&lt;oblanchard&gt;</td>
<td>let’s talk about GMO...^^</td>
</tr>
<tr>
<td>30</td>
<td>&lt;vchambreuil&gt;</td>
<td>yeah f yer lyke ^^</td>
</tr>
<tr>
<td>31</td>
<td>&lt;obertrand&gt;</td>
<td>vincent for or against GMO</td>
</tr>
<tr>
<td>32</td>
<td>&lt;oblanchard&gt;</td>
<td>?</td>
</tr>
<tr>
<td>33</td>
<td>&lt;vchambreuil&gt;</td>
<td>me rther for</td>
</tr>
<tr>
<td>34</td>
<td>&lt;vchambreuil&gt;</td>
<td>yeah but gotta debate</td>
</tr>
<tr>
<td>35</td>
<td>&lt;oblanchard&gt;</td>
<td>and you julie?</td>
</tr>
<tr>
<td>36</td>
<td>&lt;Yiamine&gt;</td>
<td>dnt like GMO</td>
</tr>
</tbody>
</table>

* The students’ names have been changed. The extract has been translated whilst trying to transliterate students’ slang, spelling errors, abbreviations, preserving roughly equivalent levels of language. “Syg” is a transliteration of “tg” (“ta gueule” = “shut your gob”). “Boloss” is a slang term of abuse. “Cool your life” was written in English in the original.

Of the twenty-two messages in the extract shown in Table 2, only three mention the topic of debate, and these messages are limited to expression of opinion, rather than argument. The principal function of this exchange of messages can only be described as maintaining or establishing the social relations in the group, including playful (?) insults. The messages were written principally in “sms language” (SMSese).
From the teacher’s point of view, the students’ debates were also very poor in quality of expression and in terms of their coverage of the essential points; she did not consider their debates to be a suitable starting point for analysis in the form of diagrams, and as a basis on which to deepen their understanding, as initially planned.

And yet low frequencies of arguments do not necessarily mean that the arguments themselves that were in fact expressed were never relevant. In other CHAT-groups’ interactions, there did appear to be argumentative potential in the students’ messages, albeit in a slang and sms abbreviated form, for example:

31 <Yorick> (...) they’ve done tests in maize fields
32 <Yorick> in the philippines without authorisation
33 <tmoy> and?
34 <tmoy> wotta th results?
35 <Yorick> n’ if ts not dangerous why did they do it completely illegally
36 <tmoy> maybe they did it illegally but that dsnt mean thts bad

Such an extract reveals the students’ competences in argumentation and reasoning that could be ‘shaped’ to more elaborate forms.

**Phase 3 (Whole subclass moderated CHAT debates)**

This phase comprised 120 minutes of time in the classroom with the students and their teacher. Figure 5 shows rainbow interaction categories for both half-classes in the teacher-moderated debate.

![Figure 5. Rainbow categories in students’ CHAT messages for moderated group debate](image)

In each debate, approximately three students largely dominated the interaction in terms of numbers of messages (14 to 18 messages). Some students did not intervene at all.

From Figure 5 it can be seen that in each half-class, category 123 (off task, social talk, interaction management) largely dominated the debate, as with the small group debates. However, in the present case this is largely explained by the fact that 12 and 9 participants had to log on to the CHAT, and thus make greetings that were replied to, as well as to log off and close the interaction. Therefore, contrary to the
small group debates, in the moderated class debates there were almost no “123” (off-task) interventions once the debate had actually begun.

It is clear, therefore, that these teacher-moderated debates were much more argumentative than the small group debates. In the latter, “123” interventions could comprise up to 90% of the interaction (Figure 3). In the half-class moderated debates, this was generally almost halved, and, correspondingly, the argumentative categories were approximately doubled. However, the students’ arguments were, again, very little elaborated: in sum, they were very short (in accordance with first “s” of “sms”, “short message service”) and were largely still written in slang.

Table 3 shows an extract from one of the moderated group debates.

<table>
<thead>
<tr>
<th>Line</th>
<th>Interlocuter</th>
<th>Message</th>
</tr>
</thead>
<tbody>
<tr>
<td>107</td>
<td>(teacher)</td>
<td>Should one forbid the production of gmos?</td>
</tr>
<tr>
<td>108</td>
<td>(vcharbonnier)</td>
<td>i think not</td>
</tr>
<tr>
<td>109</td>
<td>(atruong)</td>
<td>Perhaps</td>
</tr>
<tr>
<td>110</td>
<td>(oboissy)</td>
<td>No</td>
</tr>
<tr>
<td>111</td>
<td>(gfelix)</td>
<td>shunt necessarily stop em bt studi em</td>
</tr>
<tr>
<td>112</td>
<td>(teacher)</td>
<td>Why not?</td>
</tr>
<tr>
<td>113</td>
<td>(vcharbonnier)</td>
<td>cos otherwise there wont be enuff food for people in the world*</td>
</tr>
<tr>
<td>114</td>
<td>(srabhi)</td>
<td>i also think nt</td>
</tr>
<tr>
<td>115</td>
<td>(tmoy)</td>
<td>at present i think not because we dont really know effects of gmos</td>
</tr>
</tbody>
</table>

This teacher-led debate sequence seemed to keep the students on the topic, whilst not always changing the slang abbreviated form in which they wrote. In each sub-debate, the teacher made very few interventions, mostly asking the students to start debating, and asking probing questions. It seems that teacher moderation in a whole-class discussion made the students remain at least on the topic to be debated, although it did not lead the students to really elaborate their arguments, nor to frame them in school-preferred language.

**Phase 5 (Small group argumentation diagrams)**

This phase was planned to have comprised 180 minutes of time in the classroom with the students and their teacher. Due to interruption of the study (see below), it finally only lasted 125 minutes of classroom time. During this phase, students were supposed to work in 6 groups of 4. However, log-file analysis showed that in each chatroom, there were between 7 and 12 logged-on participants (10 on average). There were 7 “nomadic” participants, who each logged on to at least 4 of the 6 chatrooms, with either humoristic pseudonyms (e.g. “the click in the shadows”), random characters (e.g. “????????????”), or else recognisable initials and names. In each chatroom, only one or two students out of the four actually created the argument diagram. In two groups’ chatrooms, the diagram was deleted just before the end of the session, in whole or in part.

Figure 6 shows the argument diagrams created in the chat-room “Hall”, before (above) and after deletion (below).
The students’ argument diagrams contained few arguments (3 to 8 in number, 5 on average, including the statement of the thesis); they were generally very shallow (only arguments directly connected to the thesis) and were little elaborated (usually a single short proposition). The degree of correctness of argumentative links (direction, polarity) was very variable, from completely correct (4 out of 4) to not correct at all.

This argument diagram session was interrupted and abandoned before its planned end. One group of four students — the “Hall” group, whose whole diagram had been deleted by intruders — became angry, and shouted at other students on the opposite side of the room (“It’s him, it’s him! Get out, get out!”). The situation degenerated into threat of a fight. The teacher decided to stop the session and to take over control of the class, and to abandon the planned subsequent textual synthesis phase: in several cases, there was no diagram produced that could have served as a basis for the text.

Analysis of the students’ diagrams from the logfiles enabled us to identify the intruders, who had put insults in argument boxes of other groups then deleted their diagrams, as the three older boys of the class (see “Participants”, above).
**DISCUSSION**

One possible explanation for the failed outcome of this study would be that it was not specifically related to the precise characteristics of the particular CSCL technology and its attendant pedagogical scenario. This was generally an unruly class, that the teacher had difficulty controlling; any change at all from the “talk and chalk” mode might have led to disruptive behaviour. Our results do suggest, in fact, that the degree of teacher control over the class was an important factor here (e.g. the teacher moderated class debates were much more argumentative than the autonomous small group debates). Another possible line of explanation would be in terms of the fact that history-geography counted little towards the students’ overall mark in the *baccalauréat*. However, other results and considerations lend credence to roles of specific characteristics of collaboration and social interaction using computer-mediated communication as explanatory factors, notably relating to *multiple discourse genres, adolescent subcultures and the social structure of the class*.

Learning in schools can be seen as a process of appropriating an educational *discourse genre* (Bakhtine 1929/1977, Wertsch 1991), and being able to flexibly articulate this with others, according to the social situation. A first distinction can be made between *school genres* and *everyday genres*. The *school genre* in general is associated with ability to write and speak standardised language in a way that is considered by the institution to be appropriate to the communicative situation. It also includes general appropriation of explicit and implicit classroom rules (Brousseau 1998), and more *general cultural rules* (e.g. it is against the law in France for any discourse inciting racism to be produced in any state arena, which includes schools). More specifically, in this study, students were expected to appropriate general “ground rules” of communication in groups (Mercer 1995), as well as the *argumentative genre* of epistemic debate (Barth & Krabbe 1982).

There are of course multiple ‘everyday genres’, relating to the diversity of social spheres⁴. A relevant sphere of activity in this case is French adolescents’ subculture (Pasquier 2005), an integral part of which comprises ICT-related practices of “digital natives” (Bennett, Maton & Kervin 2008, Crook *in press*). For the students in the school where our study took place, possessing and being able to use all the latest technological devices is just as important to group identity as hairstyles, clothing and musical taste (Pasquier *ibid*.). The students’ CHAT interactions reveal specific aspects of their subcultures. For example, one student’s greeting was “Wesh le poto!” (roughly, “Yeah matey!”). This utterence refers, in France, to “wesh-wesh” culture (Gonçalves 2010), a strong aspect of group identity, inspired by “gangsta rap” ways of speaking and dressing, and principally associated with tough outskirts neighbourhoods.

Discourse genres, cultures social-communicative situations can interrelate in several different ways. Students may have different degrees of mastery of a given genre (and thus one may dominate over another), and they may see genres as more or less appropriate to the situation. One possibility would thus be that the students had poor skills in standardised French and in argumentation, and so wrote in their everyday genres. There are reasons that weigh against such an explanation. Firstly, recent research on mobiles and literacy (Thurlow 2003, Kemp 2011) shows that, despite cultural differences, there is presently no compelling evidence that SMSese fluency is necessarily associated with poor standardised literacy. Secondly, during meetings with the teacher we examined with the students’ (hand)written essays from regular teaching; she stated that their level in standard French was average so wrote in their everyday genres. Thirdly, with respect to the argumentative genre, we saw that students, in moderated debates, did possess the communicative-argumentative skills of people their age (see Stein & Bernas 1999).

We therefore argue that a more plausible explanation for the students’ discourse, as produced during our study, would be in terms of a strong coupling between communication technology, adolescent culture and the SMSese genre. In other words, since the students use SMSese via CHAT and mobile devices in their everyday lives, and they were asked to use CHAT in the classroom, they therefore saw it as *appropriate* in that situation (cf. Pilkington & Walker 2003), and even *necessary* in order to preserve their group identities and interpersonal relations.

---

⁴ Bakhtin (1986) writes that “… [t]he wealth and diversity of speech genres are boundless because the various possibilities of human activity are inexhaustible, and because each sphere of activity contains an entire repertoire of speech genres that differentiate and grow as the particular sphere develops and becomes more complex.” (p. 60).
This explanation is also plausible with respect to wesh-wesh culture. Clearly, collaborative learning, carried out without teacher intervention, requires the students to interact with and relate to each other: for the students, relating to each other is done (more or less) in the wesh-wesh mode. When students debated with teacher moderation, they were not primarily relating to each other (this was mediated by the teacher), and so there was some degree of change in their discourse. This suggests that for these students, the educational genre is for interacting with the teacher, and not for interacting between themselves, even when their interactions occur in school.

Finally, we need to explain why the students did or could not simultaneously manage their everyday genres with the educational genres. We propose two possible explanations, in terms of difficulties in relating to each other whilst relating to the educational task.

The first refers to the ‘distance’ between everyday and educational genres, depending on the social milieus of students. With students for whom in- and out-of-school genres are very different, as is the case with those who have appropriated wesh-wesh culture, the problem of discursive articulation is more acute. It would seem that in this case, the students in our study did not accomplish this discursive balancing act: they fell down on the side of preserving their interpersonal relations and everyday ways of speaking to each other.

The second (related) reason why students might not have been able to mix their everyday discourse with the school-prescribed one in their autonomous interactions, relates to the general social structure of the classroom, that can also be invoked in explaining the final degeneration into violence during the last phase of our study. The students who had created extra logons and crept into other groups’ chatrooms, to proffer insults and delete other students’ work, belonged to the group of three older boys in the class (see the “Participants” section, above). These three had stated that they could not debate since they were “bad students! [laughs]”. From participant observation and review meetings with the teacher, it emerged that these three were the “bosses” of the class (or rather, one “boss” with his two “assistants”). Whenever other students spoke in the class, in a way that complied with the teacher, the “boss” students silenced them with threat, mockery or sarcasm. It is therefore possible that many students did not dare to speak the educational genre to each other, because of the structure of power and dominance in the group-class (Glaser 1996). In creating small autonomous groups of students, this might have allowed some students to escape the power of the bosses, which could also relate to the social identities of the boss-students as “bad students”: either by confirming those identities (in the case where other students were allowed to succeed in the educational task), or else by threatening them, in the case where the bosses found themselves (‘despite themselves’) succeeding in the task (how could “bad” students succeed?).

CONCLUDING REMARKS

Whilst this analysis of a single longitudinal case study authorises no generalisations, it could nevertheless limit generalisation of experimental results on (computer-supported) collaborative learning, given that (sub-)cultural differences become relevant factors, and also indicate aspects to be considered in further work on integration of CSCL technologies in schools. Close attention may need to be paid to the students’ everyday milieux, discourses, communicative practices and subcultures, as well as the social structure of the class, precisely since these will be at stake in computer-mediated social interaction. Depending on these characteristics, groups may need to be created and monitored to neutralise power structures; and a longer period of practice, with explicit teaching of different genres, may be required to lead students to decouple their digital native practices and subcultures from ICT, so that the technology may be used for educational ends. In some situations, it may be necessary to engage in very long term work indeed, on an institutional level, in order to create the premises for an appropriate pedagogical culture of (computer-mediated) debate.

Within the LEAD project, this work contributed to software redesign, and the implementation of the COFFEE software (Collaborative Face-to-Face Educational Environment: www.coffee-soft.org). Additional aspects relating to teacher control of groups in the classroom were added, to prevent, if the teacher wished, additional logons beyond a predefined list, to ‘freeze’ all screens so that the teacher could address the class, and to dynamically reconfigure groups during sessions. Providing such possibilities for tight teacher control does not oblige teachers to use them; it is possible that teachers could gradually relax control as the pedagogical approach is appropriated.
Finally, this study raises questions about theories of learning in schools. It goes without saying in much educational psychology research that students who do not genuinely attempt to solve the problems set to them will be ‘excluded from the sample’, given the aim of studying effective problem-solving and learning processes. What would the theory of learning in schools be like, that also takes into account students who do not accept to ‘play the educational game’? Such a theory might foreground social relations and identities, social milieux and discourse genres, seeing knowledge elaboration as a social, cognitive and discursive practice to be appropriated and articulated with others.

ACKNOWLEDGEMENTS

This research was partly financed by the European Union IST programme (LEAD project, number IST-028027). We would like to thank the director of Lycée Renaud (Paris), the teacher and her students who participated in the study, and members of the LEAD project. Thanks to Éléonore Baker for translations into standard French of some of the students’ messages. This paper owes much to discussions with Charles Crook. We thank the two anonymous reviewers of this paper for their insightful remarks, the taking into account of which has enabled us to improve the organisation and the argumentation of this paper.

REFERENCES


