Podcasting in the classroom: involving students in creating podcasted lessons

Marco Lazzari
University of Bergamo
Faculty of Educational Sciences
Piazzale Sant'Agostino, 2
Bergamo - ITALY
+39 035 2052 920
marco.lazzari@unibg.it

ABSTRACT
This paper describes an academic experience of podcasting, which involved a group of students of a course on multimedia communication and human-computer interaction both as users of the university’s podcasting service, and as creators of podcasted lessons. The evaluation of the effect on student performance and data from student satisfaction surveys provide encouraging results.

Categories and Subject Descriptors
K.3.1 [Computer uses in education] Collaborative learning, Distance learning
K.3.2 [Computer and information science education] Computer science education
H.5.1 [Multimedia Information Systems] Audio input/output
H.3.4 [Systems and Software] World Wide Web
K.8.1 [Application packages] Freeware/shareware

General Terms
Design, Experimentation, Human Factors.

Keywords
Podcasting, elearning, distance education, multimedia communication, Pluriversiradio, Podcast Generator, open source.

1. INTRODUCTION
This paper presents an experience of educational podcasting set up at the University of Bergamo (Italy) for extending and improving its elearning environment, and illustrates an example of application of such environment to a course of multimedia communication, which involved the students both as users of the podcasting service and as creators by themselves of podcasted or podcastable lessons.

From that experiment we derive some reflections upon the value of such approach to teaching and learning. These reflections are based on the results of the examinations at the end of the course and their comparison with the results of the previous years; on the quantitative elaboration of the results of standard customer satisfaction reports filled in by the students; and on the interpretation, based on the grounded theory, of qualitative data recorded by interviewing the students.

2. EDUCATIONAL PODCASTING
The use of podcasting for educational purposes is a rather new idea and opportunity for higher education and its potential is still to be exploited: several universities have set up podcasting services (among them Michigan, Duke, and Stanford), but the literature is still poor of examples, case studies and evaluations.

Nevertheless, despite the current lack of quantitative data about the effects of podcasting on education, many educators consider podcasting as an exciting learning paradigm of impressive pedagogical potential [1, 2, 4, 8]: limited technical skills and efforts are enough to produce materials, such as course lectures, interviews, workshops reports, which can be used to meet individual's learning or teaching needs [6]; students can be involved in producing, editing and delivering podcasts by themselves as a part of their assignments, developing in such a way collaborative and social networking activities [3, 5]. Moreover, learning through listening is greatly appreciated by those students whose learning style is mainly auditory ([?]), while visual learners benefit from seeing videos from which they can catch teacher’s expressions and body language.

On the ground of these positive feelings, we started in 2005 a project aimed at developing a podcasting service to integrate the elearning facilities of the University of Bergamo.

3. FROM ELEARNING TO PODCASTING
Since 1999 the University of Bergamo has enabled its students to access learning facilities through several elearning services: an elearning platform for asynchronous activities, tools for synchronous lessons, web procedures for distributing materials and managing all the bureaucratic aspects of the university life.

Such efforts are appreciated by the students for two main reasons:

1. first of all, as rather usual in Italy, there is a high number of part-time students, who are very keen on any distance learning facility, which enables them not to commute to the university;
2. on the other hand, the number of the students enrolled at the University of Bergamo doubled over the last five years, and this enormous increase
induced some structural problems, which could be more easily faced by means of the elearning services: for instance, the Linguistic Laboratory has been virtually extended by developing on the elearning platform a large set of lessons incorporating the digital version of the audio and video materials already available at the laboratory (several hundreds of lessons for 24 different courses on English, French, German, Russian and Spanish, as well as Italian for foreign students, are available on the elearning site of the Faculty of Foreign Languages and Literatures).

While working on audio files, we could not be insensible to the revolutionary approach to knowledge sharing which was promoted by the podcasting.

Therefore, we started a project with the aim of developing an open source, free and sharable software library to manage a podcasting service, which could be freely downloaded and easily installed by other potential podcasters; and the release of an open podcasting environment, freely accessible by any Internet user.

As a result, in 2005 we designed and implemented Podcast Generator (PG), an open source library for building and managing podcasting services (http://podcastgen.sourceforge.net) and from there we built Pluriversiradio, a podcasting service for the students of the University of Bergamo, freely accessible via web (http://www.pluriversiradio.it) or through a feed aggregator (http://www.pluriversiradio.it/feed.xml).

Podcast generator is a free PHP script released under GPL, that lets users upload media files via a web form and automatically creates rss 2.0 w3c-compliant podcast feeds, which are fully compatible with Juice and iTunes. Moreover, Podcast Generator acts as a content management system, able to manage a web site that hosts one or more podcast channels; when we say podcast channels we mean thematic subsets of the documents of a podcasting service, that is, for instance, all the recordings on a specific subject, or related to a single course.

Using the first beta release of PG, in March 2006 we created Pluriversiradio, a web site to collect podcasts and to provide web surfers with the proper feeds for getting files from their podcast aggregators. This content of this site is strictly related to courses, seminars and conferences held at the University of Bergamo.

Despite born as a small size experimental project, Pluriversiradio was subsequently hosted by the Interdepartmental Center for eLearning of our university, and has been considered by the Italian Wikipedia as the first official Italian academic podcasting.

Besides the University of Bergamo, our software library is currently used by at least 200 podcasting services in Italy and abroad (last heuristic check: 2006/12/27). For instance, the Dutch foundation Kennisnet Ict op School has recently used PG for publishing a screencast series about podcasting with open source and promoted the use of PG in schools: for this purpose they have also developed a video podcast the explain the (really easy) installation procedure of Podcast Generator (http://files.ictopschool.net/podos/mp4/09.mp4).

4. Podcasted Lessons from Creative Students

Pluriversiradio has been used during the second semester of the academic year 2005-2006 for two undergraduate courses on multimedia communication and human computer interaction at the Faculty of Arts and Philosophy of the University of Bergamo; after that first experiment, other colleagues began recording podcasts for their students.

The second of the multimedia communication courses which used Pluriversiradio (Laboratory of multimedia communication) aimed at introducing students to the foundations of the human computer interfaces, to basic elements of graphics and to the management of audio files and the use of podcasting.

Podcasting was used first of all for recording syntheses of the theoretical lessons and for distributing them to the students: this is for us an invaluable help, because in Italy there is a large part of students who rarely attend the lessons (distal users), and hence such students exploit the podcasts as a source of distance learning.

Moreover, even those students who sporadically attend the lessons (proximal users) exploit the podcasts for integrating their knowledge; and those who regularly attend the lessons (central users) use the podcasting as a source of summaries or deepening.

As soon as the students became rather skilled with audio files management (using the free software Audacity for recording and editing sounds), we started an experiment with the full time students: each of them was involved in developing his/her own podcasts.

The experiment was based on three assignments:

1. for the first exercise each student was given two files: one was the recording of an interview on multimedia themes (question and answers), the second one provided a new set of answers to the same questions; each student had to cut the new answers from the second file and paste them into the first one to substitute the original answers;

2. for the second exercise the students had to provide their own answers to the original questions, record them using a simple digital recorder connected to a personal computer, and paste them into the file of the interview; the students could choose to answer by expressing their own feeling about the topic, or by pretending to be either enthusiastic or skeptical of the technology;

3. for the third exercise the students, working in pair, had to set up a lesson to be podcasted about one of the themes of the theoretical course: they were given some constraints (duration, sampling rate, bit rate), but were rather free to face the topic and to choose their favorite format: some of them arranged a formal lesson, others (a group of three students) simulated a

---

1 The foundation Kennisnet Ict op School is a public Dutch ICT support organisation established by and for education that manages the interests of the Dutch education sector and offers ICT related knowledge and delivers public educational services and products to renew and innovate education (http://www.kennisnetictopschool.nl/international/)

2 Eighteen students were involved in the experiment.

3 The author of this paper had been interviewed by a national Swiss radio station and co-produced the interview to successively use it for educational purposes.
moderated debate, others a desperate phone call between friends the night before the exam.

The students were supported by the instructors of the course for solving technical troubles and were able to interact with each other via a forum provided by the e-learning platform of the university, to post questions and answers and exchange experiences.

5. RESULTS AND REFLECTIONS

Exam results are one out of several criteria commonly used in evaluating student performance, and in reference to this experiment they serve as a readily available measure: student performance was evaluated by comparing exam grades over the past three academic years, using overall grade average. The goal was to determine first of all if there were significant differences in student performance this year, and subsequently if there were significant differences between the students involved in the experimentation and the other ones.

Table 1 shows a comparison of the average grades of the students who passed the exam of “Laboratory of multimedia communication” over the last three academic years (Italian university grades range from 18 to 30): figures highlight that the results of the current year are significantly better than the previous ones.

Table 1. Average grades (min 18 – max 30)

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>28.1</td>
<td>28.1</td>
<td>28.6</td>
</tr>
</tbody>
</table>

Table 2 splits the results in two, by separating the grades of full time students, who took part to the experiment, and part time students: these figures show that full time students usually perform better than part time, but also that while the latter provided this year results similar to those of the past years, the former have seen a considerable increase.

Table 2. Average grades (min 18 – max 30): full time vs part time students

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Full time students</td>
<td>28.4</td>
<td>28.7</td>
<td>29.4</td>
</tr>
<tr>
<td>Part time students</td>
<td>27.7</td>
<td>27.6</td>
<td>27.7</td>
</tr>
</tbody>
</table>

This successful performance is even more significant since grades for this exam are usually rather high, because of the characteristics of the enrolment (students select the course deliberately and it is the final step of their curriculum on publishing) and there is limited room for improvement.

The results of Table 2 seem to support two opposite ideas:

1. the grades of the part time students say that the use of podcasting for distributing course materials did not affect the results: this might be interpreted as a failure of the podcasting itself, or simply suggest that part time students ignored those integrative documents;

2. on the other hand, the grades of the full time students suggest that their involvement in creating podcasted lessons enhanced their learning experience in a very effective manner; by figures and observation we can say that podcasting design, recording, and editing spurred the development of reflective learning skills, stimulated students to go deep into the questions they had to face, fostered collaborative behaviors.

Although student performance is a significant gauge of the outcome and suitability of a course, student satisfaction surveys are important for casting light on students’ feeling and derive some hypotheses for the continued success of the educational program.

Therefore we analyzed data from the standard student satisfaction surveys which are part of the institutional audit process of the University of Bergamo. Students were asked several questions and their answers could range from 0 (strongly disagree) to 10 (strongly agree). For the purpose of this case study, only a subset of the questions is shown (those related to structural, logistic or bureaucratic topics were discarded).

Table 3 shows the “satisfaction scores” for the course over the last three years: the improvement is rather clear. Note that there is a known correlation between the “overall satisfaction” and the other issues (correlation above 0.9); this correlation explains why the same classrooms and laboratories can be evaluated so differently from one year to another; note that the influence applies also to the feeling of “cultural enrichment”, that usually is difficult to be affected by computer science courses in a faculty of humanities.

Eventually, the amazing evaluation of the “opportunities to meet faculty” can be explained by the combined positive effect of the availability of an online discussion forum, of the podcasted lessons and of the sense of community ([9]) fostered by the cooperation with other students, faculty and instructors to build the set of podcasted lessons.

Table 3. Scores for the course of Laboratory of multimedia communication over the last three years (min 0 – max 10)

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>opportunities to meet faculty</td>
<td>8,9</td>
<td>8,7</td>
<td>10,0</td>
</tr>
<tr>
<td>cultural stimuli from faculty</td>
<td>8,5</td>
<td>7,4</td>
<td>9,7</td>
</tr>
<tr>
<td>qual. of teaching: faculty</td>
<td>8,3</td>
<td>7,9</td>
<td>9,1</td>
</tr>
<tr>
<td>qual. of teaching: instructors</td>
<td>8,3</td>
<td>8,3</td>
<td>8,9</td>
</tr>
<tr>
<td>usefulness of laboratory work</td>
<td>8,6</td>
<td>8,2</td>
<td>9,2</td>
</tr>
<tr>
<td>qual. of classroom/lab facilities</td>
<td>9,1</td>
<td>7,6</td>
<td>9,9</td>
</tr>
<tr>
<td>interest for course contents</td>
<td>8,4</td>
<td>7,9</td>
<td>9,3</td>
</tr>
<tr>
<td>overall quality</td>
<td>8,6</td>
<td>7,6</td>
<td>9,4</td>
</tr>
<tr>
<td>cultural enrichment</td>
<td>8,5</td>
<td>7,5</td>
<td>9,1</td>
</tr>
<tr>
<td>overall satisfaction</td>
<td>8,4</td>
<td>7,8</td>
<td>9,4</td>
</tr>
</tbody>
</table>

Similar considerations arise from the analysis of Table 4, that compares the scores of the three courses taught by the author in the academic year 2005-2006 and checks them against the mean and maximum value (for each topic of the quality assessment) over the whole set of courses of the Faculty of Arts and Philosophy.
The results, which push the “Laboratory of multimedia communication” to the top of the ranking, can be explained by the new structure of the course, which was not chosen for the other two courses.

Table 4. Scores for the courses on computer science compared with mean and maximum scores over the whole Faculty of Arts and Philosophy (min 0 – max 10)

<table>
<thead>
<tr>
<th></th>
<th>MCI (I)</th>
<th>MC2 (I)</th>
<th>mean I</th>
<th>max I</th>
<th>MCI (II)</th>
<th>MC2 (II)</th>
<th>mean II</th>
<th>max II</th>
</tr>
</thead>
<tbody>
<tr>
<td>opportunities to meet faculty</td>
<td>9.1</td>
<td>9.0</td>
<td>10.0</td>
<td>8.3</td>
<td>9.6</td>
<td>10.0</td>
<td>8.2</td>
<td>10.0</td>
</tr>
<tr>
<td>cultural stimuli from faculty</td>
<td>8.4</td>
<td>8.1</td>
<td>9.7</td>
<td>7.5</td>
<td>9.3</td>
<td>7.5</td>
<td>9.7</td>
<td>9.2</td>
</tr>
<tr>
<td>qual. of teaching: faculty</td>
<td>8.5</td>
<td>8.3</td>
<td>9.1</td>
<td>7.7</td>
<td>9.3</td>
<td>7.8</td>
<td>9.2</td>
<td></td>
</tr>
<tr>
<td>qual. of teaching: instructors</td>
<td>n.a.</td>
<td>8.2</td>
<td>8.9</td>
<td>6.9</td>
<td>8.1</td>
<td>7.2</td>
<td>8.9</td>
<td></td>
</tr>
<tr>
<td>usefulness of laboratory work</td>
<td>n.a.</td>
<td>9.2</td>
<td>9.2</td>
<td>7.2</td>
<td>8.5</td>
<td>7.9</td>
<td>9.2</td>
<td></td>
</tr>
<tr>
<td>qual. of classroom/lab facilities</td>
<td>7.1</td>
<td>8.6</td>
<td>9.5</td>
<td>6.7</td>
<td>9.3</td>
<td>7.1</td>
<td>9.9</td>
<td></td>
</tr>
<tr>
<td>interest for course contents</td>
<td>7.4</td>
<td>7.7</td>
<td>9.3</td>
<td>7.8</td>
<td>9.4</td>
<td>7.8</td>
<td>9.3</td>
<td></td>
</tr>
<tr>
<td>overall quality</td>
<td>7.9</td>
<td>8.1</td>
<td>9.4</td>
<td>7.5</td>
<td>9.9</td>
<td>7.9</td>
<td>9.4</td>
<td></td>
</tr>
<tr>
<td>cultural enrichment</td>
<td>7.7</td>
<td>8.1</td>
<td>9.1</td>
<td>7.7</td>
<td>9.4</td>
<td>7.7</td>
<td>9.3</td>
<td></td>
</tr>
<tr>
<td>overall satisfaction</td>
<td>8.2</td>
<td>8.2</td>
<td>9.4</td>
<td>7.7</td>
<td>9.3</td>
<td>7.7</td>
<td>9.4</td>
<td></td>
</tr>
</tbody>
</table>

Finally, some form of qualitative analysis, based on the grounded theory ([10]), was conducted on transcriptions of colloquia with students and on their open answers to the student satisfaction questionnaire.

The preliminary results (some interviews are still to be scheduled) emphasizes the impact of the creative use of podcasting on the perceived quality of the course, but also on the ability of the students to assess their own understanding of the topics of the course and to deepen their competence beyond the walls of the classroom.

6. CONCLUSIONS

An experience of creative use of podcasting in higher education has been shown.

Quantitative and qualitative analysis of exam results and satisfaction surveys show that the involvement of students in producing podcasts for a course of multimedia communication had positive effects.

7. ACKNOWLEDGMENTS

Alberto Betella, who implemented Podcast Generator, is the powerful engine of the experimentation shown in this paper.

Many thanks to Federica Baroni, Andrea Redolfi, Paola Bolognini, Stefania Fumagalli, Massimo Campana, Sophie Cenati, Francesca Bianchi, Emanuela Buzzia, Caterina Ceroni, Cristiano Colombi, Miriam Ignoto, Andrea Mazza, Mattia Ferrari, Barbara Satta, Marco Mingone, Elisabetta Zuccotti, Francesco Pirelli and Giovanni Fiorentini for their kind and enthusiastic cooperation.

8. REFERENCES