

The impact of communication theory in the context of engineering curricula. The academic year 2003-2004 at the Politecnico of Milano (Como Campus)

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Abstract: The paper explores the features of three courses on communication introduced in the curriculum of engineering students of the Politecnico di Milano (Como Campus). The description of the courses is followed by an evaluation, which provides insight both on the utility of the experience, and on future developments of the programme.

Keyword: communication theory; engineering curriculum; humanities; computer mediated communication

1. INTRODUCTION

In the academic year 1999-2000 the Politecnico of Milano (Como Campus) offered an innovative elective course in “Sociology of Communication (Theory of Communication)” to engineering students in their 4th or 5th year, in the curricula of “Information Technology” and “Management”. The aim of the course was to introduce students to the complex phenomenon of human communication. As shown elsewhere [1], the positive feedback on the programme encouraged the introduction and expansion of the previous course to earlier stages of the curriculum, namely to the 2nd and 3rd year. Moreover, it fostered the development of a curriculum with a prominent emphasis on communication for the “Laurea Specialistica” (equivalent to a Master in Anglo-Saxon countries) in “Computer Engineering”. The new plan of teaching activities started in October 2003, and it is currently structured as follows.

The curriculum of the “Laurea Triennale” (equivalent to a Degree in Anglo-Saxon countries) includes two courses in “Communication Science”, respectively “Fundamentals of Communication Science” and “Techniques of Communication Project” for students mainly of the 2nd year. A third course entitled “Communication for Informatics Project” is also offered to student of the 3rd year. In its turn, the area of communication in the “Laurea Specialistica” presents five courses, namely “Computer Mediated Communication”, “Communication Theory”, “Usability of Computer Applications”, “Usability Project” and “Communication Project”.

Having contextualised the courses in terms of their targets, this paper aims to illustrate the fundamental aspects of three courses with special emphasis on their

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contents, teaching strategies and teaching material. The reference is to the courses “Fundamental of Communication Science”, “Computer Mediated Communication” and “Communication Theory”. The illustration will be complemented by an evaluation of the programmes, based on students’ satisfaction as assessed by a questionnaire administered in the current academic year. The evaluation part will offer a precious insight for approaching this experience in the following academic years.

2. FUNDAMENTALS OF COMMUNICATION THEORY

2.1. Generalities

The course, lectured by Lorenzo Cantoni and assisted by Sara Rubinelli, was attended by 163 students mainly of the 2nd and 3rd year. “Fundamental of Communication Science” intended, first, to enhance a reflection on the nature and constitutive dynamics of communication and, second, to provide students with interdisciplinary theoretical bases for the analysis and construction of effective communication. The focus was on the personalisation of the communicative act in terms of sender and receiver/s of the message, computer mediated communication and the features of organisational interaction.

More specifically, the course aimed to promote knowledge of: critical thinking (an exploration of the rigour of scientific thinking); basis of semiotics; human language (its functioning, codices and linguistic structures); textual analysis (theory of speech acts, textual requirements, creation of texts); history of communication (general overview from the oral society to press and mass media communication); theories of diffusion of new communication technologies and electronic texts; public speaking (according to the models codified in classical rhetoric); textual characteristics and strategies of creation of news, magazines and articles for scientific journal, as recognised by experts in the fields invited as guest-lecturers.

The course was held for a total of about fifty hours, subdivided in lectures of four hours each. The interactivity of the lectures was assured by frequent questions put forward to students, and by a reiterated invitation to reflect on, and criticise the contents presented. E-mail messages and an online platform containing both the material discussed during the lectures and advices on tasks to be performed reinforced the interaction between lecturers and students, alongside supporting students’ understanding of the discipline. The bibliography recommended for the exam included a handbook of communication theory [2], as well as the slides presented during the *ex cathedra* lectures. As for the modalities of the exams, knowledge of the discipline was assessed by a test subdivided in two parts, written and oral respectively. For the written part (30% of the final mark), students were asked to summarise a seven pages text, containing some level of technicality, in two articles to be presented to two different target groups, namely to expert readers (engineers) and non expert readers (the general public). For the oral part (70% of the final mark), they had to answer questions about the contents discussed during the lectures, and simulate a two minutes public speaking on a topic assigned during the exam itself. 93 out of 163 students have already completed both parts of the exam, with a positive average mark of 25.8 (lowest mark = 18; highest marks = 30, and 30 cum laude corresponding to 31).

2.2. Evaluation

Following the previous experience [3], students were given a questionnaire to compile for the evaluation of the academic year. The questionnaire was distributed to students individually, during their oral exam.

Students had to give answers on the following topics: academic year of attendance; year of attendance within the curriculum of studies; curriculum specialisation; other professional activities done in parallel with the student activity; overall usefulness of the course (five degrees admitted: I don't know / no / enough / much / very much useful); reasons for considering the course useful (max. three reasons); suggestions for changes. Of the 93 students who have already sat the exam, 79 students have returned the filled questionnaire (response rate: 84.9%). Answers to yes / not and multiple questions are summarized in table 1:

TABLE I.

Curriculum year	2 ND : 57; 3 RD : 19; 4 TH : 2; 5 TH : 14
Curriculum specialization	Information Technology: 79 Management: 0
Do you have a job?	Yes: 17 (in the informatics area: 8; in other areas: 9) No: 62
Was the course useful for you?	Don't know: 9; No: 5; Enough: 45; Much: 14; Very much: 6

By assigning a 0 value to "don't know", 1 value to "no" answer, 2 to "enough" and so on, the average of the course rating is 2.03. Although only 5% of the students answered "no", the course rating shows that the course could be improved in some of its features.

Here, students' comments provide useful insight. 60 students out of 73 gave reasons in explanation for the perception of the course's usefulness. The reasons can be classified as follows. The course provided: (1) better ability to communicate; (2) better ability to speak in public; (3) deeper understanding of the complexity of human communication and its techniques; (4) skills to structure discourses and express ideas; (5) new techniques of exposition. According to some responders, the course lacked: (1) some focus on issues more relating to the field of engineering; (2) empirical applications of the theory presented. In addition, some students noted that the material of the course was too much rich for the amount of hours (and academic credits) at their disposal.

Generally speaking, there is a need to make a careful selection of the contents for the following years by preserving, however, the comprehensiveness of the theoretical bases provided. From a procedural point of view, this could be achieved on the one hand by reducing the hours of *ex cathedra* lectures and limiting the emphasis on topics that, although of a cultural value, have less impact on the acquisition of communication skills (e.g. history of communication); on the other hand, by offering students laboratories of analysis, where they will be faced with communicative situations relating to issues closed to their curriculum (either project-design or presentations).

3. COMPUTER MEDIATED COMMUNICATION

3.1. Generalities

The course, lectured by Lorenzo Cantoni and assisted by Stefano Tardini, was attended by 81 students. It aimed at promoting in students the required competences for the design of effective communications using digital technologies, and for adequately analyzing them. For this purpose, the course intended to present the basic features of electronic text (hypertext) and computer mediated communication; to present some relevant dynamics related to the adoption and diffusion of new communication technologies in given social contexts; to focus on the use of the Internet, and in particular on the production and management of web-based sites and services. The course contents could be roughly divided into five main areas: the diffusion of new communication technologies; basic features of computer-mediated communication; Internet and organizations: web production, management and promotion; the “Coffee Shop Approach”: a tool for analyzing web services; meetings with experts.

The course was offered in the first semester (September 2003 – January 2004) once a week (4 hours a week), for a total of about 50 hours. Lessons were taught in a very interactive way, students were required to make questions, interventions and suggestions. Students had to develop a project in groups of 3 to 5 people; some lessons were devoted to group tutoring activities. The course hosted some extra lessons as well, taught by experts in some specific areas, such as digital television, scientific divulgation and web marketing. Outside the lessons, communication between teachers and students relied on e-mail messages and on an online platform where teaching materials were made available. The bibliography of the course comprehended three chapters of two different handbooks [4], two scientific papers [5], all the slides presented during the lessons, and the contents of some mailing lists. 30% of the final mark was awarded to the group project, 70% to an oral exam. Students got a quite high average mark: 27.3/30 (72 out of 81 students have already sat the exam).

3.2. Evaluation

32 students out of the 72 who sat the oral exam have returned the filled questionnaire, with a response rate of 44.4%. All students attended the course in the academic year 2003-04; answers to yes / not and multiple choice questions are summarized in table 2:

TABLE II.

Curriculum year:	4 th : 12; 5 th : 18; 6 th : 2
Curriculum specialization:	Informatics: 29; Management: 3
Do you have a job?	Yes: 9; No: 23
Was the course useful for you?	Don't know: 1; No: 0; Enough: 9; Much: 15; Very much: 7

As it can be seen, the course was much appreciated by students: 22 out of 32 respondents (68.75%) stated they found it either “much” or “very much” useful. Assigning a 0 value to “don't know” answers, 1 to “No”, and so on, the average of the course rating is 2.94. Students who already had a job when attending the course

were working mostly in the informatics area (6 out of 9), as programmers (3), software and applications' developers (2), web applications managers (1).

As concerns the reasons of the values students assigned to the course's usefulness, 12 students stated the course was useful because it provided them with a different perspective on information and communication technologies; their average rate for the course has been 4.5. Two of them even said that the course caused in them a real change of attitude (*habit change*) towards ICT. 6 students said the topics were new and interesting.

Among the suggestions for the improvement of the course, we report here only the changes that have been pointed out by more than one student: to have more meetings with experts (2); to treat more in depth the topic of "usability" (2); to have all literature online (2); not to have the exam divided into more parts (2); to join the course with another course in order to make it a one year (10 academic credits) program.

4. COMMUNICATION THEORY

4.1. Generalities

During its first year life the course, lectured by Nicoletta Di Blas, enrolled 84 students: 39 of them still belonged to the previous curriculum of studies (5 years curriculum), the other 45 had either already finished their 3 years bachelor or were still doing it. Most of the students attended the lessons from the very beginning of the academic year to the end, others (for example working students) could profit of VHS videos.

The course's content was divided into 3 basic sections: (1) an introduction to the main concepts of the core disciplines of communication sciences (linguistics, semiotics, etc.); (2) a short overview of the evolution of communication means, with a specific emphasis on their impact over society and cognitive processes; (3) some practical lessons on how to speak in public, borrowing concepts from ancient rhetoric and methods from current practice. Moreover, as a testimonial to section 2, a guest speaker was invited for a lesson on semiotics and movie scripts; after a short introduction, he showed and commented the movie "Gladiator" (by Ridley Scott, 2001). The contents were very similar to those offered in the course "Fundamentals of Communication" (see above): the reason is that both courses were at their first appearance and the students of the "Laurea Specialistica" had not had the possibility of following the first one. Lessons were very interactive: students were frequently invited to reflect upon specific points, comparing theory to their personal experience, and to express their opinions. Practical exercises helped clarifying difficult points: for example, students were divided into small groups of 3 persons given 20 minutes to develop a "communication code" (for card players, waiters in a restaurant, soldiers etc.), in order to highlight similarities and differences with true linguistic codes (natural languages).

The exam was organized as follows: (a) written questionnaire about section 1, with six open questions, done at the middle of the course. For those who wanted to improve their result a second chance was given at the end of the course. (b) oral question / answering concerning section 2 and 3; (c) oral presentation of a scientific paper; choice was given between a paper by Gottlob Frege (philosophy of language) and a short text concerning the phenomenon of the "agenda setting" (sociology of

communication). Specific attention was paid to the effectiveness of the oral presentation.

The overall objective of the course was to help developing sensitiveness on communication issues in general, by offering basic concepts and a proper jargon (section 1), a short story of its development (section 2) and a “practical course” aimed at improving communication’s effectiveness (section 3). Section 2 had the specific aim of showing that all communication technologies have a strong impact on society: from the appearance of the alphabet up to new communication technologies.

4.2. Evaluation

A questionnaire concerning students’ satisfaction scored very high points on all the questions (How was the course organized? Is the teacher clear? etc.): on a 1-to-4 scale, the average score was always above 3, with a peak of 3.80. 41 questionnaires were analyzed. A general satisfaction was expressed by students at the end of the exam’s session, when each was asked to express her / his opinion. They said that the course was “different” and sometimes the discussion continued even after the end of the lesson; they appreciated in particular the 3rd part (“Public speaking”), finding it very useful in professional life (but not only!), whilst the relevance of the first part (linguistics and semiotics) was not always clear to them. Students from “Laurea Specialistica” in particular were more motivated since many of them had already experienced professional activities / situations in which an effective communication is fundamental.

5. CONCLUSION

The experience of offering a main course on communication in the bachelor curriculum, plus some short projects, and of designing a specific master program in informatics with a special emphasis on communication seems to be a successful experience and is perceived by the students as being very useful and interesting.

Due to this experience, the Politecnico is considering to widen the offer in the master curriculum, adding a few new courses (on Educational communication and eLearning and on Scientific communication to lay people).

This experience is stressing once more the close and deep connection that bridges technical and humanistic education: humanities are finding their way inside the engineering curriculum, showing their being alive and able to fertilize the technological soil.

On the other end, the experience by all the people involved in teaching communication courses showed that humanistic disciplines can greatly profit from this collaboration with technical people in a Politecnico contexts. In particular, a new and “foreign” contexts helps overcome a sort of auto-referential attitude, which can be found in humanistic fields. Having to clarify everything – nothing can be given for granted – professors can’t rely on keywords, or terms for insiders, but have to develop communication strategies to make it clear and evident what is the object of communication sciences, and what is their methodology. Moreover, a continuous reflection on the usefulness of the offered interpretation tools and on the effectiveness of the suggested strategies is promoted, according to the pragmatic attitude of engineering people.

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