From e-learning to "Distance Learning":
The Case of the University of Ferrara

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Abstract—The intention of this research paper is to verify the effectiveness of a learning model known as Distance attendance (FAD), applied in two face-to-face degree courses at the University of Ferrara, during the academic year 2013-14. In practice some modules of a series of face-to-face degree courses are organized so that they can also be followed through distance learning. The project is part of the research activity of the Center of communication technologies, innovation and distance learning of the same University, and comes in the wake of the international debate on technology-mediated learning, particularly the use of the paradigms of social constructivism and collective and connective intelligence.

Through the empirical observation (in the virtual environment) of the performance of all the first semester modules that took place through distance learning in the 2013/14 academic year, and a subsequent questionnaire for students, the cognitive artifacts, technological tools and didactic methodologies used were investigated.

The result of this research highlights how, alongside the clear benefits offered by this experiment, the lecturers involved did not make optimal use of the paradigms functional to media didactic processes. The digital technology normalization process of the university modules must therefore be accompanied by a new didactic model in order to, on one hand, improve technology enhanced didactics and, on the other hand, facilitate students who, for various reasons, cannot be present in the classroom in person.

Index Terms—Distance learning, Presence and telepresence, University policy, Web conference.

I. INTRODUCTION

The experience of distance learning began, in experimental mode, at the University of Ferrara, around the middle of the 1990s, a period during which training courses were organized for teachers and principals. Thousands of people signed up. It is clear that such high demand for training was not random; rather it represented the indication of a new demand for training from a sector, in full time work, who did not have the possibility to attend professional refresher courses in person.

This convinced the University of Ferrara of the need to establish a Technology Center with the aim of “designing and testing innovative teaching methods, devising and producing materials, promoting, organizing and coordinating and assessing distance teaching activities (…) conducting research in learning, teaching and didactic environments”.

In practice, the distance activities performed at the University of Ferrara, through the Center of communication technologies, innovation and distance learning (Se®) went through two stages, each representing a different methodological approach. It is best to summarize them in order to understand the results of this explorative investigation better.

At the end of the 1990s distance learning practices consisted of sending contents through paper and multimedia documents (educational videos distributed on VHS and then DVD, hypertexts, etc.) and the checking and self-checking activity. The limits of this teaching model were clear due to the lack of socio-relational and interactive processes to support learning, partly limited by the work of the system and contents tutor (this work took place by telephone and email). Despite the important achievement, from the point of view of adult education, in relation to the removal of the barriers to classroom learning, the courses reproduced a didactic model characterized by a behaviorist approach with the delivery of information without interaction.

In the second stage, the evolution of 2.0 technologies towards social and participatory, collaborative, collective and connective intelligence activities enabled the distance learning methodological approach to be changed, as is clear from the center’s research activities: use of didactic environments based on synchronous and asynchronous interaction and on the use of dynamic documents that are created as requested by the user [1]; use of conceptual maps [2]; the redefinition of the role of the tutor focusing on collaborative activities; the use of multimedia supports and advanced digital documents for creating contents [3]; the use of tools that promote collaborative activities and the application of socio-constructive didactic methods [4].

The didactic model has evolved, over the years, towards a constructivist area approach, with the aim of going beyond individual and passive study of didactic materials provided online (e-content), and the use of paradigms that focus on the social and collaborative dimension of learning. This model was applied to the e-learning degree courses until the 2010-11 academic year (year when the e-learning degree course experience in Ferrara finished) and continues to be used in distance learning master’s degrees (1st and 2nd level).

This is the reference setting for the didactic activity supported by the technologies considered in the article. As of the 2013-14 academic year, the University of Ferrara decided to experimentally apply distance learning methodologies to face-to-face degree courses (FAD - distance attendance model).

II. CONTEXT OF THE EXPERIMENT

At the University of Ferrara, the alternative methods to traditional teaching refer to the following models: e-learning, blended learning, classroom video conferencing and distance attendance. The first two have been the most
commonly used and studied and precise teaching methods have been developed for them, in line with relevant studies and those of the researchers of the Center of communication technologies, innovation and distance learning, of the University of Ferrara. Classroom video conferencing, which envisages a delocalized but in-person teaching system, is the one that has been used and studied the least. The model consists of broadcasting the lecture live in a number of videoconference-connected locations. The student can therefore attend the lecture in the same classroom as the lecturer or somewhere else in the university (projected lecture), in the presence of a tutor. The different classrooms are connected so as to allow interaction between those taking part in the lecture.

The distance attendance model (FAD) considered in this study may be considered an evolution of classroom video conferencing and was used experimentally for the first time during the academic year 2013-14 in some face-to-face modules (see Table 1). There were 31 modules involved, belonging to 2 degree courses and 2 master's degree courses; 204 students enrolled for the distance attendance method and the total number of hours of lectures, integrated by the use of technologies was 941.

This experiment did not entail any formal difference, in terms of the enrolment method, between the face-to-face and distance attendance courses. There is a clause in the prospectus stating that students who cannot attend in person can make use of a distance attendance method to allow them to attend the face-to-face lectures via web conference.

Compared to previous distance learning experiences activated at the University of Ferrara, this model introduced a new element, the co-presence of two different audiences—the students in the classroom and the students in the virtual classroom, with everything this entails: a different relationship between the participants in the didactic process and a new geography of the lecture. The correct use, from a methodological point of view, of ICT (information and communication technology), functional to the creation of ergonomically suitable environments for this new didactic setting, seemed to be the only guarantee for the success of the experience. In a situation of simultaneous face-to-face and distance learning, it appeared fundamental to think about the role of the interfaces and the concepts of presence, defined as an experience of one's physical environment, and telepresence, an environment perceived through the mediation of the medium [5]. In order to make the distance attendance method effective the distance inside the multifunctional classroom environment needs to be eliminated as much as possible (physical place and place mediated by the screen) to make the didactic space natural. Thus the illusion of not experimenting with any form of technological mediation in the communication process is created [6], to the extent that people are induced to think that the physical environment is decontextualized or people’s bodies are dephysicalized [7]. The effective use of this mechanism, the naturalization and disappearance of technology, on one hand, and the centrality of the application of the principles to participatory culture and social networking, on the other, would allow the distance attendance students to enter the classroom.

<table>
<thead>
<tr>
<th>Degree course</th>
<th>Distance attendance modules (1° semester)</th>
<th>Total students enrolled for distance attendance</th>
<th>Hours of lectures</th>
</tr>
</thead>
<tbody>
<tr>
<td>Science and technology for cultural heritage (1° year)</td>
<td>3</td>
<td>16</td>
<td>124</td>
</tr>
<tr>
<td>Science and technology for cultural heritage (2° year)</td>
<td>3</td>
<td>14</td>
<td>106</td>
</tr>
<tr>
<td>Science and technology for cultural heritage (3° year)</td>
<td>3</td>
<td>20</td>
<td>82</td>
</tr>
<tr>
<td>Communication science and technology (1° year)</td>
<td>3</td>
<td>65</td>
<td>90</td>
</tr>
<tr>
<td>Quaternary, Prehistory and Archaeology (inter-university Master’s degree) (1° year)</td>
<td>5</td>
<td>29</td>
<td>156</td>
</tr>
<tr>
<td>Quaternary, Prehistory and Archaeology (inter-university Master’s degree) (2° year)</td>
<td>5</td>
<td>25</td>
<td>128</td>
</tr>
<tr>
<td>Culture and traditions of the Middle Ages and Renaissance (Master’s degree) (1° year)</td>
<td>5</td>
<td>15</td>
<td>135</td>
</tr>
<tr>
<td>Culture and traditions of the Middle Ages and Renaissance (Master’s degree) (2° year)</td>
<td>4</td>
<td>20</td>
<td>120</td>
</tr>
<tr>
<td>TOTAL</td>
<td>31</td>
<td>204</td>
<td>941</td>
</tr>
</tbody>
</table>

On the basis of these conditions, with the aim of creating fewer cultural and technological obstacles connected with the use of a new didactic setting, the lecturers involved were provided with the methodological and technological wealth (researchers and technicians) of the Center of communication technologies, innovation and distance learning in order to support them in the preparation and management of the teaching activities.

In practice, in addition to classroom lectures, two different methods were developed (see Table 2), a basic one, with the aim of not creating problems for lecturers who are not used to using technologies in teaching/learning processes, and an advanced one, with a dual aim: on one hand, to allow lecturers to use/experiment with “2.0” didactic methods and, on the other, not to penalize distance learning students (in the awareness of the limits of the basic model for the FAD method students).

In the first method, the FAD students were provided with continuous support from a technical tutor and were given access to a didactic portal within which they could follow the lectures live or view them on demand. The web conference was provided through non-invasive procedures with the aim of making the technologies invisible within the didactic setting. In order to overcome resistance to technological innovation in working practices [8] a highly technological environment was created, to be experienced
in a natural way and not as a foreign body to be afraid of (technophobia).

In the second method, alongside the basic teaching methods, on an intentional and non-compulsory basis, the lecturers were asked to use a series of teaching strategies more functional to distance learning (see Table 2 – Advanced method), in line with the best practices used on an international level and the training courses managed by the Center of communication technologies, innovation and distance learning of the same University.

The aim of the experiment is to apply, over time, the model to all University of Ferrara modules, in order to:

1. Improve/enrich university teaching through the use of digital technologies and the related didactic paradigms (making the lesson accessible online; integrate the face-to-face lecture with multimedia didactic materials; use environments that aim to promote participatory practices, interaction and socialization between those involved; increase the active role of the students; contribute to solving any logistical problems such as overcrowded classrooms; create didactic environments functional to the media habits of the young generations; overcome the transmission paradigm from a didactic point of view for promoting social constructivist methods);
2. Construct more flexible university courses in order to allow the didactic process to be personalized, particularly for working students and off-site students;
3. Eliminate the concept of non-attending students;
4. Promote the management of inter-university study courses;
5. Improve student performances;
6. Make the education offered by the University of Ferrara attractive.

III. ANALYSIS OF THE EXPERIENCE

The investigation described below must be considered as being preliminary (1st stage) to the implementation of a wider research project (2nd stage) to be performed in the second year of the experience (research currently in progress).

In this first stage the cognitive artifacts and didactic methods used were investigated through: a) empirical observation (in the e-learning platform) of the implementation of the chosen modules; b) the administration of a questionnaire to the students involved in the FAD method. The work stages are as follows:

1. Choice of modules
2. Cataloguing and analyzing data from a quantitative point of view (extrapolation of data from the e-learning platform);
3. Qualitative analysis of the tools used (questionnaire given to students);
4. Critical review of the initial hypotheses in light of the results achieved (conclusions).

It was decided to analyze the modules of the first semester of the 2013-2014 academic year (from September to December 2014) of two degree courses, one 3-year course in Science and technology for cultural heritage and a master’s degree course in Quaternary, Prehistory and Archaeology, amounting to a total of 19 modules and 620 hours of lessons (see Table 3). 109 students also enrolled for FAD mode. The choice fell on the degree courses whose course directors were more willing to take part in the research.

The quantitative investigation regarded the analysis of the areas provided for all the modules in the e-learning platform (Moodle), with the intention of identifying how many didactic tools, indicated in the advanced mode (Table 2), were used: didactic material accessible individually as support for the classroom lecture (video lectures, didactic videos, MOOCs, e-books etc.), collaborative activities (through the use of social networks, Wiki and forums), distance lecturer-student interaction and socialization between those involved; increase the active role of the students; contribute to solving any logistical problems such as overcrowded classrooms; create didactic environments functional to the media habits of the young generations; overcome the transmission paradigm from a didactic point of view for promoting social constructivist methods);

<table>
<thead>
<tr>
<th>Degree course</th>
<th>Students FAD</th>
<th>Modules 1st semester</th>
<th>Hours of lectures recorded</th>
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</thead>
<tbody>
<tr>
<td>Science and technology for cultural heritage</td>
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<tr>
<td>(I year)</td>
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</table>
seminars, intended for students who chose the distance method (e-seminars), self-assessment and tutoring activities.

The data collected highlighted how almost none of these tools was used. The only exception was an experienced lecturer in terms of subject discipline (“Information Technology”) who uses 2.0 technologies as an integral part of his didactic program.

Considering the results of the quantitative investigation, the qualitative investigation therefore exclusively regarded the way web conferencing, the only technological tool used, was applied in the basic method and hence "compulsory" alongside the classroom lecture. The reference parameters (based on which the questionnaire was built) were the theory on which the use of web conferencing is based in the didactic environment. The founding principles and corresponding criteria are summarized below [7], considering three main aspects: a) audio-visual communication; b) the new relationship created in this multifunctional geography; c) use of technologies.

a) Audio-visual communication in a didactic process mediated by the screen interface takes priority, therefore must be subject to clearly designed guidelines.

1. Multimedia presentation, the new graphical/textual Esperanto [9], if well prepared and supported by didactic planning techniques [3], provides media teaching/learning experiences with visual communication potential: it allows, among other things, students to keep their attention active and to memorize the fundamental points of the lesson, and lecturers to structure their presentation.

2. Aware of the communicational impoverishment in a setting mediated by the screen, it is possible that the image of the participants in the classroom, the lecturer and the students, could be fundamental for transmitting a sense of social presence [7] and facilitating didactic processes: the technology used must offer a legible and well-constructed image and, as well as the subject contents, the lecturer must also use communication tools (correct use of their voice, non-verbal language, etc.) functional to a web conference situation.

3. The same is valid for the image of the participants in the virtual classroom lecture, present via chat or audio and video. This latter possibility, the presence by audio and video of distance students, in this experiment, was not allowed for process simplification reasons. Hence it will not be taken into consideration.

b) The second aspect regards the new relationship that is created on two levels: in the classroom and at a distance, through the mediation of the screen interface. Synchronous communication systems, if exploited well, allow the lecturer to make contact with the students at home, allowing them to fully exploit the didactic experience.

c) The last aspect regards technology. The correct use of technology must contribute to eliminating the distance within the multifunctional didactic environment: being transparent in order to make the communication space natural and easy to use, the two-directional communication process must work without any technical hitches (poor visual legibility, insufficient internet connection, disturbed audio signal, etc.).

These aspects must be practically applied in compliance with precise procedures and guidelines in order to make the web conferencing tool effective on a didactic level and contribute, in this way, to cancelling out the difference between the concepts of presence and telepresence. This is a fundamental assumption for a successful didactic outcome in the FAD experience.

**Questionnaire.** Based on these considerations, an enjoyment questionnaire was drawn up, intended for all the students enrolled for the FAD mode (109) and sent by email. The response rate was 84.4% - a total of 92 respondents.

The questionnaire was comprised of 6 sections and specifically investigated the students’ demographic profile (age, gender, residence, working student); the method used for the technological aspects (internet connection quality, quality of audio and video signals, usability of the Adobe Connect tool); how the communication aspects were applied by the lecturer (legibility of the multimedia resources used, management of the relationship with the students, use of interactive methods, checking the degree of interest and attention of the students in the virtual classroom); an overall assessment of the enjoyment of the experience (not very useful, quite useful, very useful); a comparative assessment between the lecture in the virtual classroom and the face-to-face lecture based on the comprehensibility of the contents (low, medium, high) and the possibility of interaction (low, medium, high).

Below is a summary of the results of the photograph taken. From the analysis of the assessment of technological aspects it emerges that the model was very popular. The quality of the audio and video signals was given a positive assessment by over 80% of the respondents; the technological platform used was intuitive and easy to use.

Problems of a communicative and didactic nature seemed to be more common with these aspects being given a positive assessment in only 25% of cases. The clearest limits were as follows:

1. Excessive length of the lecture for online enjoyment (72%);
2. Poor legibility of the resources used (multimedia presentations) (55%);
3. Poor or no attention to students in the virtual classroom: either in terms of checking their degree of attention (80%) or through the use of synchronous interaction tools (90%). The moments during the lecture intended for discussion and comparison only took place in the real classroom;
4. Difficulty for the lecturer to manage two audiences, face-to-face and distance (86%).

The comparative assessment between the lecture in the virtual classroom and face-to-face based on two main aspects - comprehensibility of contents (medium/high for 70%) and interaction (low for 92%) - seems to be disadvantageous for the virtual classroom.
The overall enjoyment assessment of the experiment is positive, not only among working students (for 95% of them it is very useful) but also among non-working students (for 75% it is quite useful or very useful).

The analysis of the experience, aware of the need for further scientific depth, produces a clear picture. What emerges is the absence of 2.0 didactic elements and a return, with respect to the University of Ferrara experience (see introduction), to a form of e-learning as facilitated access to didactic materials (centrality of the transmission model) to the detriment of the use of ICT based on the principles of constructivism and on the active role of the participants in the didactic process (centrality of the social connotation). Also, the exclusive use of the web conference with its basic potential, does not exploit the true communication and teaching potential permitted by that environment, but only its distribution potential. The position of FAD students is therefore penalized compared to the face-to-face students: it is as though they are peeping at the lecture through the keyhole, without being able to get hold of the key to come in.

IV. CONCLUSIONS

The study highlights how distance learning (e-learning) practices are metabolizing into ordinary teaching methods (face-to-face). This, alongside the clearly positive aspects (disappearance of the concept of non-attendees, help for disabled people and economically disadvantaged people, facilitation of didactic activities for those who need permanent training), is leading to the consolidation of fairly ineffective e-learning methods, as a relocation of the face-to-face lecture, now overtaken in evolved distance learning experiences. Hence the need to accompany the normalization process with a new didactic model that has a strong epistemological impact, able to optimize learning potential and minimize significantly critical elements. In practice three elements must be developed: training for university lecturers, the role of the Technology Center and university policy.

The distance attendance experience of the University of Ferrara highlights the need to develop the subject of training for university lecturers, for the purpose of acquiring skills functional to the identification of the methodological and didactic value of technological tools. It is clear how technology can have a positive role in teaching/learning processes only if it is driven by suitable pedagogic consideration and corresponding didactic models. Starting from the 1980s in Italy numerous projects were conducted in schools to introduce what is now called “2.0 didactics” and a great deal of resources were invested in training teachers and to set up suitable learning environments (from the IT laboratory to virtual classrooms). Not much or nothing was done in the university setting. Finally, we should consider how due to the, total or almost, dependency of the university career on research activities, lecturers do not have the stimuli, or obviously the time, to invest suitably in training on the use of technology.

The use of web conferencing has been shown to have potential for speeding up the production process and for the quantity of didactic materials produced, hence it has been effective in terms of cost savings (compared to other e-learning methods), but its didactic effectiveness has not been so clear. The lecturer cannot be a key part of the whole production chain and does not have a background in didactic planning mediated by technology, hence he/she must be accompanied by a Technology Center that considers the methodological and planning aspects as well as the technological ones, as happened in this experience (recording, transmitting/archiving, classroom lecture). Research and didactics, with the support of technology, must be combined in this sector.

It is clear how operations of this kind (training for lecturers, technological/methodological support for didactics), in the Italian setting, can only take place with the definition of an explicit and shared University policy, which sees technology as a strategic element for the University.

REFERENCES


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