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INCORPORATING COMPUTER-MEDIATED COMMUNICATION IN UNIVERSITY COURSES: BENEFITS AND COSTS

This article presents the rationale, methods and results of an action research initiative which included Computer-mediated communication (CMC) in three university English Linguistics courses. In a crowded classroom situation where interactivity was limited and the learning environment largely defined by the lecturer, the introduction of an asynchronous dimension to teacher-student communication via an Internet infrastructure software brought an increase in teacher-student dialogue and a broadening of the learning environment. The successful use of CMC with a visually impaired student is also recounted and future research with such students hinted at. The benefits of incorporating CMC in the courses are deduced partly from a quantitative analysis of student answers to a questionnaire, as well as from a qualitative analysis of the lecturer's personal experience. The costs in terms of personal effort and time are considered to be high, but the overall effect for both students and lecturer is evaluated as extremely positive.

Key Words: student-teacher conferencing, virtual classrooms, interactivity, visually impaired students, distance learning.

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Introduction

This particular experience of action research[1] describes an attempt to improve the quality of the educational event by integrating Computer-mediated communication into courses of English Linguistics in university, previously delivered in traditional classroom style.

For the purposes of the article, I am adopting a broad definition of Computer-mediated communication:

Computer-mediated communication (CMC) signifies the ways in which telecommunication technologies have merged with computers and computer networks to give us new tools to support teaching and learning. (Santoro 1995) Santoro pinpoints three main ways in which CMC can be used in teaching and learning, and, despite the rapid development of the field, his classification is still relevant seven years on. CMC is firstly an effective channel for *conferencing*, i.e. communicating personally or publicly with individuals or groups of students, in teacher-student or student-student mode; secondly, it is an appropriate means of directing students to pre-organised online information, such as library catalogues (Online Public Access Catalogues) or specialised websites – Santoro calls this *informatics*; thirdly, it is an invaluable means of enhancing the teaching process itself, as *computer-aided instruction* or CAI. I will explain how these three applications brought about changes in my university courses, with a special focus on the use of CAI with a visually impaired student.

1. The context

The context of this action research is three compulsory courses in English Linguistics, designed for and delivered to undergraduate students of English Language specialising in business studies[2]. The research spans three academic years: from 2000-2001 through to the current academic year, 2002-2003. Reflections on the year 2000-1 resulted in experiments in 2001-2, which continue, slightly modified, into 2002-3. Enrolments in the courses have steadily increased, now reaching an average of 150 stud-

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[1] The essential features of this method of research are "trying out ideas in practice as a means of increasing knowledge about and/or improving curriculum, teaching, and learning" (Kemmis and McTaggart, 1988), or "learning in and through action and reflection" (McNiff and Whitehead, 2002).
[2] The three-year BA-equivalent degree course is named *Corso di laurea in esperto linguistico d'impresa* and takes place at the Catholic University, Milan.

ents per year. The first year course has been doubled to forty hours, while the second and the third year courses have been lengthened by a third, from twenty contact hours to thirty.

The first course, taken by students in the second semester of their first year, concerns English phonetics and phonology. Students are required to be able to read and transcribe English in the International Phonetic Alphabet. Broad features of BBC English and General American are studied, as well as the phonological processes in connected BBC English speech. The course now consists of twenty hours in an ordinary classroom and twenty hours in the multimedia language laboratory, where students carry out tasks relating to pronunciation and intonation. The final exam consists in writing broad phonetic transcription of twenty lines from the Roman alphabet to the IPA, and an oral in which they are required to explain what they have transcribed, and answer general questions on the functions of intonation.

The second year course takes place entirely in an ordinary classroom. For thirty hours, students concentrate on sentence level grammar and features of text, with particular attention to grammatical and lexical cohesion in written texts. In 2000-1, the exam was purely oral and students had to be able to talk theoretically about grammar. Now, the exam is both written and oral: students have to recognise factors of cohesion in various written texts and perform grammatical transformation and punctuation exercises, showing knowledge of syntax and sentence structure, and then discuss what they have written in a subsequent oral exam.

The third year course, now structured as twenty classroom hours and ten lab hours, introduces students to the theory and methodologies suggested by a corpus linguistics approach to language, particularly regarding the fields of lexicography and lexicology. Students are required to produce a written mini-project *in itinere* on the synchronic or diachronic study of a word or phrase, and, in an oral presentation to the class or to the examiner, explain the rationale behind a modern specialised dictionary or learner's dictionary of their choice.

2. The rationale for incorporating CMC into these courses

Attendance of these courses is not obligatory, as is frequent on the Italian university scene. However, during 2000-1 an average of 50 students attended each course. My main dissatisfactions at the end of the year were that the students' learning environment was extremely limited, there was

very little student-teacher interactivity (partly due to the number of students in class) and the mode of communication was too monotone. At the end of year oral exams, students showed knowledge of the course content, but there was little elaboration of what they had read or heard; they had, in a sense, participated minimally in the path to knowledge, and I felt that they could have gained considerably more from the course if it had been organised differently.

On another scale, there was a largely practical problem to be faced. In Italy, an increasing number of students work, part-time or full-time, and therefore never attend lectures. Provision for these students is left largely up to the generosity and organisation of the individual academic. Lecturers are bound to be available to see students for an hour a week, and students streamed in to my office during these hours to verify programmes that were already in print, and ask for advice on how to study this particular subject. Office hours seemed an inefficient and time-consuming way of being in contact with these students, who required individual attention, and yet often had the same needs.

One way of approaching these problems was to adapt the instructional design of the course, i.e. to re-plan the teaching methods and look for ways to maximise learning. Nalley's 1995 account of including CMC in higher education, and its key idea that "the instructional method chosen must address an instructional problem" shed light on this, as did Ragan's 1998 "guiding principles and practices in the design of distance education[3]". Ragan's guiding principles indicate three principal categories which reflect the educational process: learning goals, interaction, and assessment and measurement. He also identifies two "enabling" categories in quality education: instructional media and tools, and learner support systems and services. Following these guidelines, I clarified the curriculum objectives, and separated the "educational" part of the course, i.e. the theoretical contents taught during lectures from "enabling" or "instructional" activities (activities involving technology that would serve students beyond the scope of the course). While I viewed CMC as being mainly part of the enabling activities, I also hoped it would contribute to changing what I perceived as the educational problem of lack of interactivity. I hoped CMC would multiply the opportunities for interactivity

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[3] In Ragan's article, the conclusion is anticipated in the premise: Good teaching is good teaching and technology is an instructional tool. The author suggests that the principles and practices identified apply to both face-to-face and distance education.

between student and teacher, and therefore increase the likelihood of students participating actively in the acquisition of knowledge, rather than behaving as passive receptacles waiting to be filled.

I envisaged it also helping in organisational terms, in that there was an increasing need for working students to be able to "attend", access materials and contact me from a distance.

Lastly, in 2001-2, once I had already started using CMC, a visually impaired student began to attend my first year courses. She obviously had a different learning style from the other students, as well as partially different needs. This helped shape the course further, since her needs had to be taken into account in the delivery of the course. I will speak about this in Section 4.4.

4. The tools incorporated in these courses and their roles

4.1. A web-platform to increase interactivity and broaden the learning environment

The University Distance Learning Centre[4] provides academic staff with a virtual classroom platform accessible via the University's homepage[5]. In 2001-2, to varying degrees, I began to use the virtual classroom in the three above-mentioned modes, identified by Santoro. Firstly, regarding *informatics* (i.e. directing students to sources of pre-organised information online), I introduced students to the idea of referring to the virtual notice-board as the source of reliable information regarding my course. In the usual places where students find course information (in the Course Catalogue, on various actual notice-boards etc.), I also left instructions to

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[4] Centro d'Ateneo per l'apprendimento a distanza or CEPAD.
[5] The system used at the Catholic University is Blackboard, an Internet infrastructure software for e-Education. For technical information, see http:// company. blackboard. com. Academic staff can access this software in authoring mode, post anything they want on a personal page (CV, publications, office hours, e-mail etc.). A notice-board is provided, space for useful links, and a download area for the uploading of any kind of document. Information regarding course objectives, programmes, bibliography, timetables, exam formats and dates, and assistant staff can be accessed from a link to the course name. A Forum link leads into an internal Chat system, where only students registered for the course can have synchronous, semi-public communication with teachers or their course-mates at pre-arranged times. I used all these options except for the synchronous chat.

access my virtual classroom for up-to-date information. This was intentionally an immediate message showing that I expected my students to have a minimal amount of computer skills[6]. Indeed, the majority of students arrive in the first year already possessing basic computer skills and internet access at home. However, since the course has been lengthened, and the twenty hours of hands-on multimedia sessions in the first year now run from the first week of courses, students who lack basic computer skills gain them fairly quickly. Where specific training is required, as in the current third year, for example, I will spend the last 10 hours of the course[7] teaching them how to access a corpus on CD-ROM via a concordancer, how to use the various functions of a concordancer, and how to draw conclusions from the findings produced by the concordancer.

All organisational information was thus posted on the virtual notice-board, reproducing and expanding on information included in the Course Catalogue. Answers to questions asked in class became Frequently Asked Questions files in the download area, and information about exam dates and requirements were posted as necessary. Information about assignments was also given on the notice-board. In class, after introducing an assignment, I would then refer students to the virtual notice-board for fuller instructions[8]. This also meant that those not attending lessons could keep up, if they so desired. An example of an assignment in the second year was writing a paragraph summarising the achievements of one of three major linguists relevant to the course. In class I gave students the titles of some useful encyclopaedic works, but then told them to refer to the virtual notice-board for the information needed to complete the task. On the notice-board I gave more detailed instructions about how to find these works in the Reference library, and a style sheet indicating how I wanted the written work to be set out. I sub-

[6] It must be acknowledged that a common pitfall for teachers who include CMC in teaching is that of spending no time on "how to" skills with students. But one must also be realistic: I had no extra time to take students to the labs to teach them how to use the internet, for example. I relied on the fact that all students in UC have to take the European Computer Driving Licence, and presumed they had basic skills.

[7] The reason for choosing the last ten hours of the course is that the enabling skills using the concordancer are needed for the mini-project, which students work on after the course has finished and hand in at the end of the academic year.

[8] It is perhaps worthy of note that I never received any complaints about my expectations that students should possess computer skills. Occasionally, students turn up to exams without knowing last minute information posted on the website, but they are not penalised for this.

sequently received vociferous complaints from the Reference library staff on the excessive numbers of students accessing the same materials, and about 45 scripts were handed in to me for marking, so I considered the experiment a communicative success, since many students had followed instructions to the letter.

In the first year course on phonetics and phonology, the course included 5 compulsory sessions in the language laboratories, during which students had to listen to audiocassettes and recognise intonation patterns. Although several hours of class a week were available with an assistant, it became immediately obvious that students needed greater timetable flexibility because of overlapping with other courses. So I transformed the five recorded intonation lessons into self-access units, putting my sound files onto the local server, and uploading the handouts and answer sheets into the virtual classroom. This meant that students could access and print out the material from home, and arrive at the labs when it was convenient for them with the material in hand[9].

In the second year course, I also used the virtual classroom in Santoro's CAI mode, i.e. using the computer as an aid in instruction. For one particular assignment, students were directed to several American university sites[10]. I asked them to perform an automatically marked test on punctuation and sentence structure, and then print out their corrected results. An unquantified but sufficiently large number of students did so, and the material downloaded from the sites became the object of a lesson in class. Since American grammatical terminology can be different from British terminology, this was an occasion in which their learning environment was amplified by frequenting academic sites outside the classroom. Becoming aware of the different ways in which the same phenomena can be explained within the academic community is an important step in the maturing of understanding, and the availability of these sites became a new reference point I could refer to.

In the third year course on lexicology and lexicography, I set several tasks requiring them to prepare for class by consulting internet sites rele-

[9] It is worth noting, however, that students often forgot to print the pages out at home. This meant that photocopies of the lab handouts had to be left in the self-access centre, since students have no access to printers in the university labs.

[10] For this assignment students accessed Professor Charles Darling's Online Guide to Grammar and writing http://ccc.commnet.edu/grammar and the University of Oregon's School of Journalism grammar tests: http://jcomm.uoregon.edu/~russial/grammar/grambo

vant to the course objectives. Since the analysis of dictionaries is a component of the course, they were directed to various online dictionaries[11] and asked to report back in class with information regarding their history, compilation criteria, user-friendliness and usefulness. For the lexicology component this current year (2002-3), they are encouraged to subscribe to various scholarly or popularising mailing lists[12], specifically concerned with lexis, so as to develop interest in the topic, and become at least a "lurking" part of the community interested in such matters.

Since this course also includes collocation as a topic, one lesson involved using the Collins Cobuild site[13]. The task required students to find the Concordance and Collocations Sampler within the site, and investigate the common collocates of two lexemes that had occurred in passages read in class: *sheer* and *choppy*. Their findings (see Figures 1 and 2) were then the starting point of a subsequent lesson on collocation. This use of CMC integrates Santoro's categories *informatics* and *CAI* since an online store of information is accessed and interrogated, leading to elaboration of the information in class. The stage of reporting back in class was fundamental to the success of this kind of activity, in that some kind of link between the work online and the unfolding of the course needed to be made if students were actually to carry out the task.

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[11] Examples include the Merriam-Webster dictionary (www.merriam-webster.com) and the Century dictionary www.global-language.com/century/.

[12] Among the mailing lists recommended are Michael Quinion's World of words and various sites which send "A word a day", e.g. www. wordcommand. com/wordoftheday. htm

[13] http://www.cobuild.co.uk

This site allows users to interrogate the Collins Wordbanks online English corpus (56 million words of spoken and written text). Forty concordance lines are given as a result of a request for simple queries (e.g. the lexeme *choppy*), and 100 collocates of any given lexeme, sorted according to one of two significant scores (MI-score or T-score), as requested.

Figure 1. An extract of the Query results of choppy *from www.Cobuild.co.uk*

between them, but the water grew	choppy,	and my boat was torn
ship, but the river was terribly	choppy	and we were constantly
was in shadow. It was chill and	choppy.	Below, we came to a
he only snag is the long, can-be-	choppy	boat ride from Rhodes.
ing, little child crying. Moans,	choppy	breathing. Miguel
sky as you look out across the	choppy	Bristol Channel. [p]
enough pop tune with its rather	choppy	chorus of Every time you
nt. [p] [h] All at sea over the	choppy	cross-Channel
keep their heads down for a	choppy	`Father's Day', the of
Must I Paint You A Picture and a	choppy,	fiery Body Of Water And
He's only a few months old." Her	choppy,	fractionated statements
precise, but the ride is rather	choppy.	I'm not sure I'd want
at Martine Sitbon and Callaghan,	choppy	layers create texture
and provides students with less	choppy"	learning experiences.
s of melody bob forlornly on the	choppy	seas of introspection. A
marks, plain sailing: there were	choppy	seas, reefs, tempests,
ig fighter. [p] Flying low over	choppy	seas and dodging dark
] And chill winds, rain and	choppy	seas could not dampen
in to help with the search in	choppy	seas and strong winds.
nd he still talked in short,	choppy	sentences, but among the
e laughter tumbled out of him in	choppy	spurts. He looked at her

Figure 2. The lexical collocates of sheer *with joint frequency >10 (adapted from www.cobuild.co.uk)*

Collocate	Corpus Freq	Joint Freq	Significance
Size	5579	28	5.131381
Volume	1707	23	4.741776
Scale	3024	22	4.592502
weight	4447	21	4.435199
force	8996	22	4.399136
Joy	2203	19	4.282143
number	25248	23	3.996300
sheer	1090	16	3.958615
determination	1219	16	3.953718
Pleasure	2353	16	3.910662
Hard	15874	19	3.805827
Delight	1074	14	3.698065
numbers	6111	15	3.633355
Cliffs	341	13	3.591188
Walls	2620	13	3.495194
Hell	3678	13	3.450630
Drop	3822	12	3.296541
madness	582	11	3.289975
frustration	886	11	3.276054
Rock	5616	12	3.217890
Beauty	2972	11	3.180535
Power	14242	14	3.163589
Panic	1286	10	3.100517
Luck	2369	10	3.048505
Variety	3380	10	2.999951
work	41926	19	2.898139
class	9814	11	2.867236
quality	8229	10	2.767075
chance	11723	10	2.599274
face	16100	10	2.389066
side	21609	10	2.124494

Part of the third year course, which will take place in Spring 2003, includes ten lab hours in which students will be introduced to the skills needed in accessing a corpus with a concordancer. Studies are under way as to how these hours can become self-access hours, since the number of hours students will require to grasp the skills involved will undoubtedly vary.

Lastly, as a means of helping the students who could not attend lessons, I posted summaries of lectures, or even full lecture notes. Although time-consuming for me, this was greatly appreciated by the students.

4.2. Dialogue by e-mail

As regards my concern about the lack of interactivity in the course, I used CMC extensively for *conferencing* with the students. Questions that had previously been made during office hours began to trickle in by e-mail. I made an effort to respond quickly to whatever was asked. The linguistic functions behind the messages varied little: there was the occasional thank you for study suggestions I had given, but most requested information or clarity about the course or exam, which they could not understand from other available sources. Others wrote to ask for a personal appointment after reading information elsewhere, or to request supervision on a dissertation in English linguistics. One moaned about failing the exam repeatedly, with the emotive subject line "I don't know what to do any more". A few extremely dedicated students wrote detailed e-mails asking for clarification on lecture notes and tasks posted in the download area. Two of them outlined doubts and questions about transcribing certain phonological processes in the phonetic transcription, showing thorough study and keen interest. Another queried the answers given to an exercise on punctuation and sentence structure, wondering if I had made a mistake. These messages were the sign of advanced students, with real interest in hearing the answer to their questions. I thought their initiatives should be rewarded, and replied fully to this kind of mail. I also had e-mails from students on exchange programmes abroad, asking me for advice on programmes in the foreign universities.

One student who continued to fail the same exam, and who had discussed the problem with me on a few occasions during office hours, wrote a newsy e-mail recounting a study visit to Dublin, sharing hopes with me of passing the next time round. The e-mail, full of grammatical and lexical mistakes, became the object of an exceptional online consul-

tancy. I sent it back to her, with an encouraging note, suggesting she did an error analysis on what she had written. She then sent back an e-mail with what she had found, and I re-corrected it. Obviously, if many students took advantage of this e-mail opportunity in the same way, I could not have replied in such detail. The individual attention given to this student was warranted only by her considerable linguistic need and the fact that not many students took the initiative the way she did.

4.4 Students with special needs

The fourth application of CMC in the course is perhaps the most unusual and stimulating one. Having a visually impaired student in class opened up new avenues of pedagogical interest for me, and, at least until this student graduates, the attempt to make the course accessible to both sighted and unsighted students promises to be an interesting research area. A certain amount of background is necessary here in order to explain the usefulness of CMC in this particular context.

4.4.1 The student[14] and her adapted computer.

The student in question, now enrolled in her second year, attended mainstream schools up until university. She began using a personal computer at the age of nine, although she learnt Braille[15] before that, using a Braille notepad and typewriter[16]. To the "ordinary" ACER Te529 laptop she now possesses, she has attached some adaptive technology, both hardware and

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[14] I am very grateful to this student, who willingly spent several hours recounting her experience and showing me the various tools she uses for study.

[15] Until the advent of computers, the Braille alphabet, usually typed in relief onto paper, consisted of 63 different combinations of 6 dots arranged thus:

o o

o o

o o

Since the alphabet has been transferred to computers, two extra dots have been added to each combination (making 4 lines of 2 dots). These extra dots have a number of uses, among which signalling upper and lower case and occasionally numbers.

[16] A Braille notepad (the size of a B5 paper notepad) consists of a hard plastic back cover, with about 63 horizontal furrowed lines, and a metal front cover with 24 rectangular holes per horizontal line, each hole representing the space of one letter. The height of one line of holes on the front cover corresponds to three of the furrowed lines on the back cover. A sheet of paper. sandwiched between the front and back cover, can thus be written on (perforated) by a sharp pointed instrument or biro. Each hole (representing a

software[17], which transforms whatever text appears on her computer screen into Braille, allowing her to then read it through her fingers. The pc is placed on top of the adaptive hardware, and a Braille line or bar[18], the width of her laptop, protrudes along the front edge of the pc from the hardware underneath. This bar consists of a line of 24 Braille rectangles placed side by side which simultaneously reproduce 24 characters of the text on the screen. That is equivalent to about half a line of text, which is the maximum the user can read at one time. An alternative piece of software is a speech synthesiser, or screen reader, which converts what is written on the screen into synthetic speech. The student prefers to use the Braille bar for text, and the speech synthesizer for her rare forays onto the internet, whose dependence on graphics rather than text makes navigating problematic. Her speech synthesizer offers a variety of voices and accents, as well as the option to increase or decrease the speed of speech, but none of them fail to irritate, perhaps because of their robotic intonation and lack of sentence stress, which are perfectly discernible both to native and non-native speakers.

4.4.2. Provision for the disabled in UC

The Catholic university offers a variety of facilitating services to students with any kind of disability. Most disabled students apply for free extra tutoring, and the student in question was assigned one extra hour of tutoring a week for English. A major problem for visually impaired students is the availability of books, and although there are several volunteer associations[19] which scan books at no cost, their service is too slow for a university student who needs rapid access to texts. My lectures were generally delivered as presentations, aided visually by Microsoft Powerpoint slides, and my visually impaired student asked me to e-mail her the notes I projected at lessons. The optimum type of file her software reads is a text file,

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letter) can be perforated in 6 possible positions, corresponding to the 6 dots on a Braille grapheme: top right or left, middle right or left, and bottom right or left. A moveable horizontal metal bar, attached to the left-hand side of the front cover ensures that the user writes in a horizontal line. Once the paper has been perforated, the writer can, not without some difficulty, check the "spelling" by feeling the raised dots that appear on the underside of the paper. A Braille typewriter works in the same way, with each key corresponding to one combination of dots.

[17] The software she uses, Jaws, only works on English text.

[18] Model MB408L.

[19] such association is the Associazione Nazionale subvedenti.

so Powerpoint slides were complicated for her to read. I certainly did not realise the importance of this at first.

4.4.3 The arbitrary nature of signs: the International Phonetic Alphabet

A fundamental part of the first year English Linguistics module is the acquisition of the IPA. My visually impaired student had studied Greek at secondary school and had come across the problem of not being able to see the Greek alphabet; she had invented new signs for the letters not in the Roman alphabet, agreeing with her teacher on an alternative system. When he had to correct her written work, he referred to her alternative table of letters. At university, the student did not meet with the same flexibility. For both English and French, she was required to produce a transcription in the IPA, in exactly the same format as the other students.

As a general rule, this visually impaired student prefers to be treated exactly the same as other students, and to be able to communicate with anyone. On discussing the problem of the IPA with her, what emerged as important was to clarify together the aim to be achieved, and to have a certain mental flexibility in order to find the appropriate way of reaching it. Methods of study proposed to sighted students are often inappropriate for visually impaired students. Mathematics is a key example she cited. While putting figures in columns and drawing shapes is useful to a fully sighted person, they are useless to a blind person. She preferred to understand concepts mentally, and then find a way of representing them as appropriate. Obviously, memory is her key tool, but she sometimes uses shapes as a mnemonic device. She memorises telephone numbers, for example, by thinking of the picture her hand draws on the phone key-pad.

In the case of phonetics, it was through the tutor[20] assigned to her that the problem of the phonetic transcription was solved. It was agreed that the aim was that she should learn the sounds of the languages, and the phonological processes such as assimilation, elision or linking, and that she should be able to reproduce this in a way that the teachers could understand. In other words, the teachers should receive a transcription like everyone else's, and not have to learn an alternative phonetic alphabet just for one student. But she herself did not need to know those exact symbols. Having had the IPA font installed on her pc, what she learnt

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[20] I am indebted to my colleague Stephen Liti for explaining his admirable work with this student to me.

(like any other user) was the combinations on the keyboard that corresponded to each symbol. While a sighted user learns both these and the actual IPA symbols, she only had to learn one code[21]. At the weekly tutoring session, her tutor would bring in exercises both of words and phrases in the Roman alphabet and in the IPA and together they would work on them using her computer. The tutor would see the IPA on the screen, while the student would read and write the equivalent key combinations on her Braille bar. The system worked perfectly, and at the end of the course, her exam transcription was rated very highly, among the top 10%.

4.4.4. The future: second and third year syllabi

Having discovered that slight adaptations of the material and prior organisation on the part of the teacher can make life much easier for such a student, and enable to them to perform the same tasks as everyone else, the challenge now lies open for the second and third year modules. In the second year, the course centres largely around the question of cohesion in text, and in the written exam students are required to mark up a text, circling words, drawing arrows, or using colours to assign anaphoric or cataphoric reference and lexical cohesive features. The fact that blind students can only read and analyse half a line of text at a time would appear to put them at a disadvantage, in that the visual dimension would seem to be a help in understanding links within text. Initial experiments with her so far have suggested preparing text files with lines half the length of a normal text, i.e. with about 40 characters per line, rather than about 100, so as to make the reading of a text easier. I read her the beginning of an article dealing with sponsorship in companies, and asked her to try and identify the lexical set meaning "group of people". I read it several times, and she then identified the correct set. It may be that her well-exercised and flexible memory can cope with such an exercise better if it is done orally. On the other hand, it might be sufficient just to give her more time than other students to do the exam in written form.[22]

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[21] The IPA does actually exist in Braille, but this student did not possess the software, and understandably did not want to invest in it.
[22] During the interview for this article, she revealed a problem with the university language exams which could have been easily solved. For example, the way in which the dictation exercise is conducted in the language exams is too fast for her. She transcribes the exam on the computer, but since she reads half a line of text at a time the last reading of the dictation, during which students check their work, is a waste of time for her, in that her fingers read more slowly than the eye does.

The third year module will present further challenges, since a major part of the programme examines dictionaries. We are currently experimenting with CD-ROMS to see which products on the market can be read by her software. The latest Macmillan Advanced English Dictionary on CD-ROM, for example, makes ample use of colour in marking up key and frequent words, etc. Naturally, this is no use to her at all.

For the topic of collocation, in which third year students interrogate a computerized corpus of language to investigate the typical contexts and co-occurring features of certain words or phrases, it may be necessary to imagine another more appropriate methodology of approaching the problem. In this type of exercise, students use a concordancer which produces a screen of many lines with the key word under investigation placed in the centre column (see Figure 1). These lines appear initially in random order, but can usefully be sorted alphabetically to the left or right of the node word (see Figure 3). Since her view is syntagmatic, and she cannot read "vertically", it remains to be seen whether an alternative presentation of the same data enables her to perform the same task as everyone else. Shortening the number of characters per line, for example, might help, but the irrelevance to her of the presentation format (in columns) remains. In a normal page of concordance lines, the text is easy to read or the patterns easy to recognise because the key word is placed in the centre of the page. If it is not the position that can help her, then it may be possible to experiment with the form of the key word, making it appear in capital letters, for instance. Since her software reads .txt files best of all, this means that capitals are probably the best way to distinguish the key word from the rest, since a .txt file is not a "smart" file, i.e. it is plain text and does not mark up visual details like Bold or Italic fonts.

These topics promise to be interesting areas of research in which CMC will play a major role.

Fig. 3. Concordance lines sorted right. Node: it is

1	would not have known how to handle.	It is	apparent that, even on the best
2	d not prevent the humanitarian tragedy;	it is	arguable that it accelerated Serb
3	kely) this interpretation goes too far,	it is	clear that Clinton has not acted
4	a philippic against this terrible mess.	It is	conceivable that, even now, the
5	econd war has not yet been won or lost.	It is	conceivable, but unlikely, that
6	l have been victims of Serb attack, but	it is	inconceivable that Serbs would

5. Data collection

At the beginning of the 3rd year course in the current academic year, I administered an anonymous questionnaire in Italian on the CMC components in these courses during the year 2001-2. The students, of whom there were 66 on the first day of class, had all passed the first and second courses, and had seen a gradual increase in the amount of CMC included in the course, so I thought they were the most appropriate group to ask. The questionnaire, consisting of both closed and open items, aimed to discover their attitudes towards CMC, and solicit an overall judgement on its use in an academic course. It also asked for suggestions, improvements and criticisms. Before distributing it, I explained that I was not asking for an evaluation of the course, since that had already been accomplished in the previous semester, but was seeking information about their attitude towards CMC and its role in the course. The questionnaire probed the following areas:

a) whether they had an internet connection at home;
b) if so, whether they had used the virtual classroom last year, and had downloaded materials placed online;
c) if so, whether they had found the materials useful,
d) whether the materials could be improved;
e) whether they would come to lessons if all the course material were online;
f) whether they had accessed the websites I had recommended;
g) whether they had communicated with me by e-mail;
h) if so, in what language and why they had chosen that language;
i) whether they thought e-mail was a viable alternative to office hours and if so why;
j) if there were any disadvantages they had encountered in the use of CMC during the course.

6. Discussion of results of questionnaire

There were 66 returned questionnaires, which represents slightly less than half the students enrolled in the course. From the results there emerged some interesting data, although nothing particularly unexpected. Firstly, it was a relief to see that the vast majority of students (58/66) had internet access at home, and that all of these had down-

loaded the material made available in the virtual classroom. Nearly all of them (55 of the 58) had found it useful, and 47 of the 58 thought that there were no improvements to be made to the use of the virtual class-room. (No helpful suggestions were made on how to use it more effectively.) Since I had devoted minimal time to explaining how to access the virtual classroom, and no time on the technical side of writing e-mails, this finding bore out what I had expected: that by the third year, it is less important to spend time on hands-on computer skills, since most students by then have an adequate level of proficiency for the limited tasks that this course asks of them.

Regarding their likelihood of coming to lessons if all the course material were provided online, 53/66 said that they would. I interpreted this as an encouraging sign of a desire to interact with the teacher, since if the lecture were made available before the class, it meant that they could read it first, and then perhaps discuss it. Whether I am ingenuous on this point remains to be verified this year. 55/66 said that they had visited the sites I had recommended online, which I interpreted as a good sign of the broadening of the learning environment.

Of the sample, just under half (30) had communicated with me by e-mail during the year; of these, twenty-four had written in English. The reasons given for writing in English were appropriacy, "because English was the addressee's mother-tongue", or "because they wanted to practice what had been learned in class". This was an example of a welcome spin-off of CMC. After about a month of lessons, during which I had received a considerable number of messages, it was obvious to me that there was great confusion regarding the appropriate register to use and ways of presenting oneself and one's problems/needs in written electronic form. Indeed, many students had probably never had to address an English adult by e-mail before, or perhaps talk about themselves in English, except to their friends. I consequently uploaded a file of notes into the virtual class-room on "How to write e-mails in English". But no time was spent on this in class, so it was an example of CMC used for "alpha" learning (Ellsworth 1995), i.e. presentation of new material, as opposed to reinforcement of concepts or theories already presented in class ("beta" learning)[23].

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[23] I also included a question on whether the students thought e-mailing in English was an important linguistic skill (65/66 yes) and whether it was taught at lessons (45/66 no).

As regards the use of e-mail as opposed to office hours, the overwhelming response (55/66) was that it was a great advantage. It saved time for students who had many lessons to attend, lived far away or worked, it made the teacher "continually available", and was like "jumping the queue" outside an office. Eleven students made reservations: that its usefulness depended on the problem which sometimes needed to be resolved in person, that it was less clear than meeting the teacher (although I noticed that this student had never actually written to me), that it lacked human contact. The vast majority, however, approved the system wholeheartedly.

26/66 indicated disadvantages of CMC. Some of these were technical, such as slow connections to the internet, difficulty in downloading files (initially, I had posted Powerpoint presentations, but then changed to word documents also for the benefit of my blind student), while others indicated a perceived lack of human contact, with comments like "there's no human relationship involved", "I prefer discussion face to face", "the teaching is very impersonal and distant", "such a lesson should be complementary to a face-to-face encounter". The majority of objections were criticisms of the material in the download area, with comments like "some notes were incomplete or unclear", "not all topics were comprehensible", "some information gets lost", "difficult topics are less clear in this form". Such criticism is naturally healthy, and paves the way to more attentively prepared materials. I did have the sneaking feeling that some students were just looking for more and better spoon-feeding, but that was obviously not the case of the majority.

7. Conclusions: benefits and costs

In the light of this research, it emerges that the inclusion of CMC in these courses has been of clear benefit to the students. Both as a "*communication-support* tool" and as a "*content-transmission* tool", to use the terminology of Benbunan-Fich and Hiltz (1999), it helps overcome problems of time and distance, enabling working students to keep up with the course and arrange to meet the teacher when necessary. The results of the questionnaire show that students are satisfied with its inclusion in the teaching methodology, and they generally like it as a mode of communication. Minimum specific "training" is included in the first two years of the course (see Section 4.1), but the use of CMC gives students ample opportunity to practise the skills that they already possess, and the train-

ing they receive in the third year will be directly useful to their coursework. The exploratory aspect of the course, i.e. encouraging students to look beyond the actual and virtual classroom, could be considerably developed, in my view, and the occasions when students are encouraged to look beyond the classroom (via websites like the Cobuild homepage, the American university sites, or even in the university's own library) show that the apparent lack of interactivity in the classroom is not due to a lack of interest in the subject. It might reflect different learning styles (more individualistic styles, for example, as opposed to collaborative learning and taste for discussion), or else it might just be that the weight and number of physical presences in class discourage participation. Further research would be needed to answer these questions precisely.

For the special needs student, CMC is a breakthrough in many ways. Since much of CMC is text-based, and what isn't can often be made so (e.g. text-only versions of library catalogues), it both multiplies and simplifies the learning opportunities for the visually impaired. My student described the advent of e-mail, for example, as a revolution for her, in that it made her much more independent both for her study and in her private life (letters, for example, no longer had to be read aloud to her).

From my point of view as professor/instructor/facilitator, CMC is a challenging but costly development. In terms of professional skills, provision in Italian universities for in-service training would be a welcome step forward. The example of my computer-programmer-cum-language teacher colleague becoming the blind student's tutor was sheer luck for her. His tireless enthusiasm and determination to find a way round her problems is stimulating in terms of long-term goals, both for the visually impaired and for teachers faced with similar situations. My more conventional grasp of CMC is due to an interest in self-development as a teacher in a technological society, and my desire to provide as effective a means of communicating my subject as possible. Moreover, the increasing needs for distance learning in the university set-up would indicate that the role of e-moderator (Salmon 2000) is one which could soon be relevant to the composite profile of the university professor.

It must be said, though, that the costs in terms of preparation and time are considerable. Some significant information volunteered in several questionnaires, such as "the teacher is always available", is a warning signal. The desire for efficiency on the part of the teacher can lead to glossing over the fact that one major advantage of CMC is that it allows for asynchronous rather than synchronous communication, and the

time-lapse should be built into the dialogue created, in the sense that both teachers and students need to realise the time-lapse is necessarily there. One possible administrative difficulty is that it is well-nigh impossible to quantify the amount of time taken up by e-mail dialogue, and the question "How far can this go?" does arise. But if it is pedagogically useful for teachers to be available by e-mail too, and if the freedom from time and distance is an ever-increasing factor in the field of education, then best practice would be to include it in course design.

The e-mail-versus-office hours experiment has undoubtedly brought fruits in this case. The students who come to the office hours now tend to know basic information, and need to discuss particular problems; they are often working students with whom there has been prior e-mail contact. The download area contains a Frequently Asked Questions file, which is periodically updated and, one would hope, saves a few repetitive e-mails. Thus communication appears to be more efficient, both in terms of interpersonal meetings and conferencing mediated by the computer. The trend does seem to be, however, that the more information students are given, the more they ask for.

One aspect of the incorporation of CMC into the course that could be developed is student-student (not just student-teacher) interactivity, and experiments could perhaps be made using the synchronous communication mode that Blackboard offers.

This case-study demonstrates how student-teacher dialogue can be increased, and how positively students respond to the broadening of the learning environment through CMC. There is ample room for research in many areas of the field, including the discovery of imaginative ways of maintaining yet containing interactivity within reasonable time-limits.

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