

Virtual Campuses, Groupware and University Evolution

Antonio Cartelli

University of Cassino, Cassino, Italy

cartan@unicas.it

Abstract

The paper first discusses the need for the change of today's universities, called to a reorganization of their teaching and process management, due to the pressure they are submitted to by internal and external modifications. In any university these problems are faced and solved in a different way, but always digital technologies play a relevant role in the transformation. This is the main reason for the discussion of the results from the research project "Promoting Best Practices in Virtual Campuses" (PBP-VC), and of the framework which emerged from it. Furthermore the analysis of the main features of Computer Supported Collaborative Work, and Groupware, and their application to the special case of the experience the author made inside his Faculty are reported. The discussion of this last issue serves as a useful instrument for the confirmation of the first hypothesis on the possible use of strategic instruments helping the positive evolution of universities.

It is straightforward to remark here that the proposal of the framework used in the PBP-VC project is accompanied by the analysis of some changes in its structure, so that the results from groupware and socio-technologies application can be considered.

Keywords: best practices, groupware, ICT, socio-technical approach, virtual universities

Introduction

In this paper different needs and fields of investigation converge towards a main target, which can be synthesized as follows: is there the need for a transformation of traditional universities into new organizations (i.e., learning organizations), by means of digital technologies? Whether this process is possible, what strategies must be adopted to be successful in the university evolution?

The author experience and the results from former research lead to the analysis of different problems, and to search for the answers to the following questions, as a different articulation of the former one:

Material published as part of this publication, either on-line or in print, is copyrighted by the Informing Science Institute. Permission to make digital or paper copy of part or all of these works for personal or classroom use is granted without fee provided that the copies are not made or distributed for profit or commercial advantage AND that copies 1) bear this notice in full and 2) give the full citation on the first page. It is permissible to abstract these works so long as credit is given. To copy in all other cases or to republish or to post on a server or to redistribute to lists requires specific permission and payment of a fee. Contact Publisher@InformingScience.org to request redistribution permission.

- the results from virtual universities and virtual campuses, where many attempts have been made for finding and benchmarking good practices, can help hitting the target, and make easier the transformation of traditional universities?
- the framework for the analysis of the best practices, developed while studying virtual cam-

uses, can be used as it is, or improvements and modifications are needed?

- the results from the studies on Computer Supported Collaborative Work (CSCW), helping people develop new working strategies, strongly based on IT/ICT, can be used in this situation? and if yes, what impact they will have on the above ideas and models?
- as a special case to be included in the former one, how much the author experience on a work group in his Faculty, where the introduction of Web technologies forced the re-organization of the work, can be useful to support the above hypotheses?

To answer to the above questions three different sections are reported below, the first one focusing on university transformation, the second one centered on the virtual campus experience and the last one based on the analysis of groupware application to the author special case.

University and Digital Technologies: Possible Evolution or Forced Transformation?

Since ten years ago the idea of the creation of online universities for a new approach to education spread out, at least in developed countries, and many projects were proposed to introduce radical changes in higher education, based on the systematic use of digital technologies and virtual learning environments (Weller, 2007). Among the first and most famous examples of projects of this kind there were the California Virtual University and the Copenhagen Virtual University. The former, in a few years became the California Virtual Campus, which is still active in the support to online and distance education activities of many Californian Educational Institutions; the latter, after the first enthusiastic experiences, was not able in autonomously sustaining on the market and disappeared.

The Commission of the European Community, on its side, aimed at the creation in the 2000-2010 time interval, of a European space of higher education, helping the development of a sound economy throughout Europe, strongly based on innovation and on the creation of a “learning economy”, as it was stated in the Bologna and Lisbon processes (Bologna Secretariat, 2010; Rodriguez 2003). To hit the above target the EACEA (Education, Audiovisual and Culture Executive Agency), one among the agencies of the European Commission, funded many projects for the creation of Virtual Campuses in the 2004-2006 years. The “Promoting Best Practices in Virtual Campuses” (PBP-VC) project, was one among them, aiming at the creation of a framework for the analysis of the former experiences and the finding of the success factors which could guarantee the existence and sustainability of virtual campuses.

In Italy, like all over Europe, the debate on the creation of virtual and online experiences in higher education (HE) invested almost all sections of population, including the Parliament. In 2003, after some years of discussion, the so called Moratti-Stanca law was made, which led to the creation of “Telematics Universities” (i.e., online universities). This law, still valid, created a separation between traditional and distance (e-)universities, and specifically assigned to the last ones the production of online courses and the graduation of students by means of e-learning strategies.

Now, after more than seven years of the Moratti-Stanca law, the panorama is changed and also if the “Telematics Universities” are still alive in the context of higher education, many traditional universities have modified their approach to education, and have widely introduced new technologies in their educational and management processes.

The change has been mainly forced by the exponential growth of IT/ICT use in teaching and in the administration. On a first hand, that is on the side of teaching innovation, the presence of a varied landscape must be remarked. Depending on the lecturers' personal experiences and on the availability of specialized structures supporting e-learning inside Universities, all possible uses of IT/ICT instruments and digital equipments, with respect to psycho-pedagogical paradigms, can be

found (Galliani 2004). Otherwise stated, in the same University and in the same Faculty, professors and lecturers in their everyday work can make chalk and talk lessons, less traditional lectures supported by the use of video-presentations (PC + video-projector + presentation file) and, last but not least, they can integrate their lessons with e-learning platforms supporting online and collaborative educational activities involving students, experts, lecturers and professors. On another hand, deep organizational changes have been introduced in the Universities, for the introduction of the efficiency and the efficacy criteria never adopted before, and for the progressive reduction of the university's financial budgets, the last ones mostly depending on the economical crisis recently affecting Western economies. Many factors have in fact forced university administrative offices to deeply invest on web technologies and online information systems. Those systems modified the management of students' careers, the way of keeping the students updated on the course evolution and any other form of communication: both students-students, students-professors or students-administration offices.

As a result digital technologies, initially used for experimenting different teaching strategies and for creating a separation between traditional and online universities, are now the driving force for the re-organization and structural transformation of traditional universities, both on the side of education and work management.

It is then vital to give an answer to the following question: what strategies must guide this transformation process? If an answer is not immediately available, can other hypotheses and methods be derived from different experiences and help driving the transformation?

In what follows the results of the studies on virtual campuses are discussed for the importance they have on the above issues.

The Virtual Campuses and the Framework for the Promotion of Best Practices

As reported in the introduction, over the period 2004-2006 there have been many eLearning and virtual campus initiatives and projects co-financed by the European Commission.

Despite the many successes and positive outcomes that have arisen from these projects, a European Commission workshop held in 2005, to explore the issues associated with virtual campuses, highlighted the need for a critical review of existing projects and initiatives (EACEA, 2005). In the workshop emerged a range of issues that affected the successful implementation and deployment of virtual campuses and their long term sustainability.

The project "Promoting Best Practices in Virtual Campuses" (PBP-VC) was co-financed by the EACEA in 2006 to investigate the issues affecting the successful implementation of the other co-financed virtual campuses and to design a framework where the best practices formerly developed could be put; it was in the hope of the agency that the model so obtained could be fruitfully used to help people develop better projects and let them be more sustainable.

The investigation the researchers working on the PBP-VC project carried out, led them to concentrate on the relationships between education, technology and all stakeholders involved in the virtual campuses. It was clear in fact that whilst technology might be leading change at a rapid pace, too little attention could be paid to exploring the new forms of pedagogy made possible by eLearning and virtual campuses. It looked vital that effective staff development had to be provided within educational institutions, so that online tutors and developers could change the way they thought about teaching and learning, and how to employ emerging technologies to enhance learning. Having the most up-to-date and innovative technologies in itself would not guarantee success and learner satisfaction.

If virtual campuses had to be sustainable, a number of key economic, social, pedagogical and technological challenges had to be addressed from learning providers. Furthermore there were challenges in addressing the needs of learners from diverse backgrounds whose cultural experiences were different from the dominant educational culture underpinning their online courses. This was particularly relevant within the context of the international delivery of online courses, and franchising or joint partnership agreements between educational institutions in different countries and continents in the creation of virtual campuses.

The PBP-VC project aimed substantially at providing:

1. deeper understanding of the key issues and critical success factors underlying the implementation of virtual campuses;
2. practical framework to help guide the process of creating best practice in virtual campuses;
3. examples of best practice, case studies and case scenarios;
4. awareness of the issues and approaches to successful and sustainable virtual campuses;
5. awareness of how institutional transformation can be brought about by the development and application of new models of teaching and learning for virtual campuses;
6. awareness of how the successful implementation of virtual campuses contributes to the Bologna process and enhances the curricula and the quality of courses.

To hit the above targets the research group working on the project looked at papers, reports and web-based content relating to the different projects. In addition, several face-to-face knowledge elicitation sessions took place with a range of stakeholders, researchers and developers associated with EACEA virtual campus projects. As a result an initial model of issues underpinning best practice was developed, which was based on organizational, technological, pedagogical, student/user, financial and consolidation issues. It is shown in Figure 1 (Cartelli, Maillet, Stansfield, Connolly, Jimoyiannis, Magalhães, Toland, 2008; Cartelli, Stansfield, Connolly, Jimoyiannis, Magalhães, & Maillet, 2008). In what follows the main issues in the model are widely discussed.

Organizational Issues

Such issues include bureaucracy and administration that can differ markedly among virtual campus partners and cause significant problems in attempting to provide seamless, coherent educational experiences and exit awards, particularly when a course is delivered between numerous partners across international boundaries and cultures. Also related to this issue is differing government, political and legal systems which can affect important concerns such as copyright in terms of publishing and the ownership of materials and courses. In addition to the above ones, the language and the culture were highlighted by some virtual campus projects in relation to many of the courses to be delivered in English; furthermore, cultural resistance to e-learning and to the concept of virtual campuses, were evidenced. At last effective teamwork and agreements on roles and responsibilities, all ensuring that all partners worked well together in achieving the outcomes of the virtual campus project were highlighted.

Technological Issues

The issues of effectively utilizing and harnessing technology presented a number of problems both in terms of getting the technology infrastructure set up, as well as overcoming peoples' attitudes to the technology. Such issues can also be affected by different cultural attitudes in relation to the role of technology in enhancing learning. The attitudinal and cultural problems associated with technology emerged in a number of virtual campus projects where it was often the staff who appeared to have the greatest difficulties in learning to use new technologies (it was often compounded by the negative attitudes of some staff towards the burden of having to learn new skills

and master new technologies). Also identified as being an important issue was the need to frequently evaluate and monitor the use of the virtual campus platforms to ensure that staff and students were using them in the most effective way.

Pedagogical Issues

The choice of appropriate pedagogical models and approaches underpinning virtual campuses was of great importance since it had a big impact on the educational experience of the students; problems in this area can affect issues relating to student retention and negative attitudes towards e-learning and a lack of active participation. It is vital that the pedagogy underpinning a virtual campus supports and enhances the students' experience in learning a particular subject area. A number of virtual campus projects reported that many of their students felt that once they had received appropriate support and guidance they felt more positive towards their studies. Some virtual campus projects identified peer support among students being part of good practice since students were able to help each other in overcoming certain problems which gave them a greater sense of ownership and participation in the virtual campus project. Also underpinning pedagogical issues is ensuring the quality of the teaching materials developed and evaluating them on a regular basis and in particular addressing specific student needs in an effective way.

Student/User Issues

The importance of focusing on the needs and learning experiences of the student was highlighted by all the participants who took part in the initial knowledge elicitation sessions. Important elements associated with these issues were the need to have in place clear and effective communication strategies in order to be able to interact with students at different levels, whether using formal or informal mechanisms. In addition, the importance of conducting detailed and continued needs analysis with students was highlighted as being a key action underpinning best practice which helped in identifying appropriate topics.

Financial Issues

Appropriate costing methods and effective cost/benefit analysis is vital if a virtual campus is to become sustainable. Therefore, appropriate pedagogical approaches and models have to be adopted that attract students to register on virtual campus courses and also attract funding in terms of fees from students and institutions. Very little work has been conducted into determining the true costs and benefits of providing e-learning courses and running a virtual campus, particularly in comparison to more traditional face-to-face teaching. In relation to the virtual campus project investigated, little attention appeared to be given to exploring whether they could be self funding and financially sustainable once the initial period of external funding had expired and thus, whether the model and approach adopted for the development of the virtual campus could be financially viable.

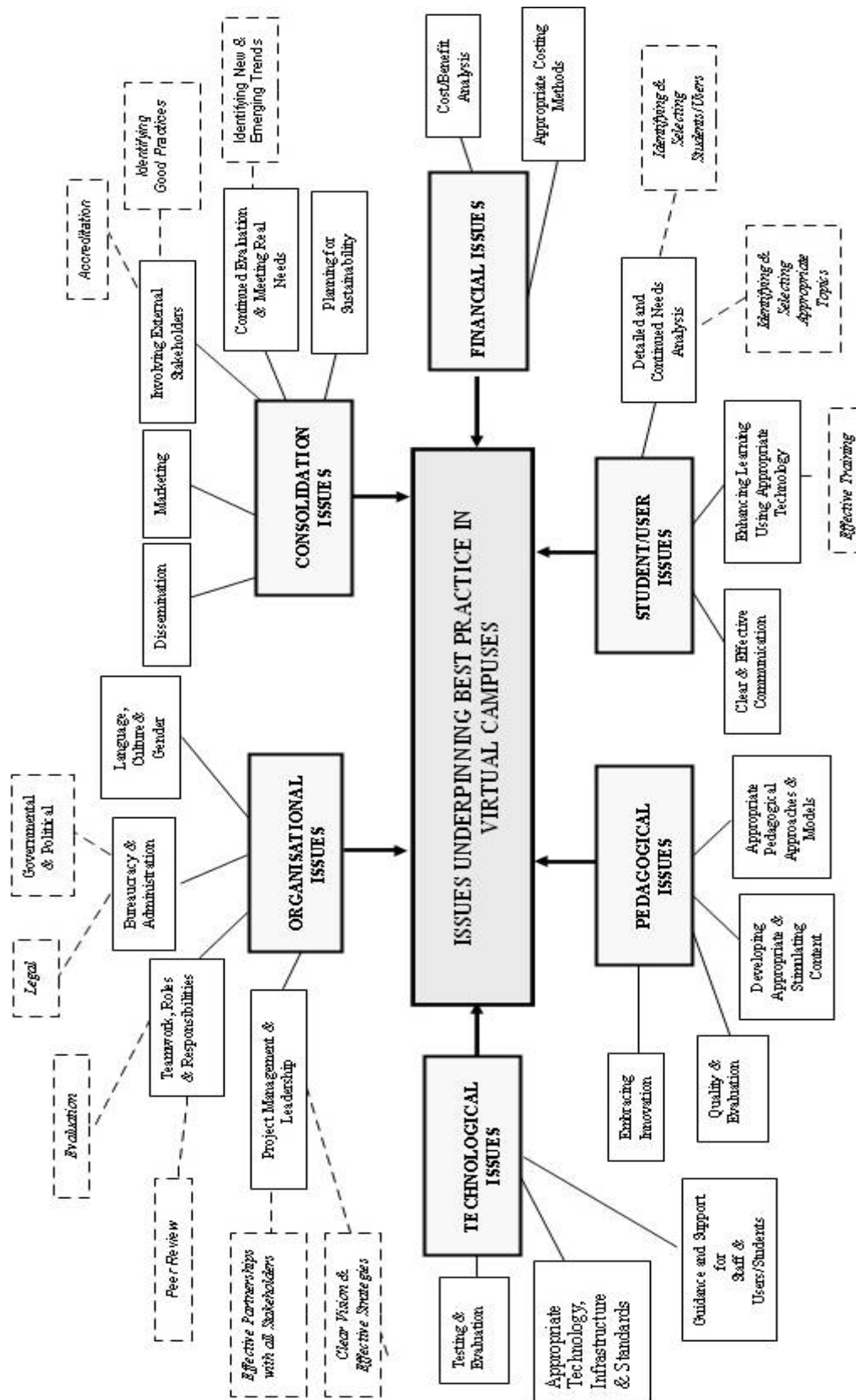


Figure 1: The framework for the analysis of the key issues underpinning best practices in virtual campuses

Consolidation Issues

Consolidation issues reflect the activities that can help developing adequate marketing and dissemination plans targeted at groups of key stakeholders such as students, government bodies and companies. With regard to dissemination, during the literature-based investigations conducted by the PBP-VC project, it was often difficult to find detailed information in the form of reports and papers on specific virtual campus projects and initiatives. This highlighted the need for projects and initiatives to make reports and findings more freely available to the wider e-learning and virtual campus community, particularly in relation to reflecting upon the results and outputs of projects and initiatives, and identifying best practices. A number of virtual campus projects and initiatives highlighted the need to gain accreditation from professional bodies relating to their particular subject area in order to attract fee paying students to their courses, as well as gain increased standing within their professional community. In terms of planning for sustainability, the importance of this issue was identified by all the participants as essential to achieving the long term aims and objectives of a virtual campus project, and was viewed as being a key goal and activity to be considered throughout the whole life-cycle of the project.

The main conclusion one can derive from the above considerations is concerned with the application of the above model to traditional universities which are involved in the re-organization of their educational and organizational processes. The main reason for that statement is in what follows:

- online or virtual universities and campuses were created having clear in mind the model of traditional universities; their original structures and organizations were then transferred in the virtual world, and the main efforts were devoted to the creation of special communication channels letting people interact with this new world. Now digital technologies have been introduced in traditional universities to let them be more efficient and improve the quality of teaching-learning processes. Is that the same aim to be issued by virtual campuses?
A positive answer, in the author opinion, can be assumed for that question.

At this point of the discussion it can be stated that the model adopted in the PBP-VC project (Figure 1) can be used for the analysis of the evolution processes of traditional universities.

Groupware and University Evolution

Undoubtedly collaborative software, sometimes referred to as groupware, or workgroup support systems or simply group support systems, can have a leading role in helping traditional universities become better organizations and be more effective in the management of their educational and organizational issues.

Groupware is in fact computer software designed to help people involved in a common task achieve their goals. It is usually associated with individuals not physically co-located, but instead working together across an internet connection. It can also include remote access storage systems for archiving common use data files that can be accessed, modified and retrieved by the distributed work-group members. (Wilson, 1991)

It is behind the aims of this paper the discussion on the connections between computer-supported cooperative work (CSCW) and groupware, and especially if the last one is part of the first (Carstensen & Schmidt, 1999), or not. It is also useless for what follows the analysis of the differences between social software, which applies to systems used outside the workplace (social networks etc.), and collaborative software especially designed for the workplace, which creates collaborative working environment (CWE), supporting people in both their individual and cooperative work (Beyerlein, Freedman, McGee, Moran, 2002).

In the next section a special case will be discussed, where the use of social software (i.e., Google group) has helped the creation of an effective collaborative work environment inside University.

The Case of a Faculty Adopting Web Services for Information Management

In the first months of 2010 the University of Cassino (Italy), decided to adopt a new web service for the management of administration data, especially those concerning the information on the courses to be accessed from students (i.e., courses, lectures, professors/lecturers etc.).

The Faculty of Humanities in that University was invited, first among all, to experiment the new system and, as a consequence, it was forced to plan the transition from the traditional organization of its work to a new one, where all the information had to be made available online to the students before the new academic year started.

It is straightforward to note that the organizational change involved all stakeholders: the dean of the Faculty, the directors of the courses, the lecturers/professors, the clerks and the students. It is therefore useful a short description of the requirements the Faculty had to respect to let the innovation process start.

First, the basic rules governing the life of the Faculty are reported, because they had to remain unchanged notwithstanding the innovation. The Faculty Council manages everything concerning itself and its courses (i.e., it approves any assignment, engagement and change in its organization and concerning students careers). The curricula of the courses in the Faculty are planned and approved by the Course Councils, they are then evaluated and approved by the Faculty council and, at last, they are assessed and approved by a special commission in the Ministry of University and Education (i.e., the compliance with the national graduation classes is analyzed). Once the curricula approved the students can choose them before or during the first period of the academic year. Everything involving student's career (i.e., students' curricula) must be approved by the Course Council and the Faculty Council, before students start attending courses and examinations.

On another hand, lecturers and professors must put their personal data and any information concerning their lectures on the web site before lessons start. These information must be connected with those on the Faculty courses and the study curricula. Each course director is helped in the organization/preparation of the work by an administrative clerk unit, who is in touch with the students' secretarial office.

In May 2010 the web site, or the part of it to be used for the management of the data of the Faculty and the Courses, was ready. Soon after, the dean of the Faculty made several periodic meetings with the directors of the courses, the clerks and the technical staff working on the web site; the work-group aimed at making the web site operational in the time due, by analyzing the evolution of the work, discussing the problems to be faced and suggesting possible solutions for them.

Many difficulties and problems affected the team work, and the correct run of the Faculty web site; in September it was evident that there was no relevant progress in the evolution of the web site and in its positive use by students and all stakeholders.

The need of overcoming the above difficulties led to the enlargement of the work group by the inclusion of the author of this paper, and his engagement as group coordinator.

After the first meeting of the new work-group there was general agreement on the proposal concerning the use of a communication instrument letting people exchange information less informally and more efficiently and effectively. The instrument to be used for that purpose was Google Groups and all the persons of the team were included in the mail-list of the social network and made able of accessing group services and managing e-mails.

After a few messages (less than three-four days), everyone was able to access the virtual space and communicate with other persons in the team and with the whole group.

In less than a week a further extension of the group was made (by including people in the central offices of the University) and the work-group was ready to start.

The discussions held in the kick-off meeting and the first messages posted on the mail-list clearly showed the need of clarifying and defining the following issues:

- ⤴ the creation of an organization chart where the role of the different actors was given, well defined and accepted,
- ⤴ the definition of the communication channels the information had to flow through (priorities, dependencies and authorizations),
- ⤴ the definition of the sequence of the operations to be carried out (i.e., until that moment everyone in the group explicitly described the difficulties he/she experimented in the management of the information on the web, and waited for the solution of the problem by the technical staff).

The first two issues obtained a positive answer by the adoption of the scheme reported in Figure 2, proposed by the group coordinator, where the different actors were assigned different responsibilities about the information to be produced, validated and put on the web site.

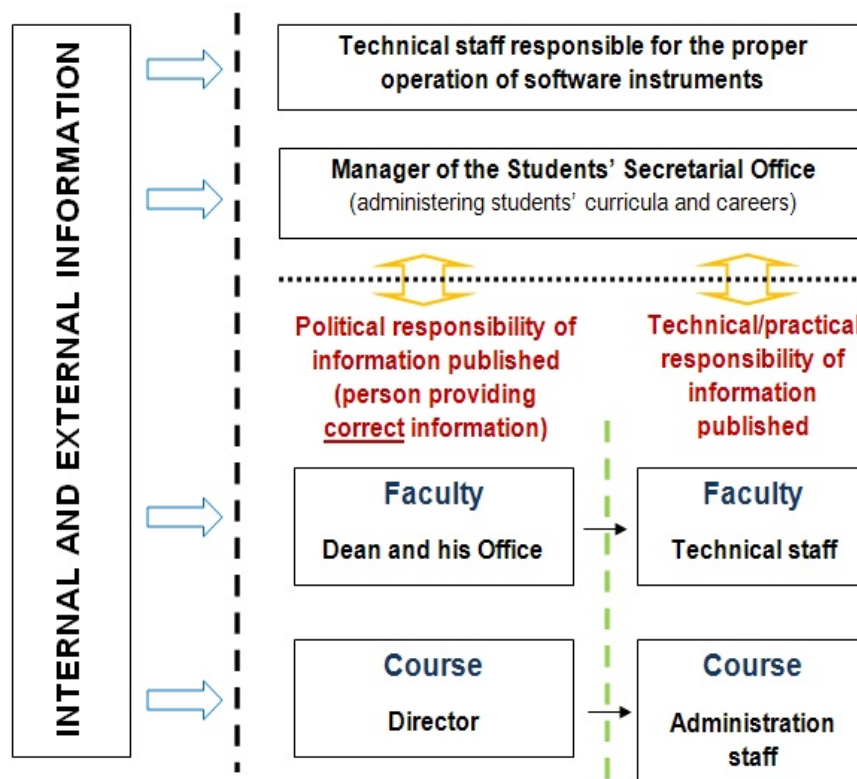


Figure 2 – Organization chart of the team and description of the information flow

In the above scheme it is not reported the flow of the information and of the messages among the stakeholders, for the following reasons:

- ⤴ the web site had a hierarchical structure with protected accesses, so that the person who was granted access to a given web area, could modify its content and that of all the pages depending on it (i.e., linked to it), but could not modify other information,

- ⤴ the messages on the problems to be solved and the requests for the help were posted on the Google Group, and could be read by all the people in the team.

As regards the third issue (i.e., the sequence of operations to be carried out), the group coordinator suggested the following procedure in three steps:

- ⤴ first, to verify the correctness of the structural information (i.e., static web pages), concerning the Faculty and its Courses (by starting from the Faculty, and soon after all the Courses),
- ⤴ second, to analyze the correctness of the information showed on the web site (i.e., dynamically build on the fly by means of database queries), with respect to those stored in the University data base (Courses' structure, list of professors/lecturers, links to them etc.),
- ⤴ third, to give professors/lecturers the instructions for the uploading on the web site of the information on their courses, to invite them to make that job as soon as possible, and solicit them to do it before a given date; last but not least, to help people experimenting problems in putting their materials on the web to overcome their difficulties.

In two months the following targets were hit (they are reported in the time order):

1. all static pages on the Faculty web site contained the right information,
2. more than 90% of the errors and mistakes in the dynamic construction of the web pages were solved, and the procedures for the right management of information were defined,
3. some problems coming from the former organization of data and from the procedures adopted to make them retrievable, never corrected in more than one year and half before, were definitely solved,
4. two synthetic guides for the professors/lecturers, giving them the explanation for the management of their web pages, were made available to the members of the work group and to all professors/lecturers in the Faculty,
5. one public session for the explanation of the procedures to be used to put data on the web was made for those professors/lecturers who didn't find comfortable with the guides,
6. some private sessions to help those who had difficulties in computer use were made, so that no data were lost or made unavailable on the web.

In conclusion, less than three months led to the complete reorganization of the Faculty web site and of the services on it.

Conclusions and Future Studies

The comparison of the experience described above, that is, the re-organization of the information management in a Faculty of Humanities, and the framework described in the second section, is useful for at least two reasons:

- first, it confirms the positiveness of the idea of transferring the framework developed for the virtual campuses to traditional universities;
- second, it induces to re-think the structure of the framework and to analyze possible amendments and improvements for it.

As regards the first issue, the application of the model for virtual campuses reported in Figure 1, to traditional Universities directly relies on at least the following reasons:

- ⤴ traditional universities are today forced to adopt web technologies and to reorganize their administration and management processes for many external and internal reasons (i.e., today society is pervaded by digital technology, and e-governance, e-democracy, e-learning are realities they have to face),

- △ the perspective of lifelong learning assigns to universities a leading role in the continuous education of citizens and professionals, but it is quite impossible to let adult people access education and training opportunities without e-learning and online learning strategies and environments.

In this perspective it seems like a nonsense to discuss about the opportunity of the presence of e-universities, virtual universities and/or virtual campuses; only the integration of digital technologies, online databases and knowledge management strategies in traditional organizations will in fact led universities to overcome the difficulties they are meeting in today society (at least in Italy and Europe), and maintain their leading role in higher education.

Furthermore, the experience made within the Faculty of Humanities introduces new elements useful to improve the framework reported in Figure 1. In that scheme the connection between the pedagogical issues and the technological issues is represented in the box “embracing innovation”, due to the equivalence of the “introduction of IT/ICT digital strategies in teaching” with the “new pedagogical strategies in education”, which is the consequence of the strong impact that digital technologies had on teaching innovation in virtual universities and virtual campuses in those years. It is straightforward to remark now, 4 – 5 years after those experiences, that innovation in teaching and education is moving towards new frontiers and that the experiences on the extended use of digital equipments are very usual.

What is new is the connection emerging between the technological issues and the organizational issues, as reported in the experience described in the above section, where the use of a social network instrument led to the application of groupware strategies for the solution of the problems the team met while re-organizing its work.

The consideration of human capital, social factors and the adoption of the social-technical approach to the introduction of Management Information Systems (MIS) in organizations (Cartelli, 2007) can be seen as an extension of the application of groupware strategies. The consideration of the social factors in the management of technological environments is in fact a key factor for the success of the innovation and the consequent change in the organizational change. On the basis of this issue it can be hypothesized the presence of a connecting element between the technological issues and the organizational issues in the framework reported in Figure 1.

The case of the Faculty of Humanities, which has become a successful example of innovation, clearly shows that the only presence of technology not necessarily produce good results; success factors in that case have been the choice of suitable communication strategies, the consideration of the special role that persons could play inside the community and the right selection of the steps to be followed in the work.

In Figure 3 the new element is included in the left portion of Figure 1, which is the only one interested by the hypothesized modification.

It is too early to say if further modifications are required to let the model be applied successfully to traditional Universities but, in the author opinion, a first step in that direction has been made.

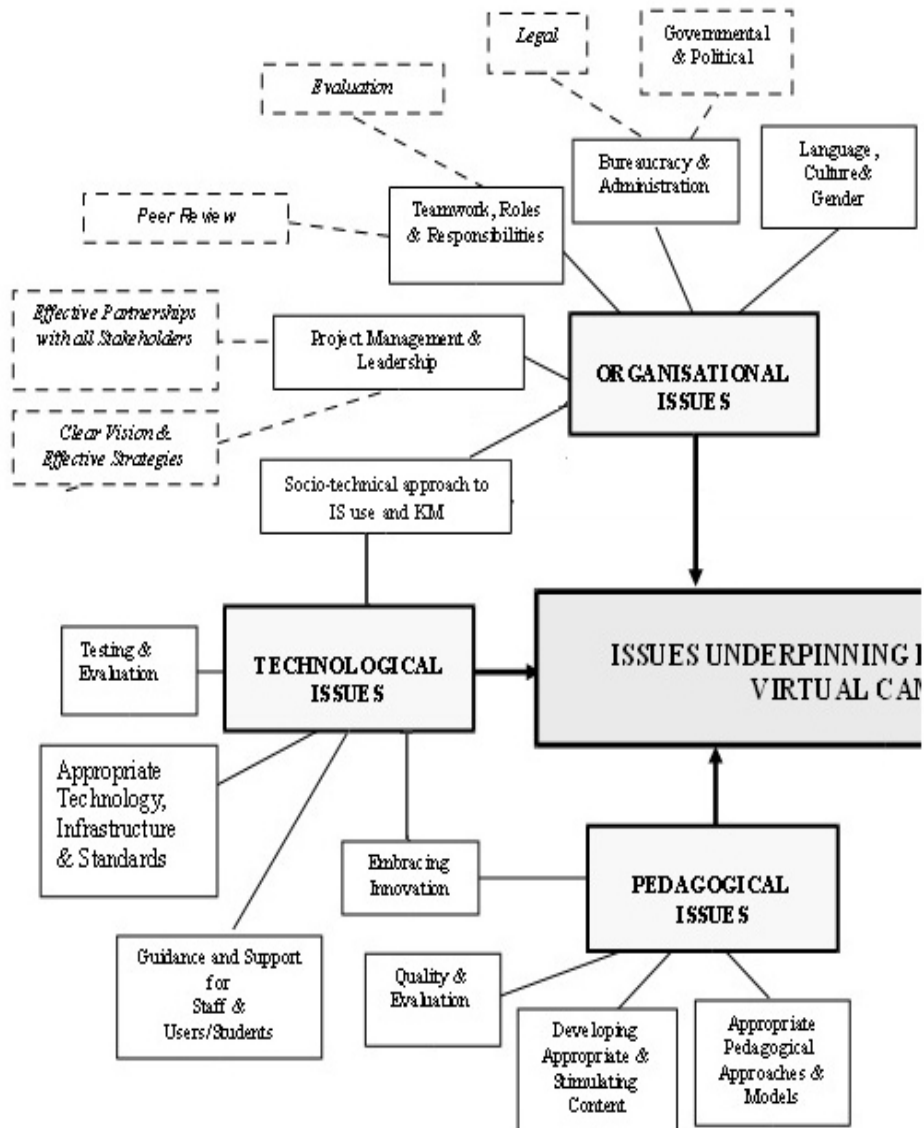


Figure 3 – The “Socio-technical approach to IS use and KM” connecting element between Technological Issues and Organizational Issues

References

- Beyerlein, M., Freedman, S., McGee, G., Moran, L. (2002). *Beyond teams: Building the collaborative organization*. The Collaborative Work Systems series. Hoboken, NJ: Wiley.
- Bologna Secretariat. (2010). The European Higher Education Area (EHEA) official web site. Available at the URL <http://www.ehea.info/>
- Carstensen, P. H., & Schmidt, K. (1999). *Computer supported cooperative work: New challenges to systems design*. CTI working paper series, no. 43, Center for Tele-Information, Technical University of Denmark.
- Cartelli, A. (2007). ICT and knowledge construction: Towards new features for the socio-technical approach. *The Learning Organization*, special issue "On Sharing Knowledge: sociotechnical approaches", 14(5), 436-449.

- Cartelli, A., Maillet, K., Stansfield, M., Connolly, T., Jimoyiannis, A., Magalhães, H., Toland, J. (2008). Identifying and promoting best practices in virtual campuses and e-learning. In (J. Luca & E. R. Weppel, ed.s) *Proceedings of the 20th World Conference on Educational Multimedia, Hypermedia & Telecommunications, ED-Media 2008*, Chesapeake(VA): EACEA, pp. 897-902.
- Cartelli, A., Stansfield, M., Connolly, T., Jimoyiannis, A., Magalhães, H. & Maillet, K. (2008). Towards the development of a new model for best practice and knowledge construction in virtual campuses. *Journal of Information Technology Education*, 7, 121-134. Retrieved from <http://www.jite.org/documents/Vol7/JITEv7p121-134Cartelli397.pdf>
- EACEA (2005) “*Virtual campuses*”, *report on consultation workshops*, 11th October 2005, Brussels. Accessible online on Feb 21st, 2011 at http://ec.europa.eu/education/programmes/elearning/doc/workshops/virtual%20campuses/report_2005_en.pdf
- Galliani, L. (2004). *La scuola in rete*. Bari, Italy: Laterza.
- Rodriguez, M. J. (2003). *European policies for a knowledge economy*. Cheltenham, UK: Edward Elgar.
- Weller, M. (2007). *Virtual learning environments: Using, choosing and developing your VLE*. London: Routledge.
- Wilson, P. (1991). *Computer supported cooperative work: An introduction*. Dordrecht: Kluwer Academic Pub.

Biography



Antonio Cartelli has passed a national competition for associated professorship in Experimental pedagogy. He manages the Laboratory for Technology of Education and Knowledge Management and the Centre for ICT and on line teaching in the Faculty of Humanities at the University of Cassino - Italy. Among his interests are: misconceptions, mental schemes, Information Systems for research and teaching, Web Technologies in teaching research and their everyday application for the improvement of teaching and learning. He is also author of many papers and books concerning the themes he is interested in.