Implementation of Virtual Environments in Training and Education

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Coordinator of the Project
Dr. Mario BARAJAS
University of Barcelona
Department of Didactics and Educational Organisation
Passeig Vall Hebrón, 171
08035 Barcelona (Spain)
E-mail: mbarajas@ariadna.d5.ub.es

Partners:

Universidad Nacional de Educación a Distancia, Spain.
Universität des Saarlandes, Institut für Rechtsinformatik, Germany.
Foundation for Research and Technology, Hellas, Institute of Applied and Computational Mathematics, Greece.
Innovation in Education and Training Ltd., Greece.
University of Wales-Bangor, School of Education, United Kingdom.
Professional and Academic Channel for Europe 2000, Belgium.
University of Oulu, Faculty of Education, Finland.
The Nottingham Trent University Faculty of Education, United Kingdom.

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Abstract

IVETTE's Thematic Network main goal was to investigate education and training innovations in the current implementation of Virtual Learning Environments (VLEs) in higher education institutions. The principal objective was to gain a profound understanding of those elements related to the teaching and learning domain, the institutional sphere, and the cross-cultural diversity within virtual learning. The study was carried out with the analysis of nine case studies of institutions involving tertiary education and postgraduate training in six different European countries.

IVETTE's chief aims were to study the teaching and learning approaches in VLEs, emphasising those that combine face-to-face and virtual learning; to critically assess the impact of European diversity onvirtual learning experiences with respect to curriculum and language differences; to contribute to innovation in public educational institutions in relation to the restructuring of their functioning and promotion of educational co-operation in the European sphere.

The project has produced the following outputs: a) three empirical studies on issues and practices in teaching/learning approaches, in cross-cultural and academic dimensions in European diversity; and in institutional/organisational factors; b) a virtual conference engaging policy makers, teachers, trainers and experts in the field for verification and dissemination of the results of the studies undertaken; and c) a report integrating the studies the conference results that include policy implications with the aim of contributing to policy discussion.

IVETTE defines virtual learning as ***"****any kind of ICT-based learning arrangement where we find any combination of distance and face-to-face interaction, and where some kind of virtual time and space is present*". The study analyses how VLEs are implemented in light of three areas of research mentioned above (teaching/learning, institutional issues. And cross-cultural dimensions). In general, the undertaking of VLE development within institutions of higher learning requires:

- The attention to a variety of institutional actors. These range from developers to administrators and institutional actors. Designing and using VLEs requires fundamental changes in the role of teachers and technical staff. Academics have to acquire or develop new knowledge and skills to become designers of teaching materials, tutors, facilitators, etc. Additionally, they have to cope with essential changes in the conception of time and space introduced by these technologies.
- A transdisciplinary approach engaging multiple disciplines such as subject matter specialists, instructional designers, and system administrators involved in pedagogical design and development of virtual learning experiences.
- A careful consideration for the integration of socio-cultural elements. The issues of language and cultural differences constitute the two most important elements for consideration. This diversity should be taken into account in any educational and training programme that is organised in either a single European country or Europe-wide.

IVETTE proposes recommendations for the initiation, implementation, diffusion and organizational ation phases of VLE. Creating specific Green and White books is a strategy institutions should undertake. The implementation of VLEs will not succeed without an equal, integrated and coordinated investment in all of the elements of the model proposed: infrastructure, training and development, and organizational culture. Other key recommendations involve supporting the development of "innovation units", looking for a balance between the pedagogical model and the potential of technological tools, designing materials specifically for VLE, and setting up different working conditions for staff. Finally, IVETTE recommends clearer government policies for supporting intercultural approaches in their educational and training; setting the management conditions of international cooperation, writing guidelines for cross-cultural learning

environments, promoting language support, and including cultural differences in the course design and in the course delivery in order to overcome cross-cultural issues in international VLEs.

Section 1 Executive Summary

Project Aims and Approach

The aim of the Thematic Network IVETTE was to investigate the initiation and implementation phases of Virtual Learning Environments (VLEs) in higher education institutions from an innovation perspective. It intended to bring to light the elements related to the three themes: the teaching and learning domain, the institutional sphere, and the cross-cultural diversity involved in learning experiences. The identification of these elements facilitates understanding and contributes to the building of a conceptual framework for the further development of e-learning initiatives and schemes.

The principal objectives of the project were: [1] To map out the teaching and learning approaches in VLEs, especially those arising from combining face-to-face and traditional educational methods; [2] To critically assess the impact of European diversity on common elements of curriculum, language approaches, and institutional adaptation of the E&T systems in virtual learning environments; [3] To contribute to innovation in public educational institutions regarding the restructuring of its functioning in co-operation with similar European institutions.

The working definition of Virtual Learning Environments utilised by the IVETTE Network was as follows: ***VLE is any kind of ICT-based learning arrangement where we find any combination of distance and face-to-face interaction, and where some kind of virtual time and space is present.*** Thus, VLE supports learning experiences that can have a minimal use of telematics technologies and a predominance of in-class activities to a high level of technology usage and a completely virtual class with no face-to-face activities.

The study was conducted with eight higher education institutions and one training company that works closely with various European universities. Although many of the experiences and projects studied (case studies) were linked to professional development and training departments of the universities involved, IVETTE did not specifically study VLEs within the training sector in private institutions.

The social and technological changes the European Union is facing require new ways to access knowledge. We are moving towards a knowledge-based economy and a knowledge-based society. Education and training are crucial in this transition. This scenario is portrayed by the so-called “life-long learning” concept that characterises most of the sectors of the economically competitive population in Europe.

These phenomena give rise to new forms of education and training, organised under the principles of flexibility in learning. There are emerging experiences that show that most of the traditional open and distance learning organisations are taking advantage of the new ICT systems, soon to be transformed into new *virtual campuses*.

Conventional Universities and training centres also follow this trend since public educational institutions see this as an opportunity to widen access to their courses. The implementation of virtual forms of services is regarded as a source of income for these institutions. In an attempt to reach new market potential

As exemplified by diverse reports from Commissioners, there has been a clear political agenda for a “Learning Society” throughout the 90’s in Europe. It appears that changing demographics, technological development, and globalisation require not only individual

adaptation but also renewal of education systems and learning at the workplace. There is a belief that in Europe we are in danger of falling behind competitor economies. Investment in continuous training is considered important because it can provide people with skills relevant to both work and spare-time. Increasingly, learning is seen as a continuing activity for which each individual is responsible. From an employer's point of view, learning has to be objective-oriented.

There are many alternative discourses on education; relationships between economic necessities and extended lifetime are far from new and are not predicated by the existence of new technologies. Virtual learning environments and other modes of flexible learning should not be seen as a panacea for the challenges facing Europe, its educational systems, its economy or its citizens. But, the implementation of the Virtual Learning is not a decision taken by some people who are merely interested in introducing changes or innovation in the existing educational policy. This is, on the contrary, a response of the existing educational systems to new, urgent and very fundamental societal needs.

The IVETTE Network attempted to study the initiation and implementation phases of VLE innovations in different University settings. The implementation phase in educational innovation is concerned with the specific actions taken to put an idea or reform into practice in order to effect change. Characteristics of this phase involve complexity and often many sub-processes. The innovation generally interacts with its setting and the behaviour of the people within the setting. Currently, this is a strong trend towards viewing the implementation phase of the change process as both the most complex and the most difficult stage in the process of change. Successful change is regarded as successful implementation.

The value of particular innovative initiatives should be taken for granted, because we cannot be sure of the purposes, possibilities of implementation, or actual outcomes of the emergent changes. This assumption has two implications. First of all, the nature of educational change should be examined according to specific values, goals, events, and consequences obtained in concrete situations, since, in this case, educational innovations are not the aim. Secondly, we begin to understand that the challenges of institutional change are not simply mastering the implementation of a single innovation, but the complex processes implicating planned and unplanned processes influenced by socio-economic conditions, institutional practices, and local conditions.

To highlight the complexity of institutional change in the case of VLEs, there may be diverse factors of a variety of scopes influencing change. IVETTE applied a socio-cultural approach to innovation and change in the study of VLEs. More specifically, IVETTE applied a model that links the institutional issues that arise during the implementation of VLE to the teaching and learning factors and to the cross-cultural dimension that emerge from the practice of international learning experiences.

Results and findings of case studies on main traits characterising VLEs

The cases studied already demonstrates the great extent of variety encountered in the nine cases studied. However, this is not to say that the project has not identified similarities in the VLEs reviewed. The fact that most of the experiences are medium-scale interventions that emerge either from individual desire to introduce innovating practices in learning/teaching practices or from those emerging from pre-determined institutional strategic plans should be highlighted here. In terms of their implementation within the conventional institutions, the trend seems to be that of parallel structures. As a consequence a central concern is that of sustainability as independent and self –financed learning/studying environments. The areas of specialisation VLEs addressed in the cases (either at the continuing education level or

undergraduate level) fall within the professional sphere, with the majority being in the field of educational sciences.

The cases revealed that VLEs in institutions were introduced: [a] parallel to traditional teaching/learning schemes at the level of undergraduate studies; [b] in conjunction with and or complementary to traditional teaching/learning schemes with the focus on the development of telematics-based courses and educational products; [c] as new structures being formed within existing institutions or old structures being upgraded; [d] as professional development/continuing education schemes/post graduate studies where the factor of collaboration with the private sector was vividly evident.

As with respect to the influence of technologies in teaching and learning, the selection and use of telematics tools do not imply the adoption of any particular pedagogical approach. In fact, one can find from the most traditional lecturing, even if it is delivered by sophisticated means (satellite videoconferencing) to the most advanced project oriented approach. However, VLEs has a tangible impact on the social organisation of education. The concepts of time, place and community find a multiplicity of meanings and can be experienced in many different ways. On the other hand, even in the cases in which the adopted pedagogical model can be considered as traditional, aspects related to the teaching functions, the learning materials, the tutoring and support system, and evaluation undergo considerable changes.

With respect to cross-cultural characteristics, the investigation of the IVETTE cases revealed that the element of collaboration is stronger at the intra and inter university (national) level that it is at the European level, independent of whether it is a university-university or university-industry collaboration. Most of the initiatives require at least the formation of collaborative schemes within the same institution. To a large extent VLE initiatives addressing undergraduate level courses do not reveal features of a cross-cultural orientation for these are developed and implemented at the institutional or at the national levels. This manifests the monolingual character of these cases. Some of these however, upon reaching a level of maturation do envision the establishment of collaboration with other European and international institutions and markets.

Attitudes and reasons towards using Virtual Learning Environments

One of the main characteristics of the traditional face-to-face educational system is the necessity for the learners to be physically present in the classroom during the educational process. This necessary condition manifests serious disadvantages: Numerous citizens cannot fulfil the condition of physical presence in the classroom for various reasons (health, family, economic, professional problems etc). Therefore, these citizens cannot benefit from the traditional face-to-face educational system, both for their initial as well as for their continuing education and training and lifelong learning. Contemporary societies, however, cannot afford to perpetuate exclusion of their citizens from education. They are obliged to make the best possible use of the totality of their human resources for their economic, technological, scientific and cultural development.

Another reason for the widest possible utilisation of VLEs in the continuing education and training sector is associated with the fact that science and technology are changing very rapidly. A high percentage of the knowledge students acquire during their studies in the tertiary educational institutions is no longer useful for their professional activities a few years after their graduation. Therefore, there is an urgent need for systematic and intensive continuing education and training of the workforce in all industrial societies. The problem is how we can respond to the ever-increasing need for the continuing education and training of the European workforce. It is obvious, that this cannot be done with the traditional face-to-face education and training institutions. Staff members of the enterprises cannot leave their

home and workplace every year or so in order to follow face-to-face continuing education and training programmes in the traditional educational institutions. The market requires just-in-time learning solutions

By analysing the case studies, it was possible to extend the discussion and identify many of the attitudes and reasons why teaching staff and institutions want VLEs. In some of the cases examined, the staff want to be able to offer an opportunity to learn that could not otherwise be offered. Other examples saw a request coming from the industry to find a way to update the skills of engineers while they were still employed. It is quite possible that this could have been achieved in other ways, but the solution offered by a distributed learning situation that allowed engineers to study at a location near their place of work has been tried and is now regarded as an effective way of making educational provisions.

Although some academics are keen to develop their skills in relation to different aspects of VLEs and consider this experience to be a way of enhancing their reputation and their career potential, others feel that their real work should continue to be in their research and imparting the knowledge gained from their research to their students. There may be a difference in attitude in teachers according to the main focus of the institutions in which they work. If the institution is looking for prestige through research publications it is more likely to reward the research-productive staff. It is also possible to conduct research into teaching methods and this could include an examination of how lecturers in any discipline experiment with a new way of teaching their discipline. This however is a new concept and has only recently been recognised as a possible area for investigation which can merit the title of 'research' especially for those in disciplines other than the hard sciences, as education and other social sciences.

Academic staff have always been expected to keep up with the thoughts and practices of their profession and of their particular academic discipline, but the online methods offer them a new way of doing this in addition to traditional methods such as reading academic journals and attending conferences. If they find they enjoy using the new technologies for their own professional development they might be encouraged to think about using these technologies to pass on their knowledge and experience to their students.

Having decided that it is beneficial to use the new technologies for teaching and learning, why do teachers then choose a particular pedagogy for a particular learning situation? The answer to this has not been discovered, but many people think that teachers teach the way they were taught. Similarly the reason why they choose a particular learning environment seems to often be linked with its ready availability. The fact that a particular learning tool is already in use elsewhere in the same institution or in a similar institution is more likely to be a factor in the decision.

With respect to institutions, the more modern ones are willing to get ahead in the field of creating new learning opportunities for people by offering them the chance to use VLEs. They want to be sure that they are not moving too fast for their potential customers, but they want to be seen as offering the most exciting experiences, attracting a good number of students, and avoiding the risk of being overtaken by other institutions in this field.

Although they may have felt that economies of scale were relevant to the mass production of paper-based, this is no longer the case as not only the content of many courses is changing so rapidly now, but also the possible methods of delivery are changing so fast that the emphasis must be on flexibility and building in tools and experiences that can be changed very easily and frequently. Some open learning establishments have already suffered the experience of having to destroy masses of obsolete learning materials and are now converting to a "Just in Time" philosophy. They only produce the learning materials that are needed for the current students.

By offering courses through VLEs, some institutions felt that they can attract a wider variety of students who are located at greater distances from the institution. This can be true in certain circumstances, for instance where the courses are aimed at professionals who use ICT equipment for their work and so already have the necessary personal skills and have reliable equipment and connections. Examples of post-graduate courses for Engineers have been described in IVETTE.

When offering courses to professionals of other disciplines, institutions are more cautious and prefer to target those individuals that live within reasonable access of the Institution so that they have the opportunity to follow courses semi-virtually, that is, they can follow at a distance when it is convenient to them and they can attend in person when they choose to. This sort of arrangement can also be seen as a transition arrangement so that both staff and students can experiment with different learning techniques, methodologies and equipment without running the risk of total failure if any thing is not completely functional.

Apart from the Open and Distance Universities which rely on Virtual Learning as their delivery method, some Institutions were reluctant to engage in the use of VLEs with traditional students, partly because they already have large sums invested in property and equipment at specific locations and they are unwilling to loose the opportunity to use these facilities by offering courses which allow students to study at a distance. In a way, they see that the offer of VLEs would be in competition with their current activities and may be detrimental to their overall existence.

On the other hand, there have been so many uncertainties discussed in trying to bring about a transformation in attitudes and approach that are needed to radically change teaching methods that many institutions are not willing to take anything but tentative steps in that direction.

How VLEs are being implemented in terms of cross-cultural and linguistic issues

Many key texts issued by the EU reveal its awareness that tradition and culture are serious obstacles to the integration of states, citizens, enterprises etc. Although physical distances are limited in Europe, cultural distances are significant. However, while systematically considered an obstacle, they are, at the same time, stressed as one of the EU strongest assets. Virtual learning in Europe, then, has an effect far beyond virtual learning itself.

The most explicit example of mutual influence between culture and virtual learning is probably to be found in the use of language. Language traditionally tends to be seen as a barrier in virtual learning models, but could be considered in a more constructive way. The language policy adopted by the EU (i.e. equal treatment of all national languages and the respect of the individual citizen's language) is an innovative political agreement.

Some problems faced on the basis of the analysis of the cases and the experience of the partnership were:

Calendar of the learning activities. In order to fix the calendar of trans-European virtual learning activities, one has to take into account a number of relevant factors, such as the fact that the academic year in the various countries involved in the courses traditionally follows a different calendar.

Curriculum of the courses. The curriculum of trans-European virtual experiences should be selected very carefully due to international differences in course content. For example, the curriculum of undergraduate and/or graduate studies for the same scientific discipline in various European universities is different. It should be noted that, in the case of postgraduate courses, it is easier to agree on curricular content, since there are no legal constraints on the

programmes for postgraduate education, apart from administrative regulations. ON the other hand, some cases revealed cultural differences between larger European regions in attitudes towards the use of technology in education.

The language barrier. This problem affects numerous aspects of the course such as the design and production of the learning materials, the establishment of interactivity among tutors and learners, and the support and control of the progress of the learning process. Solutions of the language barrier problem in the design and production of the learning materials are related to inserting vocabulary in more than one language in the learning materials (books, Web pages and other electronic resources), thereby covering the main linguistic groups to which the learners belong. When the learning materials are distributed via satellite television, it is possible to use different language channels, thus giving all of the students the option to select the language of his/her preference.

With respect to establishing interactivity among tutors and learners and the support and control of the progress of the learning process, one solution frequently used is to conduct the tutorials on two levels: a) *the local level*, with a network of local tutors in each participating institution and/or country, carried out in the local language, b) *the central level*, with a common team of tutors for all the participating institutions and/or countries, carried out in a common language.

Design and production of the learning materials A very careful procedure should be followed in order to achieve consensus about the parts of the learning materials, which will be designed and produced by each of the participating institutions. The subdivision of the tutorials into two levels, i.e. the local level and the central level could be of some assistance in overcoming the relevant difficulties. In addition to taking into account the inclusion of the language of each group of prospective learners in the learning materials, we should consider cultural parameters affecting the structure of the learning materials itself

How are VLEs being implemented in terms of teaching and learning

In all cases, IVETTE maintained two crucial conditions for working with VLEs: a) VLEs should provide opportunities to improve the quality and variety of teaching and learning that are not being achieved using current methods; b) VLEs should reduce the administrative burden on teachers, thus allowing them to manage their workload more efficiently and to be able to give more time to individual students educational needs.

Considering these requirements as the basis for the study of teaching and learning in VLEs, it becomes obvious that the approach for analysing the process must reflect various other aspects in addition to the discussion of didactical techniques.

Different educational paradigms. In a typical online learning environment, courses are based on written learning material available in an electronic and/or printed version, including questions, exercises and tests to be completed as well as discussions taking place “on-line” with a tutor from a remote place. Other online learning approaches consist of a more teacher-centred approach, where lectures are held in ways similar to face-to-face instruction. A typical adaptation of this concept by means of telematics technologies is real-time, two-way videoconferencing that simulates traditional classroom teaching. Learning is situated. The learners are best capable of acquiring new understanding and skills in real-life situations if they have been taught to examine their own actions in relation to the goals of those actions.

The context of teaching and learning in VLEs. In the virtual learning community expertise is distributed. *Teaching* can be thought of as utilising a more experienced person, *the teacher*, in the learning process. In this case it does not necessarily conflict with self-direct learning if the

purpose of teaching is to support individual learners when required. Teaching situations can also be seen as providing resources for learning in a similar way to ready-written learning materials

Key issues for pedagogical design in VLEs. When teaching and learning take place in VLEs, it should be kept in mind that there is already a didactical concept incorporated within the environment that determines the scale of pedagogical functions. In the context of the VLE, the technology itself limits the range of possibilities (dominance of texts due to bandwidth restrictions). It is the environment, depending on the functionality of the technology and a certain set of tools, functions, bars, fixed hierarchies and positions (again with some kind of pedagogical limitations) that limits the design of courses.

New teaching strategies. In a VLE, the learners themselves can largely direct learning. Therefore, the meaning of mentoring and tutoring for learning support and study guidance gets special emphasis. Tutoring can mean support related to the learning process, study contents, tasks, or technical problems. Effective mentoring is akin to guiding the student on a journey at the end of which the student is a different and more accomplished person. In a formal learning situation, mentoring functions is roughly understood as providing support, challenge and vision. In VLE, tools and strategies for providing both tutoring and mentoring should therefore be adaptable for each purpose.

How are VLE being implemented in terms of institutional issues

Universities worldwide have apparently not changed very much during the last two decades. It is widely assumed that the sources of institutional conservatism aren't found only in the administrative bureaucracies, but also in tenured faculty, and even on students. In this sense, to think that the structure of Universities and other educational institutions will dramatically change in the future because of the new possibilities of telematics networks is an optimistic prognosis.

In institutional activity, there is a danger of dichotomising the origin of innovation to either the work of individuals or groups of individuals working in the institution (bottom-up innovation), or for innovation to come from institutional management as a directive to staff (top down innovation approach).The study of the transformation, or the transformation agents themselves is not enough to understand the nature of change in a system. In fact, institutions of higher education are social organisations characterised by traditions, cultures, norms, and institutional missions. Universities themselves carry out the so-called "learning patrimony" in a country. The learning patrimony refers in these cases to a set of values, dispositions and attitudes in regard to education and training. The pedagogic relation between students and trainers is an example of how the pre-established roles of knowledge transmitters and acquirers are mediated by the attitudes embedded in the learning patrimony.

The following paragraphs examine the aspects taken into account in the implementation of VLE's from the institutional point of view:

Institutional traits on implementation. There was little evidence of major initiatives to handle the problems of mainstreaming VLE activities or consider the ramifications of such expansion for the overall life of the institutions. On the contrary, many universities do not have enough support to use Virtual Learning Environments in their regular teaching structures. At the undergraduate level, there is a consistent tendency to introduce VLEs as part of new initiatives, such as new curriculum contents and course activities, new optional courses, etc. Generally speaking, these are innovations that are in process of validation, or are part of research and demonstration projects both at the national or international level.
The internal politics of each institution play a very big part in the way decisions are made. VLE activities are currently operating at either a level that does not demand new legislation or did not place any pressure for change on the institution as is sufficiently at the margins of the institution's duties. It is not usual for Universities to set up a number of different entities inside the organisation to regulate and promote the expansion of flexible learning systems based on an analysis of the current and future needs. The first decision was based on how the new VLE activities will be integrated into the university structure, taking into consideration the extent of the offer and the target population. Strategies for co-operation among universities for course offers vary among European countries. They ranged from creating consortiums of universities inside one country to promoting international partnerships between universities running postgraduate course, as well as organising flexible co-operation networks with other institutions world-wide in order to provide international seminars of high quality adapted to the needs and existing competencies in the partner institutions.

Innovation actors. An interesting finding is that many innovation actors involved in VLE do not have tenure; they are research assistants, tutors, and other personnel working on a contract basis. The belief that most of senior staff will not participate in this type of innovation, as we mentioned here before, is also an implicit reason that points to why this occurs. The typical professor's profile is that of a lecturer working individually, unaccustomed to working in the teams necessary for VLE experiences.

The factors that raise the status of a University teacher therefore seem to act against the adoption of VLE activity. In most cases there is a group of promoters whose career path is specific to research and development of VLEs. This mitigated against mainstreaming VLEs in institutions unless there is a change in the reward structure for university teaching.

Currently, there is a more credible discourse about ICT that only very recently emerged from the very same University experiences. Teaching innovation can now be considered research in teaching, a phenomenon that it is new for University knowledge areas other than pedagogy. Unfortunately, this type of research still does not have the same status and academic recognition as that of traditional research.

Professional development. In most cases there are areas within a University where these skills have been developed. These skills are typically found in service units (the unit that supports all computer activity in the University or units specifically established to develop audio-visual material and publications)..These groups tend to work in collaboration with academic departments and involve a team of teachers. In this way they work towards bringing about a change in teaching practice. In some cases groups drawn from these environments have evolved to become "units" within Universities on their own accord.
The development of new pedagogic skills in the teaching force and the incorporation of technical and pedagogic skilled personnel into teams require a major reconfiguration of the division of labour in universities. While the development of such teams to undertake additional and/or pilot activity does not pose any particular difficulty, the knowledge gained by the teams working on pilot projects tends to remain within the teams and is barely diffused in the rest of the Institution.

Financial matters. There is a long term feeling that VLEs may either provide new sources of income or reduce current costs, but the overwhelming picture on financing is that there are "special funds" for experimentation. Very few of the institutions seem to have sufficiently developed the capacities and methods that will manage the replacement of existing work with lower cost or marketing based VLE activity to make VLE activity economically self sustaining just now. A source of concern, then, is to secure the long-term financing of VLEs experiences

Links with External Organisations / Partnerships. Because VLE activity is, generally speaking, supplementary to normal university activity, it is often sustained by special initiatives or in expectation of extending the reach of a university beyond the university campus. This encourages collaboration with external partners as either funding organisations, clients, or suppliers. This adds extra dimensions to the activity system to incorporate the community values and needs of the partner organisations. This is not unusual for modern universities, as research work increasingly depends on such collaborations.

Validation. None of the institutions had specific regulations for validating VLE-based learning. This may be an issue in the future, as there are new requirements in assuring the quality of service delivered. These are issues addressed by the new guidelines in some European countries.

Conclusions and Implications of change

The main conclusions and implications of change of the IVETTE's Thematic Network are the following ones:

Conclusions and Implications at institutional level

The Network strongly considered the adoption of VLEs in the context of the traditional face-to-face paradigms of learning as a very important phenomenon. Such a consideration by the institutions implies a step forward in the transition from traditional teaching environments towards newer models of education. There seems to be an evolutionary path that starts from individual experiences promoted by individual teachers at the pilot level, and evolve towards more complex innovations supported by the managerial authorities through specific plans for supporting this type of innovation or through strategic planning. Three levels of evolution were distinguished: initiation, implementation and institutionalisation. Both top-down and bottom-up approaches are present, although it seems unusual that top-down initiatives could work by themselves.

Undertaking VLE development within institutions of higher learning requires the attention of a variety of institutional actors. These range from developers to administrators and institutional factors.

As with respect to *staff*, assuming that many of the lecturers are not happy with the traditional classroom, the virtual learning arrangements might be an opportunity to improve their practice. Designing and using VLEs require fundamental changes in the role of academic and technical staff. Academics have to acquire or develop new knowledge and skills to become designers of teaching materials, tutors, facilitators, etc. Additionally, and more importantly, they have to cope with essential changes in the conception of time and space introduced by these technologies. In this respect, examples of good practice and programmes for staff training, as demonstrated in the examples studied, are necessary.

As with respect to *division of labour*, it is also clear that there will be a substantial change in the role of teachers if VLEs are to develop. There is a need for teachers to collaborate with

fellow teachers and other educational professionals who, when and if they exist, are often in service departments in universities. Current methods of recruitment and rewards for university teachers in all the institutions are in favour of conservatism.

As with respect to *students*, although the benefits that could arise from a large student group engaging in online, collaborative learning have yet to be established, there are clearly questions for students to ask about the nature of VLEs and the quality of service they can expect. There will be greater demands on the skills of students such as time management and ICT knowledge.

As with respect to *technical infrastructure* there were no major technological barriers to the introduction of VLEs, and universities recognised the need to spend money to improve the hardware available to students. Issues arising from access to other resources for students at a distance (and the non-use of existing resources in the University) were also long term problems that still need to be confronted by the institutions.

Conclusions and implications on teaching and learning in VLE.

In the discourse on teaching and learning issues, the cases were faced with issues such as: [1] *The changing nature of teaching and students roles.* Teachers and students roles are interdependent. That is, if the role of the teacher is that of moderator, learners need to be self-reliant. A self-reliant student is connected to a less directed role of the teacher. This raised the level of students' responsibility in learning. In the virtual learning model (in which the learners do not necessarily share the same classroom), the teacher is removed from the centre by following up the individual learning processes. The teacher's role in the virtual model moves towards that of a tutor that support the learning process; In virtual learning the teacher is more of a **"**team of teachers" or a "virtual teacher" than an individual. This is due to the complexity of collaborative courses, as the international or other types of distributed learning arrangements; [2] *The pedagogical design and teaching in VLEs.* There are pedagogical barriers to overcome and compromises to be made when standardised products that are increasingly available on the commercial sector are chosen. A trade-off has to be made in order to select a particular learning environment, unless a university-made learning environment is chosen; [3] *The planning and development of the learning experiences:* Teaching in VLEs means that in addition to being a good educator you have to be a good organiser and designer of information, communication, didactical implementation, and media integration. Teaching becomes a much more complex process during several stages than in traditional educational situations. [4] *New strategies for teaching:* Within the context of new educational paradigms the new teaching functions can be characterised by the shift from traditional teaching as a content provider towards a mentor guiding and supporting learners through the process of knowledge acquisition. As previously discussed, in an open learning environment, learning is largely self-directed; but, since there is no "given" pedagogy in VLEs, due to their variety of potential pedagogic strategies, VLEs do not support particular models of teaching.

***Conclusions and implications of change on cross-cultural and linguistic issues*.**

VLEs allow institutions to extend their reach beyond local and national geographical borders. However, the fact that most of the cases studied did not optimise on the advantage of this challenging possibility deserves mentioning here. The element of collaboration turned out to be stronger at the intra and inter university (national) level than it is at the European level (independent of whether it is a university/university or university/industry collaboration). It seems that it is only upon a level of maturation that some of these initiatives foresee the establishment of collaboration with other European and international institutions and markets.

Although there have been legislative resolutions referring to cultural diversity at the level of the member-states and Europe, we observe that these have not been embraced by the educational policies of national educational authorities. This fact gives rise to a number of questions and implications of change, such as: a) it is necessary for the relevant European bodies to formulate more strongly worded supplementary resolutions and recommendations to national governments referring to the necessity of implementing concrete measures in the field of intercultural approaches in their educational and training system; b) It is of crucial importance for the various member-states of the European Union to take the necessary measures which will allow them to immediately implement already existing and forthcoming recommendations made by the relevant European bodies. Will the implementation of the intercultural approach in education and training have any negative consequences for the education of the majority of the learners in the national educational systems?

At the practical level we should value language and intercultural differences as an integral and dynamic part of the whole learning process and not as something separate or add-on representing different methodologies and approaches.

Policy Recommendations

IVETTE's policy recommendations provide guidelines for those stakeholders who are in the process of implementing new virtual learning environments. The approach for policy recommendations adopted by the Network was to take all of the actors involved in VLE into account, not only the traditional so-called policy makers usually linked to managerial instances, since in the initiation and implementation phase, educational/training institutions are currently confronting, we need a dialog among all stakeholders. It is hoped this section will contribute to the necessary exchange of opinions and experiences.

Policy recommendations at institutional level

In addressing policy recommendations concerning VLE adoption and implementation, a University might adopt one of the following strategic activities depending on the level of experience in the field:

Initiation phase strategy: *Institution's Green Paper*. Production of a Green Paper as the basis for decision-making on the implementation of VLE.

Implementation phase. Establishing an organisational E-Learning policy: The implementation of VLEs will not succeed without an equal, integrated and coordinated investment in the following three elements proposed: [a] *Infrastructure*. The necessary infrastructure at the locations convenient for staff and students must be established. It includes the provisions of access to learning resources, which need to be created specifically for VLE. Infrastructure beyond the institution needs consideration as well. In order to be effective, VLEs should implement technology that can be reasonably available to the learner without relying too

heavily on specific resources; [b] *Training and development:* Training of actors in the mechanics of VLE use and how to implement any particular pedagogies chosen is essential. This step includes staff and students in order to ensure they have the appropriate levels of information literacy, as well as the use of techniques that are associated with the pedagogical model chosen; [c] *Transforming the organisational culture:* Organisational culture includes the policies, attitudes and personal models of learning, organisational climate, staff rewards, assessment and grading systems.

Diffusion phase. Diffusion of virtual learning within the institution: Diffusion of new e-learning strategies/technologies in traditional research institutions that also have extensive teaching programs is already severely constrained by the current culture/mindset of the individuals and the institution, despite the fact that they may produce better learning outcomes for the students. The promotion of "research in teaching" to a higher status can help the diffusion of VLE innovations. The development of teamwork is an effective institutional approach to avoid "academic exclusion" associated with VLEs. Experienced and distinguished Professors in their area of expertise should be encouraged to be a part of VLE development groups.

The institutionalisation phase: Production of a Strategic Plan and the Institution's White Book. The building of VLEs requires the inclusion of expertise from several different areas: pedagogy, instructional design, software authorship, hardware configuration, networking capabilities, and administration tasks related to enrolment, billing, and crediting. A complete infrastructure must evolve in order for this apparent paradigm shift to succeed. University need a ***Strategic Plan*** that includes: a) business plan; b) survey of most used pedagogical model(s)and description of case studies concerning the implementation of VLEs; c) academic research papers, conference reports related to VLEs, to University development, learning and a wide range of related topics; d) surveys of existing hardware, software and communication networks of the kind that are currently used for the implementation of VLEs; e) reports discussing the likely future development of hardware, software and communication networks of the kind that are likely to be used in the future for the implementation of VLEs; and f) market research reports describing the current and possible future markets for knowledge and skills in certain disciplines. This process might result in establishing of an "institutional policy", by publishing a ***White Book*** for the promotion of VLEs innovations in each institution.

Policy recommendations on teaching and learning

To formulate policy recommendations in this area, we need to set the teacher and the learner in the academic, social and cultural context in which actors are operating. IVETTE suggest the consideration of the following aspects:

Developing new strategies for teaching/tutoring. Teachers need special training for online-education. Teaching in virtual learning environments needs competence in technological (so-called *hard skills*) and organisational aspects as well as new skills in applying relevant didactical methods, moderating/facilitating, etc. (so-called *soft skills*).

Supporting innovation units. To support the development of "innovation units", integrating interdisciplinary teams made up of academic staff (subject-matter experts), pedagogical advisors, and technical support, working cooperatively in promoting and implementing VLE experiences are essential.

Supporting Professional development. Teaching using VLEs requires technological and organisational capabilities as well as new skills in applying relevant didactical methods and new strategies for teaching/tutoring and moderating/facilitating. It is necessary to recognise new educational roles for those involved in the development of VLEs at different levels.

Specific VLE resource design. The efficacy of learning materials designed specifically for teaching in VLEs has been proved. However, the cost of developing high quality teaching materials from scratch remains a problem. Institutional innovation units can ease this process.

Cross-cultural policy recommendations

Among the recommendations identified in IVETTE we point out the following:

Careful management of international cooperation. The institutionalisation of a virtual learning in institutions would promote the potential of Universities to operate at a trans-European level. VLE used with cross-cultural audiences demonstrate problems of a legal and economic nature as well as problems that emerge from the differences in the national learning patrimonies of the audiences. A clear institutional policy on these factors would promote the spread of VLE across Europe.

Writing guidelines for cross-cultural learning environments. The elaboration of guidelines for the development of cross-cultural strategies in teacher training programs is a necessary step towards good learning practice in VLEs. This is a need that goes beyond particular institutions and should be approached in collaboration within the EU.

Promoting language support. In catering to cultural diversity in a VLE, we need to be mindful of linguistic and cultural diversity rather than viewing it as a problem. Different languages facilitate different thinking. VLEs need to build on such language support.

Including cultural differences in the course design and in the course delivery. Developing an approach to course design and in the course delivery means valuing and including participants' socio-cultural and educational identities in the course trajectory and in the course materials. When possible, and depending of the knowledge area, the different discourses (and from different cultures) of a wide range of communities of practice should be accounted for and made explicit.

Section 2 Background and Objectives of the Project

2.2. Aims and Objectives

The aim of the Thematic Network IVETTE was to investigate the initiation and implementation phases of Virtual Learning Environments (VLEs) in higher education institutions from an innovation perspective. It intended to bring to light the elements related to the three themes: the teaching and learning domain, the institutional sphere, and the cross-cultural diversity involved in learning experiences. The identification of these elements facilitates understanding and contributes to the building of a conceptual framework for the further development of e-learning initiatives and schemes.

The study undertaken by the Network was conducted with eight higher education institutions and one training company that works closely with various European universities. Although many of the experiences and projects studied (case studies) were linked to professional development and training departments of the universities involved, IVETTE did not specifically study VLEs within the training sector (as a stated goal in the Technical Annex). This was due to the fact that, early in the life cycle of the project, the partners assessed that there was not enough accumulated experience within the Network, nor were there resources to research private sector initiatives. Such investigation entailed the consideration of variables and factors that were outside the sphere of interest of the Network.

The principal objectives of the project were:

- To map out the teaching and learning approaches in VLEs, especially those arising from combining face-to-face and traditional educational methods.

- To critically assess the impact of European diversity on common elements of curriculum, language approaches, and institutional adaptation of the E&T systems in virtual learning environments.

- To contribute to innovation in public educational institutions regarding the restructuring of its functioning in co-operation with similar European institutions.

The above-mentioned objectives were achieved through a set of different activities as outlined here below:

- Undertaking of **nine case studies** in different educational institutions in order to identify key teaching/learning, cross-cultural and academic European dimensions, and institutional/organisational factors facilitating or impeding the initiation/implementation of virtual learning environments.
- Organising three **Workshops** among participants in order to develop an integrated view of the factors affecting virtual learning.
- Negotiating research results with a wider audience via an international **virtual Conference** in order to disseminate project outputs.

Since all the topics studied and discussed are closely interconnected, IVETTE took a holistic approach to the study. The Thematic Network explored issues and answers to contribute to

new perspectives for research that will add to a better understanding of the changes triggered by VLE-based innovations faced by educational institutions.

The main outputs of the project were:

- Three empirical studies on issues and practices in the following areas: a) teaching/learning approaches in virtual open learning environments; b) cross-cultural and academic dimensions in European diversity; and c) institutional/organisational factors in fostering VLE in public institutions.
- A virtual Conference engaging policy makers, teachers, trainers and experts in the field for verification and dissemination of the results of the studies undertaken.
- A report integrating the studies the conference results that include policy implications with the aim of contributing to policy discussion.

The Network that carried out the project activity is comprised of the following institutions:

1. University of Barcelona, Department of Didactics and Educational Organisation, Spain (project coordinator).
2. The Spanish National Distance Education University, Spain.
3. Universität des Saarlandes, Institut für Rechtsinformatik, Germany.
4. Foundation for Research and Technology, Hellas, Institute of Applied and Computational Mathematics, Greece.
5. Innovation in Education and Training Ltd., Greece.
6. University of Wales-Bangor, School of Education, United Kingdom.
7. Professional and Academic Channel for Europe 2000, Belgium.
8. University of Oulu, Faculty of Education, Finland.
9. The Nottingham Trent University Faculty of Education, United Kingdom.

2.2. Context of the network

The social and technological changes the European Union is facing require new ways to access knowledge. We are moving towards a knowledge-based economy and a knowledge-based society. Education and training are crucial in this transition. This scenario is portrayed by the so-called “life-long learning” concept that characterises most of the sectors of the economically competitive population in Europe. This situation affects not only university institutions, but also other education and training organisations. Continuous education programs now enable people working in a profession to update and upgrade their expertise alongside their daily work. On the other hand, the massive access to post-secondary education has also led to a drastic increase in the number of students as well as a change in the average conditions of education.

Both phenomena give rise to new forms of education and training, organised under the principles of flexibility in learning. There are emerging experiences that show that most of the traditional open and distance learning organisations are taking advantage of the new ICT systems, soon to be transformed into new “virtual campuses” (VCs). The participants are experiencing new ways of learning and communicating with peers and teachers throughout new forms of organising the learning environment, based on several technological configurations. What are now called “Virtual Learning Environments” (VLEs) are based on different combinations of telematics tools and multimedia.

Traditional Universities and training centres also follow this trend since public educational institutions see this as an opportunity to widen access to their courses. The implementation of virtual forms of services is regarded as a source of income for these institutions. In an attempt to reach new market potential, training companies implement VL services by bringing learning

close to people's homes. Meanwhile, both public and private institutions find new ways of collaboration by jointly offering courses using telematics networks.

2.3. The need for the study of VLEs

As exemplified by diverse reports from Commissioners, there has been a clear political agenda for a "Learning Society" throughout the 90's in Europe. It appears that changing demographics, technological development, and globalisation require not only individual adaptation but also renewal of education systems and learning at the workplace. There is a belief that in Europe we are in danger of falling behind competitor economies. Investment in continuous training is considered important because it can provide people with skills relevant to both work and spare-time. Increasingly, learning is seen as a continuing activity for which each individual is responsible. From an employer's point of view, learning has to be objective-oriented.

These ideas and beliefs have to be set in a political context that demands that the world be more responsive to market forces and that individuals take more responsibility for their actions in society. This political atmosphere means that there is apparently more onus on individuals to seek continuous personal and vocational development, and more onus on universities and other higher education providers to be more flexible in their approach to the education and training marketplace.

There are many alternative discourses on education; relationships between economic necessities and extended lifetime are far from new and are not predicated by the existence of new technologies. Virtual learning environments and other modes of flexible learning should not be seen as a panacea for the challenges facing Europe, its educational systems, its economy or its citizens. Other methods are, and have been, available. Moreover the social, political and economic situation of European citizens is much more likely to determine participation than the existence of any given technology.

The implementation of the Virtual Learning Environments is not a decision taken by some people who are merely interested in introducing changes or innovation in the existing educational policy. This is, on the contrary, a response of the existing educational systems to new, urgent and very fundamental societal needs.

2.4. Definition of Virtual Learning Environments in the Network IVETTE

The working definition of Virtual Learning Environments utilised by the IVETTE Network during the project was as follows: VLE is any kind of ICT-based learning arrangement where we find any combination of distance and face-to-face interaction, and where some kind of virtual time and space is present. Thus, VLE supports learning experiences that can have a minimal use of technologies and a predominance of in-class activities to a high level of technology usage and a completely virtual class with no face-to-face activities. IVETTE did not associated virtual learning with specific technologies, but assumes that Internet-based communication tools are predominant in the field.

Section 3. Methodology and Project Results

3.1. Framework of analysis

The IVETTE Network attempted to study the initiation and implementation phases of VLE innovations in different University settings. The implementation phase in educational innovation is concerned with the specific actions taken to put an idea or reform into practice in order to effect change. Characteristics of this phase involve complexity and often many sub-processes. The innovation generally interacts with its setting and the behaviour of the people within the setting. Currently, this is a strong trend towards viewing the implementation phase of the change process as both the most complex and the most difficult stage in the process of change. Successful change is regarded as successful implementation.

When analysing innovations, this axiomatic position is not sufficient to justify reliability. There are many approaches to the implementation that treat VLEs as a given. These approaches do not question the appropriateness of the innovations for the communities that they serve as they are mostly concerned with technical problems.

The value of particular innovative initiatives should be taken for granted, because we cannot be sure of the purposes, possibilities of implementation, or actual outcomes of the emergent changes. This assumption has two implications. First of all, the nature of educational change should be examined according to specific values, goals, events, and consequences obtained in concrete situations, since, in this case, educational innovations are not the aim. Secondly, we begin to understand that the challenges of institutional change are not simply mastering the implementation of a single innovation, but the complex processes implicating planned and unplanned processes influenced by socio-economic conditions, institutional practices, and local conditions.

To highlight the complexity of institutional change in the case of VLEs, there may be diverse factors of a variety of scopes influencing change. In particular, shared vision, communication and the wider environment may exert an influence during the various stages of adoption, implementation and institutionalisation of the innovation[1]. IVETTE applied a socio-cultural approach[2] to innovation and change in the study of VLEs. More specifically, IVETTE applied the model that links the institutional issues that arise during the implementation of VLE.

Preparing learners for participation in an information society, in which knowledge is the most critical resource for personal, social and economical development, is one of the basic objectives for education today. Virtual Learning is considered as one of the most promising innovations to improve teaching and learning with the help of new telematics networks. Nevertheless, learning depends on many factors, ranging from the classroom environment to the teachers' strategy, the resources used, among others. Teaching and learning mediated by the use of telematics offer new opportunities and new shortcomings to be overcome. Teachers need to understand that new skills, abilities, and knowledge are necessary in a virtual classroom. The question arises as to whether open and flexible learning environments built on information technology will lead us to qualitatively better, more effective and more efficient education, and how these new educational models have to be introduced.

When we approached cross-cultural issues in international settings, we noticed a range of problems that influenced the educational panorama. The European Commission has transformed the idea of European citizenship in a key issue for European integration. This notion is an

[1] According to the traditional model of planned change proposed by Fullan (1991)
[2] This approach is an adaptation of Cole&Engestrom's (1993) cultural-historical theory

essentially humanistic idea designed to construct a democratic Europe that is respectful of a balance between economic, technological, ecological and cultural considerations.

Based on these considerations, the framework of analysis pointed out to three dimensions - institutional, teaching and learning, and the cross-cultural and linguistic dimension - forming a constellation of facts and issues emerging from the implementation of VLEs. IVETTE laid out a model that connects these dimensions with similar level of significance, without the need to prioritise any of them in a particular situation; the circumstances of the VLE innovations and the context would decide what dimensions were more relevant at the time of interpreting the situation (Fig 3.1.)

By studying the implementation of different experiences of virtual learning environments in

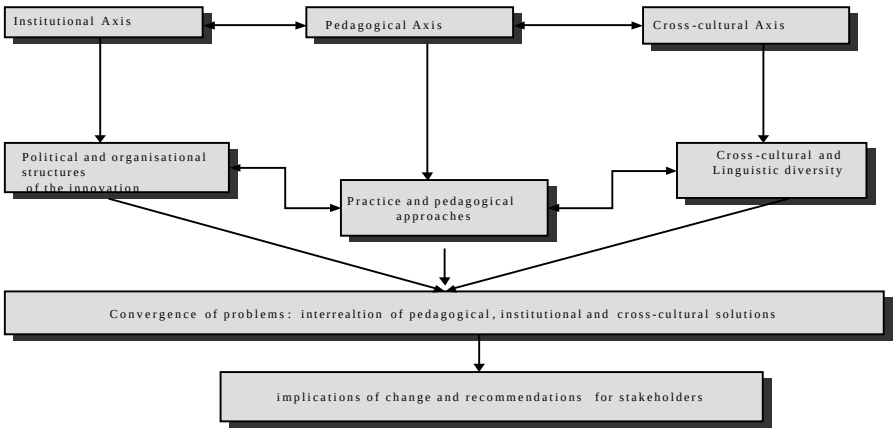

Fig 3.1- IVETTE's Framework based on a holistic socio-cultural view of learning innovations

different European countries, we faced the task of drawing a network of relationships among these three dimensions before the innovations become institutionalised.

3.2. Research Considerations

Although VLE might be triggered by socio-economic factors, according to IVETTE project the process of change does involve elements related to the teaching (pedagogic effectiveness) and institutional sphere (institutional restructuring, resistance to change, etc.). Moreover, other questions are involved: if we do not respond to the academic, linguistic, and cultural diversity in Europe, we risk creating systems of low social, pedagogical and economic efficiency. This justifies the need for a holistic perspective in the study of VLEs. The section below outlines the dimensions studied by the IVETTE project.

Institutional dimension

It has been recognised that the institution itself plays a chief role in the transition process towards the new environments we are experiencing. Within the cases investigated, also taking into account other experiences coming out of other EU funded projects, IVETTE explored the following issues:

Institutional innovation policies: The Network studied both internal and external factors influencing institutional innovation strategy/policy, which are also crucial: pressures, dependencies, funding, co-operation/collaboration with other organisations and accountability to labour market demands are also indicators of an innovation policy in this field. The network explored the reasons for institutions to create virtual campuses, the specific needs and requirements, the market for these courses, as well as the specific policies of different institutions.

Management/organisational issues: Institutions willing to develop VLE are dealing with very important issues at the management/organisational level, to the point that the functioning of the institutions must adjust to new needs. Fitting virtual courses into the academic scheme of regular courses, the necessity of facilities, the creation of course materials, the course timetable, and the training of staff, among others, were some of the indicators to be studied.

Implementation Approaches to virtual campuses: The network discussed the different models of virtual campuses (including some technological arrangements) the experiences dealt with, and how these models fit the strategic plans of universities and institutions, especially in the context of European collaboration. An analysis and evaluation of the cases and the projects studied across Europe resulted in presenting different models of implementation of VCs.

Teaching/ learning dimension

IVETTE shed light on the extent that VLEs represent an added value to teaching and learning compared with traditional environments. The thematic network discussed the following factors, among others:

New pedagogical approaches: teaching and student roles, teaching interactions, course and resource materials, communication and socialisation of learning actors, and in general, constraints and opportunities of virtual learning with regard to (new) pedagogical ideas.

Changes in the organisation of learning: modes of delivery, combinations of face-to-face and distance learning, time managing, new components of the learning environment (e.g. students' socialisation and self-learning versus group work).

European diversity and integration dimension

The international component of virtual learning appears to be crucial in the near future. Those universities able to offer academic and exchange activities with trans-European participation will be ready to access a market that is eventually becoming less and less specialised. However, we need to answer many questions before this can be generalised. We considered the following indicators for analysis:

Collaboration Frameworks: European institutions have the opportunity of offering common courses (and other types of academic collaborations) through VLEs, either at an undergraduate or a postgraduate level. The aim of this dimension is to define the models of collaboration between an institution and its main traits.

Curriculum and accreditation: There are many issues related to curriculum approaches in Europe, especially those related to assuring mobility. Besides posing new approaches, VLEs also introduce new perspectives when accessing large and diverse audiences. The capacity for producing new international courses in VLEs may pose new questions about credit transfer. At a local level, the accreditation of learning experiences in virtual campuses also has other problems to face.

Culture and language issues in trans-European collaboration: Teaching and learning in a multicultural/transnational environment, as allowed by the VLE, introduces new linguistic and cultural challenges. Many of the problems are related to curriculum materials and resources, tutoring, and communication among participants.

3.3 Methodology applied

The Thematic Network undertook nine cases studies, per each participant institution. The analytical approach was the multiple case study. As a Thematic Network, IVETTE partners built on their experience in the mentioned projects in the table above for the construction of the cases and for the enrichment of the workshop discussions. When necessary, partners were able to do in-depth interview with the senior managers of the institutions and focus groups discussions, specifically with course directors, coordinators and teachers.

Multiple case study methodology is particularly useful for those studies in which, such as in this one, the situation being analysed cannot be interpreted without understanding the context in which the studied phenomena occur. This methodology follows an inductive track because the categories, explanations, and interpretations are based on the researcher's experience and data rather than on previous theories.

Additionally, the project organised three workshops at different stages of the project. The aim was to collaborative discuss the cases undertaken. The focus groups methodology allowed the participants to share and partake in an in-depth analysis of the data obtained in an effort to generalise the results. A final "virtual workshop" was organised in an international forum specifically dedicated to exchanging information about all aspects of ICT in learning. The workshop aimed to present the project outcomes for dissemination and validity to a wider audience.

Selection of case studies

Although IVETTE did not seek to be representative of Europe as a whole, attempts were made to ensure that the cases were distributed in four basic geographical areas: North-western Europe, Central Europe, Scandinavia and the Mediterranean. The Network partners had extensive experience in projects taking place either at a national or an international level that involved the use of virtual learning at different levels and with different technologies[3].

[3] Many of these projects, given their innovative and international nature, were financed by European research and development programs.

Participating Institution	National and international projects involving online learning experiences
University of Barcelona	UB-CAT, TEAM (**REM**)
UNED	Foteumidis, Now-Meta, DEMOS
University of Saarland	**SIRIUS, "International Online Internet Seminar"**
University of Wales-Bangor	Inter-University ODL-PGCE **(REM,** TIRWE, Infinet, From Donne to Marvell, Uno, **The Kogi,** Environmental Challenges)
Nottingham Trent University	**REM (**EUROTEXT, ITTE, **ERASMUS European Citizenship)**
IET Ltd.	**TEN-Telecom, Telescopia , FORUM, "Greek History and Civilization".**
University of Crete-FORTH	Ifigenia (**DELILAH**, IMTS-VLTE, COSMOS)
EUROPACE2000	"Postgraduate interuniversity course in Information Technology", "Postacademic Interuniversity Course in Telecommunications", (**VirtUE –Virtual University for Europe)**
University of Oulu	**ProTo-Project Tools for Learning**, **TEN-Telecom, SCHEMA**

Table 3.1- Innovative learning projects analysed. Projects in parenthesis are other projects with a virtual dimension in which they were directly involved. Those in **bold** were of an international scope.

The projects selected for discussion and analyses were chosen for their virtual learning component, and if possible, their international dimension. The main traits of the experiences are presented in the Table next page. The cases were assigned to primary and secondary thematic areas as shown in this table:

Dimensions/Cases	INSTITUTIONAL	TEACHING/LEARNING	CROSS-CULTURAL
UBA, UWB, FORTH			
SAAR, OULU, EURO			
NTU, IET. UNED			

Table 3.2 - Predominance of dimensions studied in institutions involved

For instance, the University of Wales-Bangor concentrated primarily on the study of the institutional dimensions, and secondarily on the other two areas. Following this procedure, each partner produced a case study report for further discussion and analysis by the network.

3.4 Results and findings on main traits characterising VLEs

This section deals with the main characteristics of the environments analysed in the case studies. It is composed of the results of the discussion and analysis of the nine case studies undertaken in the first and second part of the project. The cases dealt with during the first part of the project were discussed in-depth, and the results of this discussion are shown here.

3.4.1 Main traits of Virtual Learning Environments

For the last decade educational institutions have been introducing the so-called "virtual learning environments" at different levels of development with different organisational arrangements. IVETTE Network studied the concept of Virtual Learning Environments (VLEs), the main traits of the adoption and implementation of the new virtual learning environments, as well as the consequences of these processes in terms of the changes needed in education and training centres.

Although the phrase “virtual learning environment” is the most popular, there are others that point to similar concepts, mainly sharing traditions linked to the concept of open and distance learning. For instance, terms such as telematics Learning Environments, distributed learning environments, etc. have also been used. The purpose of this section is to define VLEs based on the evidence produced in the nine case reports.

As there are many definitions and conceptions of VLEs, IVETTE was first concerned with the definition of Learning Environments (LEs) and the delimitation of their main traits. IVETTE first considered a learning environment as a place or community arranged specifically for learning purposes, and that it is based on ideas of a) knowledge, the structure of knowledge and learning; and b) practical arrangements necessitated by learning connected with time, place and repetitive rituals (seen as a system and process in constructivism) which together provide the social organisation for learning/teaching.

In order for learning to take place there are three essential components of any LE, which are defined on an inter-disciplinary basis. These can be described in terms of:

- pedagogical functions: learning activities, teaching situations, learning materials, tutoring and support, evaluation, etc.
- appropriate technologies: how the selected tools are connected with the pedagogical model.
- social organisation of education: time, place, and community.

VLEs fit these general characteristics, but include other, more specific ones. Generally speaking, VLEs are on-line domains allowing both synchronous and asynchronous collaborative interaction among teachers and learners. Meanwhile, VLEs provide learning resources to be used by students at any time. Compared with traditional learning environments, the intensive use of ICT triggers the new educational opportunities of VLEs.

For IVETTE, the use of telecommunication tools in the teaching and learning process is a key point, and some even mention the concept of Telematics Learning Environment. The concept of Virtual Campus[4] is also concurrent to that of VLEs. Hence, within the IVETTE project we chose to define a *VLE as any combination of distance and face-to-face interaction provided that some kind of time and/or space virtuality was present*. The support learners receive in any of these combinations, normally provided by the use of a telematics tool, has been of special interest to the project. Although this question depends on how VLEs are implemented, we feel that reference as to the type of ICT being used to achieve virtuality, communication and co-operation should also be made here. Table 3.3 shows the type of technology applications used in the various cases.

[4] As per Oilo (1998) "The virtual campus model uses telematics in order to perform formal and informal activities, which take place on a campus in a trans-national, network-based co-operation. It implies that all students on all participating campuses have access to all other participation institutions and professors."
For Working group 4, on Virtual Universities and more effectively titled "Flexible Universities" chaired by the Project Officers Knut Aslaksen (DGXXII Socrates), Peter Wintlev-Jensen and Joseph Urban (DGXIII Telematics Applications Programme), the concept of the Virtual University was perceived in three different ways: a) as an on-line learning environment (a virtual representation of a conventional university) simulating and enhancing traditional university features; b) as a model for virtual mobility and exchange of ideas and thoughts, and for the collaboration and co-operation between geographically distant partners;c) as a model for the re-engineering of traditional universities through the introduction of new technologies and flexible learning schemes. Key feature in all these perceptions is collaboration: on an institutional level, collaborative development and delivery of learning materials and services; and on an individual learner/tutor level, models for case-based collaborative learning.

Besides addressing needs of both continuous education and undergraduate studies in a variety of areas, the nine cases investigated reveal that a considerable variation exists in the scope, development approach, scale, learning/teaching arrangements, target population, orientation, and the type of technology and its configurations in the current VLEs in Europe today. Similarly, the notion of trans-nationality and even inter-institutional co-operation takes quite diverse orientations. As a consequence of this variation it might be of value to consider what VLEs are from a case-dependent approach instead of a collective analysis where the individualistic character of each case is not always fully revealed. This is also made evident in the stated objectives of the studied cases (see Table 3). The section that follow are a reflection of the variation in current VLEs.

3.4.2 VLEs characteristics emerging from implementation

In terms of their implementation within the conventional institutions, the trend seems to be that of parallel structures. As a consequence a central concern is that of sustainability as independent and self -financed learning/studying environments.

While the dimension of programme evaluation - whether of internal or external nature - does not seem to play a central role in the currently implementing VLEs, there is ample evidence that in all cases attempts are being made to assess the effectiveness of the interventions implemented, not necessarily in cognitive terms but rather in terms of the learning culture being created through the implementation of the specific VLE. In this respect, besides being a response to social demands for the transfer of knowledge through innovative means, the current VLEs can serve as research/test-bed sites for investigation into the process of developing/implementing innovative structures in education and training, as well as on the newly created socio-pedagogical cultures that emerge from and evolve in such structures.

Table 3.3 already demonstrates the great extent of variety encountered in the nine cases studied. The variance in what can be considered a VLE extends beyond these two dimensions (objectives and used technology) and we discuss below the range of observed difference between cases according to the three dimensions that structure the research in this project: (1) teaching and learning, (2) cross-cultural issues, and (3) institutional issues.

However, this is not to say that the project has not identified similarities in the VLEs reviewed. The fact that most of these are medium-scale interventions that emerge either from individual desire to introduce innovating practices in learning/teaching practices or from those emerging from pre-determined institutional strategic plans should be highlighted here. The areas of specialisation VLEs addressed in the cases (either at the continuing education level or undergraduate level) fall within the professional sphere, with the majority being in the field of educational sciences. Other professional areas addressed are: engineering, medicine, law, and language studies.

Teaching/learning characteristics

The selection and use of telecommunication tools do not imply the adoption of any particular pedagogical approach. In fact, in the cases studied one can find from the most traditional lecturing, even if it is delivered by sophisticated means (satellite videoconferencing) to the most advanced project oriented approach. However, the selection and use of these technologies has a tangible impact on the social organisation of education. The concepts of time, place and community find a multiplicity of meanings and can be experienced in many different ways. On the other hand, even in the cases in which the adopted pedagogical model can be considered as traditional, aspects related to the teaching functions, the learning materials, the tutoring and support system, and evaluation undergo considerable changes.

Institution	Objectives	Selected ICT technologies	Examples of Pedagogical perspectives
UB	To combine open and distance learning methodologies into the regular face-to-face classrooms using web-based training and other telecommunication tools. It provides training at a distance to students who cannot come to the classroom on a regular basis (UB-CAT) To create a 'virtual space' supporting the use of Internet at all academic levels, including course delivery, research, international co-operation, etc.; to engage the University in telematics-based community activities. (UB-MEDIA)	UB-CAT has developed a Web-based learning interface that can be adapted to different teaching strategies - modular courses. The system holds different levels of communication from regular e-mail to discussion areas, BSCW exchange of documents and resources, etc. UB-MEDIA allows for delivering Web-based modular courses and accessing resource materials, as digital videos and other multimedia materials, text-based documents, Web pages, etc.	Open and distance learning adapted to different teaching strategies: modular courses based on self-learning strategies. Teaching and learning exchanges between students themselves and between teachers and student are enhanced. Also traditional lecturing.
IUED-UNED	To develop a tool oriented towards the generation of multimedia materials by the teachers to be accessed by a Web-based exchange system. These materials are used to support the studies in the different subjects. The basic element in the application is the design of Virtual Classrooms, with common and basic elements, that the teacher uses adding the contents of a concrete subject.	The IUED-UNED application integrates three basic concepts: computer based teaching, multimedia and Internet. The use of the net is oriented to Web-based communication: updating information, sending questions and doubts to the teacher, forms to manage operations and access to the UNED Web databases.	Use of several communication strategies among learning actors, enhancing the possibilities of creating learning communities by decreasing the isolation of regular distance education students. Facilitation of access to different sources of information for individual and group work.
EuroPACE 2000	To deliver ICT-mediated distance education, building heavily on networking between classical universities, open universities, technology providers, telecom operators and industry, both for the local and international market.	Satellite videoconferencing has been a transmission medium in a unidirectional way. Additional communication tools are available to the students -off-line interaction and support (e-mail, newsgroups) and additional readings (web).	Lectures are given through 384 KB multipoint-videoconferencing, bearing great similarities to traditional lecturing for large groups of students. This is combined with off-line interaction and support (e-mail, newsgroups) and additional readings on the web.
NTU	To create and implement a multimedia working environment, integrating four main curriculum areas, remote communication and collaboration.	First Class conferencing system and Web-based training. All users have a personal mailbox, access to the database of materials and to conferencing facilities including the cafe area. The tutors and students have separate discussion areas as well as joint areas where the specific activities are found.	Computer-mediated communication; group work, scaffolding in tutoring approach. Learning-demand of communicative actions (week activities, etc.); modular design. Four types of tutor role: participator in conversation; modeller, which implies someone who stimulates the learner by creating materials and situations for active learning; coach, consultant, referee, assessor and 'help line'; and scaffold, as a guide and monitor rather than co-learner.

Institution	Objectives	Selected ICT technologies	Examples of Pedagogical perspectives
IET, Ltd	To create an experience in Tele-education using the concept of "virtual-distributed-classroom", with both national and Trans-European coverage. Participants were large institutions and companies, universities and experts. The seminars were at the postgraduate level and referred mainly to the fields of advanced technologies and business administration. The ECOONDA project goal was to design, develop and implement a telematics training program related to environmental issues in urban areas.	The TEN project it is based on a fully integrated network (satellite, plus ISDN, plus LAN Ethernet). The same partner also introduced a project based on the TopClass software, which provides a structured learning environment in which students are assigned to classes led by experts. Part of the multimedia learning materials - designed and produced in the framework of the ECOCONDA Project - is accessible through the Web to every one. Only the people having the necessary ID and password can access the remaining part.	The teacher makes his/her presentation in front of a PC equipped with a video camera in the hub station. The learners follow the presentation of the teacher on the screen of the satellite television receiver in the corresponding remote station. At any time they can ask the floor, in order to present remarks or ask the teacher questions.
UOUL	To provide the students with the capabilities needed in planning and organising new and flexible learning environments and educational applications based on new technology. The programme is mostly implemented through distance education and is based mainly on multipoint videoconferences and Web based learning environment.	Based mainly on multipoint videoconferences and WWW. Interactivity and communication among the students and teachers is provided by the Proto application (Project Tools for Learning). It consists of a remote editor for portfolios and project work, special discussion areas and a library for learning materials.	Pilot 1: Autonomous learning and methods of project work are emphasised in the studies. Learning through one's own experience and reflection emphasises the student's own activity to a great extent. The studies proceed as a project from the students' point of view. Tutoring and guidance are also very important in these kind of self-directed studies. Pilot 2: The course emphasised student's own activity and co-operation. The guiding principle is that the studies proceed as a project from the student's point of view. The students can get assistance from the tutor in both technical and content-related problems.
USAA	To provide international collaborative courses with Internet-related issues (Law-related work on the Internet, using the Internet in Professional Life, Teaching and Studying in Virtual Learning Environments)	Courses have been fully implemented on the Web, including asynchronous communication forums, user-administration and authentication, resource handling and integration (libraries), Chat and Talk, handling tools for questionnaires, the contact page and other Web-forms, document-upload for group-work, the homepage contests, a quiz-module, video- and audio conferencing, etc.	A modular structure was designed to stay flexible enough to effectively and promptly accommodate the user's needs. The didactic concept relates very much to the research in the field of computer-mediated communication and constructivistic ideas. Most of the activities were therefore based on group work and learning, demanding a great deal of communicative actions.
UCR-FORTH	The design and implementation of the course of study is such that it incorporates multimedia and hypermedia based learning tools as well as Internet based material.	Local Area Network dedicated to the course/innovation. At later stages it is predicted that courseware and the training/learning approach will be available on Internet. Learning/Teaching materials are hypermedia/multimedia based.	To complement the face-to-face lecturing system with multimedia learning material based on self-learning strategies.

Institution	Objectives	Selected ICT technologies	Examples of Pedagogical perspectives
UWB	To devise a course for secondary PGCE students which will be based wholly within schools but which will still be managed and taught through the HEIs. The teaching and monitoring provided by the HEI is intended to be basically the same, but it has to be conducted at a distance.	First Class conferencing system. While the students are in the University, they use the University's computer network. When they are in the schools, they use the computer networking facilities there that are made available by the University.	The actors were involved in lectures, seminars, meetings, email messages and telephone calls, filling in paper forms as well as face-to-face meetings. The interactions between the different actors can be considered to be a set of "conversations".

Table 3.3 - Main characteristics of the case studies

A common feature underpinning all these pedagogical perspectives is the significant presence of on-line tutoring. Asynchronous and synchronous communication possibilities between students themselves and students with the teacher represent an emerging and promising prospective for VLEs. However, with large numbers of students participating in this kind of activity teachers find themselves in an ”information jungle” without the time and the energy to give a quality answer to all students’ demands.

Most cases also make reference to the technological limitations of VLEs as to the implementation of the most progressive, interactive and inquiry oriented pedagogical approaches.

Cross-cultural characteristics

In Europe the most successful virtual learning experience appears to be at the postgraduate level and in instances where international participation is present. The international component seemed therefore crucial to the implementation of VLEs. The project identified three issues that required further attention in order to enhance understanding of the way institutions can manage European diversity and integration. These are:

- Collaborative Frameworks
- Curriculum and Accreditation Problems
- Culture and Language issues in trans-European Courses

The investigation of the IVETTE cases revealed that the element of collaboration is stronger at the intra and inter university (national) level that it is at the European level, independent of whether it is a university-university or university-industry collaboration. Most of the initiatives require at least the formation of collaborative schemes within the same institution. To a large extent VLE initiatives addressing undergraduate level courses do not reveal features of a cross-cultural orientation for these are developed and implemented at the institutional or at the national levels. This manifests the monolingual character of these cases. Some of these however, upon reaching a level of maturation do envision the establishment of collaboration with other European and international institutions and markets.

3.4.3 Institutional models for implementation

The IVETTE cases revealed that VLEs in institutions were introduced:

- parallel to traditional teaching/learning schemes at the level of undergraduate studies.
- in conjunction with and or complementary to traditional teaching/learning schemes with the focus on the development of telematics-based courses and educational products
- as new structures being formed within existing institutions or old structures being upgraded.
- as professional development/continuing education schemes/post graduate studies where the factor of collaboration with the private sector was vividly evident.

There is little evidence from the case studies of major initiatives of handling the problem of mainstreaming VLE activities or considering the ramifications of such expansion for the overall life of the institution.

As public bodies, Universities are subject to public statute in all cases. They have obligations to their pre-existing operations. In all of the cases, the use of VLE (in institutions) has introduced additional activities rather than replace existing ones. The VLE activities were operating either at a level that did not require new legislation or did not place any pressure for change on the institution as it is sufficiently at the margins of the institution's work.

On the other hand, funding for the implementation of pilot level activity and "special funds" for experimentation appeared to be available at both the European and national levels. As mentioned earlier, a major concern of the experiments has to do with their sustainability over time.

The studies carried out suggested that the Higher Learning Institutions across Europe are engaged in a number of Virtual Learning activities but they do not seem to have embraced the idea of VLE unequivocally. It appears that the initiation of VLE activity is undertaken by enthusiastic technical people, university teaching and research staff as well as administrators who were convinced that VLEs offer enhanced opportunities to learners, but for various reasons, which range from financial (priorities set over the allocation of the available resources) to the perception of the role of the University (traditional/academic versus innovative/market driven), and from arrangements for learning to learning assessment, there are barriers which "prevent" institutions from embracing the idea wholeheartedly.

3.4.4 Attitudes towards Virtual Learning Environments

IVETTE research activity assumes that most of the education and training institutions are facing important challenges in the information society. The innovation caused by the advance of telecommunications in education is so deep that, even if we are at the onset of such developments, they might change the sector in Europe in the upcoming years.

One of the main characteristics of the traditional face-to-face educational system is the necessity for the learners to be physically present in the classroom during the educational process. This necessary condition manifests serious disadvantages: Numerous citizens cannot fulfil the condition of physical presence in the classroom for various reasons (health, family, economic, professional problems etc). Therefore, these citizens cannot benefit from the traditional face-to-face educational system, both for their initial as well as for their continuing education and training and lifelong learning.

Contemporary societies, however, cannot afford to perpetuate exclusion of their citizens from education. They are obliged to make the best possible use of the totality of their human resources for their economic, technological, scientific and cultural development. Therefore, there is a need for a solution that would enable these citizens to make the best possible use of the educational system. This can be done effectively with the methodology of Flexible and Distance Learning, i.e. with the use of VLEs.

Another reason for the widest possible utilisation of VLEs in the continuing education and training sector is associated with the fact that science and technology are changing very rapidly. A high percentage of the knowledge students acquire during their studies in the tertiary educational institutions is no longer useful for their professional activities a few years after their graduation. Therefore, there is an urgent need for systematic and intensive continuing education and training of the workforce in all industrial societies. The problem is how we can respond to the ever-increasing need for the continuing education and

training of the European workforce. It is obvious, that this cannot be done with the traditional face-to-face education and training institutions. Staff members of the enterprises cannot leave their home and workplace every year or so in order to follow face-to-face continuing education and training programmes in the traditional educational institutions. The market requires just-in-time learning solutions.

The implementation of the Information Society creates still another proponent for the use of VLE. It is well known that one of the main characteristics of the labour market in the Information Society is the need for flexibility of the workforce and adaptability of the enterprises. The members of the workforce will be obliged to change their professional orientation at least two times during their career. Again, the traditional face-to-face delivery methodologies cannot respond to this demand unless they use the capabilities of e-learning.

By analysing the case studies, it was possible to extend the discussion and identify many of the attitudes and reasons why teaching staff and institutions want VLEs.

In some of the cases examined, the staff want to be able to offer an opportunity to learn that could not otherwise be offered. Other examples saw a request coming from the industry to find a way to update the skills of engineers while they were still employed. It is quite possible that this could have been achieved in other ways, but the solution offered by a distributed learning situation that allowed engineers to study at a location near their place of work has been tried and is now regarded as an effective way of making educational provisions.

Trainers and teachers appear to have less chance to ascertain whether the points they are trying to convey have actually been understood than they do in a face-to-face situation. In a face-to-face situation, the teacher can look for signs that a learner is troubled by a particular point (worried expression, fidgeting, distracted manner), but has to adapt to eliciting this sort of information in a different way in VLEs.

Some teachers find the idea of working in a medium like this to be really exciting and challenging and they are convinced that this can offer potential for an opportunity to extend the minds of each individual to work in conjunction with the minds of the other learners and with the teacher. Others see this kind of experience as too risky and too dependent on the robustness of a system of hardware, software and communications that does not have a sufficiently good record of availability and reliability. They are concerned that even a small percentage of the total number of learners in the class may be excluded from certain activities just because of poor systems performance.

Although some academics are keen to develop their skills in relation to different aspects of VLEs and consider this experience to be a way of enhancing their reputation and their career potential, others feel that their real work should continue to be in their research and imparting the knowledge gained from their research to their students. There may be a difference in attitude in teachers according to the main focus of the institutions in which they work. If the institution is looking for prestige through research publications it is more likely to reward the research-productive staff. It is also possible to conduct research into teaching methods and this could include an examination of how lecturers in any discipline experiment with a new way of teaching their discipline. This however is a new concept and has only recently been recognised as a possible area for investigation which can merit the title of ‘research’ especially for those in disciplines other than the hard sciences, as education and other social sciences.

Some staff have security of tenure and are given a certain amount of liberty to decide how to divide their time and energies between teaching, researching and developing work for either of these activities. At the other extreme, some staff are engaged for a certain number of teaching contract hours and have very little opportunity to experiment with different methods of delivery.

Academic staff have always been expected to keep up with the thoughts and practices of their profession and of their particular academic discipline, but the online methods offer them a new way of doing this in addition to traditional methods such as reading academic journals and attending conferences. If they find they enjoy using the new technologies for their own professional development they might be encouraged to think about using these technologies to pass on their knowledge and experience to their students.

Having decided that it is beneficial to use the new technologies for teaching and learning, why do teachers then choose a particular pedagogy for a particular learning situation? The answer to this has not been discovered, but many people think that teachers teach the way they were taught. Similarly the reason why they choose a particular learning environment seems to often be linked with its ready availability. The fact that a particular learning tool is already in use elsewhere in the same institution or in a similar institution is more likely to be a factor in the decision.

With respect to institutions, the more modern ones are willing to get ahead in the field of creating new learning opportunities for people by offering them the chance to use VLEs. They want to be sure that they are not moving too fast for their potential customers, but they want to be seen as offering the most exciting experiences, attracting a good number of students, and avoiding the risk of being overtaken by other institutions in this field.

Although they may have felt that economies of scale were relevant to the mass production of paper-based, this is no longer the case as not only the content of many courses is changing so rapidly now, but also the possible methods of delivery are changing so fast that the emphasis must be on flexibility and building in tools and experiences that can be changed very easily and frequently. Some open learning establishments have already suffered the experience of having to destroy masses of obsolete learning materials and are now converting to a “Just in Time” philosophy. They only produce the learning materials that are needed for the current students.

By offering courses through VLEs, some institutions felt that they can attract a wider variety of students who are located at greater distances from the institution. This can be true in certain circumstances, for instance where the courses are aimed at professionals who use ICT equipment for their work and so already have the necessary personal skills and have reliable equipment and connections. Examples of post-graduate courses for Engineers have been described in IVETTE.

When offering courses to professionals of other disciplines, institutions are more cautious and prefer to target those individuals that live within reasonable access of the Institution so that they have the opportunity to follow courses semi-virtually, that is, they can follow at a distance when it is convenient to them and they can attend in person when they choose to. This sort of arrangement can also be seen as a transition arrangement so that both staff and students can experiment with different learning techniques, methodologies and equipment without running the risk of total failure if any thing is not completely functional.

Apart from the Open and Distance Universities which rely on Virtual Learning as their delivery method, some Institutions were reluctant to engage in the use of VLEs with

traditional students, partly because they already have large sums invested in property and equipment at specific locations and they are unwilling to loose the opportunity to use these facilities by offering courses which allow students to study at a distance. In a way, they see that the offer of VLEs would be in competition with their current activities and may be detrimental to their overall existence.

On the other hand, there have been so many uncertainties discussed in trying to bring about a transformation in attitudes and approach that are needed to radically change teaching methods that many institutions are not willing to take anything but tentative steps in that direction.

It is clear that VLEs can fulfil many of the aspirations at the European level. However, this does not depend on a simply accepting VLEs. The social, cultural and political context in which learners, trainees, and educational institutions exist carry with them history and experience of other forms of the organisation and delivery of learning and training. There are valid educational (and other) reasons why VLEs cannot be implemented in some cases or cases where other forms of provision of learning are preferable.

On one hand, we have examples of institutions or individuals that do not have the structures and organisation or the inclination to implement VLEs on a large scale. This does not diminish their capability to deliver education, or adopt aspects of virtual learning or implement virtual learning on a pilot scale. These reflect the teaching and learning, social and cultural and institutional perspectives in the IVETTE project.

3.5. How VLEs are being implemented in terms of cross-cultural issues

The study of culture has been submitted in recent years to diverse and radical approaches, across a range of disciplines and aspects. Collectively these approaches mark the decanonisation of culture, namely the redefinition in functional instead of elitist terms. In other words, each area of human activity, each nation, and even each social group (whether local, regional national, multinational, economic or religious), including virtual ones, are worth being considered and investigated as a (sub)culture.

Languages, which are often considered one of the so-called national barriers between communities, have been shaped by such communities as a road to cultural profiles and cultural autonomy. Languages do not pre-exist, but national languages have been greatly favoured in their establishment by given communication technologies and by the institutionalization of communication channels under governmental control.

Virtual learning and language in the European perspective

The most recent developments in the field of ODL and virtual learning in Europe were initiated by the EU. After having invested in the physical mobility of people (e g. students and teachers within the ERASMUS Program), the EU now aims to promote mobility using communication. To promote this the EU offers substantial financial support to trans-national and trans-cultural virtual learning research projects.

From a wider point of view these projects may appear as a paradox. On one hand, the EU, as a primarily economic and political construct supports the delicate position of an international group of nations that claim to retain their own rights and responsibilities in matters of culture, hence also education. On the other hand, the EU imposes regulatory

initiatives that affect these nations in the development of their education, hence also their culture.

Many key texts issued by the EU reveal its awareness that tradition and culture are serious obstacles to the integration of states, citizens, enterprises etc. Although physical distances are limited in Europe, cultural distances are significant. However, while systematically considered an obstacle, they are, at the same time, stressed as one of the EU strongest assets.

ODL and virtual learning in Europe, then, has an effect far beyond ODL itself. While apparently dealing with innovation in university didactics, the practices of virtual learning are directly related to the economic and socio-political objectives of actors involved in those practices, regardless of their status in educational institutions, training organizations, companies or governments.

The most explicit example of mutual influence between culture and virtual learning is probably to be found in the use of language. Language traditionally tends to be seen as a barrier in virtual learning models, but could be considered in a more constructive way. The language policy adopted by the EU (i.e. equal treatment of all national languages and the respect of the individual citizen's language) is an innovative political agreement. Indeed, it is striking how strongly the principles of the EU's "ethnolinguistic democracy" differ from those of other international organisations. Hardly any forum on virtual learning takes place without devoting a certain time to "language". However, there is no reason why virtual learning environments - and certainly the more highly interactive technologies - would necessarily generate language problems.

These considerations make it clear that, as far as organisational options are concerned, new approaches to language may be necessary. Instead of mechanically borrowing our didactic and linguistic solutions from the political traditions of "language policy", the managers of virtual learning, are obliged to produce an active policy, a "management" of language. Furthermore, such language management needs to be based on negotiated agreements between participants that are consistently implemented in activities, and managed to secure smooth realisation.

Issues encountered in the use of VLEs across Europe

There was a focus on the cross-cultural problems that arose in the cases in which virtual learning experiences were jointly organised by a number of educational and training institutions distributed over a large area of Europe, involving learners and tutors belonging to different cultural and/or linguistic environments,

In the following section, we will discuss some problems faced on the basis of the analysis of the cases and the experience of the partnership.

Calendar of the learning activities. In order to fix the calendar of trans-European virtual learning activities, one has to take into account a number of relevant factors, such as the fact that the academic year in the various countries involved in the courses traditionally follows a different calendar. In some countries the academic year is subdivided into two semesters, in others it is subdivided into three terms. In addition, the dates of the beginning and the end of these subdivisions, and therefore of the corresponding vacations, are different from country to country.

Due to the fact that the different European countries belong to different time zones, the hours of the day during which real-time joint learning activities can be scheduled (such as computer-mediated conferencing or videoconferencing) had to be selected very carefully.

Furthermore, because of the latitude difference among the various European countries, there are significant climatic differences from country to country, as well as differences in the duration of the day and night. These differences should also be taken into account when scheduling real-time joint learning activities.

Curriculum of the courses. The curriculum of trans-European virtual experiences should be selected very carefully due to international differences in course content. For example, the curriculum of undergraduate and/or graduate studies for the same scientific discipline in various European universities is different.

It should be noted that, in the case of postgraduate courses, it is easier to agree on curricular content, since there are no legal constraints on the programmes for postgraduate education, apart from administrative regulations.

Most countries have a national curriculum of some kind, which controls both the time available, and the subjects studied. Experiences in different cases indicate that where the subject content does not relate directly to the curriculum (or to a particular subject), it is extremely difficult to motivate tutors or to find students to be involved in the work since the study becomes an optional extra. This means that their participation is in addition to their usual work. They cannot be forced to do it, nor may their work be assessed. In this respect, it is also difficult to motivate students to take a study programme seriously when they are not evaluated for the work and its outcome. For these reasons, joint teams creating learning materials are preferable.

Another important point is that the technologies should also be considered in terms of the immediate cultural differences that become apparent in the attitudes formed towards the use of technology. Some cases revealed cultural differences between larger European regions in attitudes towards the use of technology in education. Inhabitants of Northern and Western European countries show a significant preference for study with computers than students and professionals from Southern and Central European countries. Southern Europeans demonstrated the belief that a high level of educational competence is necessary to work with educational technologies, and seem to prefer working with computers in small groups.

The language barrier. The language barrier challenge is perhaps the most difficult problem we face in trying to carry out a trans-European distance learning course. This problem affects numerous aspects of the course such as the design and production of the learning materials, the establishment of interactivity among tutors and learners, and the support and control of the progress of the learning process.

A great variety of solutions of the language barrier problem have been already applied in many cases in connection with the design and production of the learning materials. We can insert some of the content and vocabulary in more than one language in the learning materials (books, Web pages and other electronic resources), thereby covering the main linguistic groups to which the learners belong.

When the learning materials are distributed via satellite television, we can use different language channels, thus giving all of the students the option to select the language of his/her preference. In this way, each learner has the possibility to follow the course in one of these languages, according to his/her preferences.

With respect to establishing interactivity among tutors and learners and the support and control of the progress of the learning process, one solution frequently used is to conduct the tutorials on two levels: a) *the local level*, with a network of local tutors in each participating institution and/or country, carried out in the local language, b) *the central level*, with a common team of tutors for all the participating institutions and/or countries, carried out in a common language. In the latter example, the common team of tutors will include most of the local tutors used in the local tutorials.

From a language management perspective, when the learning is multilingual, the content of local Web sites and the local communication are in the mother tongue of participants. Outcomes of local activities that are relevant for international communication are summarised in English. A common language is used for joint activities, but participation and follow-up of activities are organised locally in the mother tongue. Instruction is given to insert breaks during videoconferences that enable participants to have a summarised interpretation, conduct local discussions in the local language, and prepare videoconference interactions in the common language.

It is to be expected that technologies will contribute to the future solution of the communication and linguistic problems. Videoconference lectures can already be organised with some creativity in a multilingual mode by providing simultaneous interpretation through headphone sets. Translation can, for most of the time, be provided by one of the participants, due to the fact that technical subjects only need limited vocabulary and that most participants are more or less familiar with the subject of the lecture. Speech recognition and automatic translation (eventually connected to subtitling) offer promising possibilities for the immediate future.

Intercultural communication among tutors and learners. An important problem faced when trying to carry out a trans-European distance learning course concerns the intercultural communication among tutors and learners. This problem affects similar aspects as those of the language barrier. For instance, concerning the design and production of the learning materials, in addition to taking into account the inclusion of the language of each group of prospective learners in the learning materials, we should consider other parameters affecting the structure of the learning materials itself. These parameters are closely related to the cultural environment of participants, such as monetary units, temperature scales, geographical names, historical events, etc.

To enhance interactivity among participants, the tutor subdivides the learners into a number of groups, making an effort to include learners belonging to different linguistic and/or cultural environments in each group. In this way, the intercultural communication among the learners is increased.

Design and production of the learning materials. The joint design and production of the learning materials to be used for the trans-European virtual leaning experiences is a very delicate matter. A number of difficulties might arise when trying to solve this problem. For example, the relevant staff members of all the institutions involved in the courses hold the reasonable opinion that they are among the best specialists in the corresponding field. Therefore, a very careful procedure should be followed in order to achieve consensus among them about the parts of the learning materials, which will be designed and produced by each of the participating institutions. The subdivision of the tutorials into two levels, i.e. the local level and the central level could be of some assistance in overcoming the relevant difficulties. Within the framework of the local tutorials, the local tutors will have the possibility of presenting any additions and/or amendments to the common learning materials of the course that they consider necessary to their own audience.

In some of the cases, views on the course content differ significantly between the private sector and universities. This fact can result in ill feelings and a degree of dissatisfaction with the course. In light of their general endeavour perception that the courses benefit from the interest of a wide audience and serve the purpose of "best practice", universities want to emphasise the high quality of the course reflecting their scientific standards. Industry, on the other hand, demands high quality content but with a practice-oriented slant.

Cultural biases can also affect the acceptability of courseware. Restricting the adaptation of "foreign" courseware to translation-a common practice in the international exchange of courseware- may be unsuccessful. A possible solution to this problem is "localising" or "versioning" either by the course developers or through local adaptation at the user level. Such adaptation should seek to incorporate local cultural material not only for its own value and accessibility but also to facilitate understanding of general concepts found in imported distance education programmes.

3.6 How are VLEs being implemented in terms of teaching and learning

Instructional methods and the quality of courses within the different IVETTE cases can hardly be compared, since the whole setting of the educational activities must be considered. Some environments are entirely based on the virtual mode; others are linked to traditional courses taking place at a local university campus. This influences the structure of the virtual environment as well as the methods being applied. Nevertheless, in all cases, IVETTE maintained two crucial conditions for working with VLEs: a) VLEs should provide opportunities to improve the quality and variety of teaching and learning that are not being achieved using current methods; b) VLEs should reduce the administrative burden on teachers, thus allowing them to manage their workload more efficiently and to be able to give more time to individual students educational needs.

Considering these requirements as the basis for the study of teaching and learning in VLEs, it becomes obvious that the approach for analysing the process must reflect various other aspects in addition to the discussion of didactical techniques.

Different educational paradigms

In a typical online learning environment, courses are based on written learning material available in an electronic and/or printed version, including questions, exercises and tests to be completed as well as discussions taking place "on-line" with a tutor from a remote place. Other online learning approaches consist of a more teacher-centred approach, where lectures are held in ways similar to face-to-face instruction. A typical adaptation of this concept by means of telematics technologies is real-time, two-way videoconferencing that simulates traditional classroom teaching.

Whereas the traditional paradigm is based on the concept of knowledge transfer, the new paradigm used in some VLE experiences relies on more constructivist principles. According to this philosophy, learners construct their knowledge on their own (a simple transfer is not possible), and active learning must be encouraged. Contemporary learning theories emphasise problem solving in the learning process. They also take into account the social nature of learning and the complexity of students' acquisition of knowledge. The learning process requires negotiation: the constructivist ideas of learning and knowledge in

learning environments, self-reliant learning, and project work are closely connected with considerations of the nature of knowledge in the teaching and learning process.

Learning is situated. The learners are best capable of acquiring new understanding and skills in real-life situations if they have been taught to examine their own actions in relation to the goals of those actions. Classrooms, which are isolated from real life, can only simulate reality to a certain extent. This is also true of virtual classrooms constructed by technological means (like video conferencing). It is therefore essential that learning in open learning environments is closely connected with learners' real-world activities, situations and social relations. A starting point in this sense is provided by project work methods in which students have to consider the study goals and apply what they learn to practical situations. In such cases self-direction also means goal-oriented learning activity targeting real problems. One of the main functions of an open learning environment is to offer learners the tools to plan their learning, to report the results of their learning experiences and to evaluate their learning outcomes in a social context.

The context of teaching and learning in VLEs

In this discussion it should be kept in mind that teaching and learning always take place in a specific context. The available infrastructure concerning personnel, competency, budget, and technologies shape this context. Beyond the legal aspects, we should not forget the framework of learning (curriculum, teaching conditions, etc). Therefore, a learning environment and its concepts are based on a certain background of needs, requirements and facilities.

In the virtual learning community expertise is distributed. *Teaching* can be thought of as utilising a more experienced person, *the teacher*, in the learning process. In this case it does not necessarily conflict with self-direct learning if the purpose of teaching is to support individual learners when required. Teaching situations can also be seen as providing resources for learning in a similar way to ready-written learning materials.

By using the technologies, teaching situations can be brought closer to the learner. Synchronous computer conferencing (such as IRC and Chat) and videoconferencing can form part of this learning environment. Learning materials can function like a library for a learner. It can offer references for problem solving and background information about course contents. The availability of teaching situations can be improved through access to multimedia materials such as video or audio (including video-on-demand) resources of lectures and archived discussions as part of the learning materials. It is difficult to distinguish between interactive learning materials and teaching situations. Depending on the concept, the most important learning material can be the material produced by the students themselves during the learning process.

Key issues for pedagogical design in VLEs

In practical teaching situations, the methodology used in computer-assisted learning is moving more into ICT-assisted knowledge construction, distributed expertise and collaborative learning. Hyper- and multimedia-based sources of knowledge have replaced traditional study books with electronic materials in many cases. ICT and networking can make the learning environment more open in terms of knowledge acquisition in all phases of education.

To analyse key issues in the implementation of teaching and learning in VLEs, we refer to pedagogical functions as being the practical activities and methods in the learning environment that make learning possible.

When teaching and learning take place in VLEs, it should be kept in mind that there is already a didactical concept incorporated within the environment that determines the scale of pedagogical functions. In the context of the VLE, the technology itself limits the range of possibilities (dominance of texts due to bandwidth restrictions). It is the environment, depending on the functionality of the technology and a certain set of tools, functions, bars, fixed hierarchies and positions (again with some kind of pedagogical limitations) that limits the design of courses.

This is less problematic when the environment can be adapted to specific needs as can happen with (often times handmade) modularised developments, flexible and open from their technical concept. But there are pedagogical barriers to overcome and compromises to be made when the standardised products that are increasingly available on the commercial sector are chosen. These so-called Integrated Distributed Learning Environments (IDLE) become more and more popular, especially in those cases when teachers are able to run and easily administer courses without being confronted with the full set of actions to be taken when implementing a Virtual Learning Environment. Instead of a bottom-up strategy (e.g., analyse the situation, define the needs, develop the concept, develop and implement the environment, run the course, evaluate it...), a top-down strategy is chosen and the variety of pedagogical functions is then reduced to the tools offered by the pre-defined and standardised environment. On the other hand, although the bottom-up approach seems more adequate from the pedagogical point of view, it usually has other added problems, such as technical insecurity and a larger effort for the development of materials and system maintenance.

In practice, we notice that the development of a virtual learning environment can be the result of a pragmatically oriented decision at the institution, as was expressed in some of the cases. This can also be used as a step for introducing the evolutionary transition from traditional teaching environments towards settings related to ideas of social constructivism. The evolution of learning environment is a complicated process, where institutions' cultural and historical situation with practical arrangements is often the critical factor, not the learning theory.

The IVETTE cases demonstrated that designing VLEs necessitates more research and insight into how the principles (valid for "technology-empty" learning environments) can be transferred to technology-rich education and into the identification of the range of new pedagogical concepts and principles. Indeed, from a pedagogical point of view, the cases showed that learning requires the consideration of a large variety of aspects on a detailed level and of the interaction between them (e.g. providing motivation, stimulating interaction between students and teachers, etc). The development of a VLE is both a very complex process and a very important one, since it determines the quality of teaching and learning to be delivered through technology.

Planning, development and managing learning

There are several stages for course design that must be considered: a) analysis of basic conditions (e.g. infrastructure, resources); b) planning; c) development; d) course running; and e) evaluation.

The stage of the analysis can be characterised by the examination of the context conditions mentioned above. Who is the user group, what is the technological environment, what is needed, which resources are available? A conceptualisation can then be performed during the planning phase. Here, various components are taken into account for the development of the environment and course delivery:

- Information selection and design (e.g., learning material, guidance)
- Communication (e.g., language, synchronous/asynchronous, channels: text, audio, video)
- Organisation, Management (e.g., user-administration)
- Technological Realisation (e.g., e-mail, chat-tools, video/desktop-conferences, etc.)
- Didactics, (e.g. how to raise/maintain/increase motivation, communication strategies between teacher/learner, learner/learner, teacher/learner/environment, considering learning, cultures, and the design of assignments and control units)

There are important aspects to be considered in this discussion about teaching and learning during the planning and development stage while courses are running in a VLE. Teaching in VLEs requires the consideration of many organisational aspects. This point even increases dynamically in inter-cultural settings and even more when the benefits of technologies are applied in the context of local, regional, national or international collaboration. Being a good teacher means being a good organiser and designer of information, communication, didactical implementation and media integration, as well. The course concept varies according to the integrated cultures and the available infrastructure concerning technology and networks. This demonstrates that teaching becomes a complex process during several stages as compared to traditional educational settings.

Although in typical Internet-based learning environments there are no technical limitations concerning the number of participating students, it is obvious that as more students participate, more organisational and administrative work is required. It happens that, in spite of an interested discourse that is rarely grounded in practice, the use of VLEs means a tangible increase in the workload of the teacher, as evidenced in all the cases studied.

If education takes place on an international and inter-cultural level, there are even more aspects to be considered with respect to communication issues, such as language choice cultural particularities, as we have discussed before when we dealt with cross-cultural issues.

Closely related to these issues of teaching and learning is the point of evaluation, which must take place in order to determine the success of the environment and online teaching. Economic factors (cost for staff and technology) have to be considered as well learning outcomes. Evaluation activities consist of the validation of the knowledge as well as the assessment of the students. According to a constructivist approach, it is essential to involve students in the evaluation process of the information produced in the course. This leads to more critical and reflective discussions about the course content. In some of the cases, special discussion forums for debates and criticism, as well as collective commenting on the writings, were effective tools for the assessment of students in the open learning environment.

It becomes clear, then, that teaching issues in VLE are multi-dimensional and directly inter-linked with other crucial aspects of activities within and outside of the learning environment. This explains, too, why there is such a variety of VLE and courses, as found in the project.

New teaching strategies

In a VLE, the learners themselves can largely direct learning. Therefore, the meaning of mentoring and tutoring for learning support and study guidance gets special emphasis. Tutoring can mean support related to the learning process, study contents, tasks, or technical problems. Effective mentoring is akin to guiding the student on a journey at the

end of which the student is a different and more accomplished person. In a formal learning situation, mentoring functions is roughly understood as providing support, challenge and vision. In VLE, tools and strategies for providing both tutoring and mentoring should therefore be adaptable for each purpose.

In VLEs, tutoring gets special emphasis in terms of "moderation". This is the case when communication concepts are implemented including support for interactive processes like group work to be done collaboratively by learners[5]. There are a lot of "open questions" for online teaching that are still being widely discussed as to how and to what extent moderation must take place in settings where learners work collaboratively on content assessment.

Although the 'transparency' of the technology is one of the most important goals in the learning environment, special technical tutoring becomes necessary in a VLE in order to avoid student frustrations. It helps learners to get to know the technical equipment and software used, thus being conscious of the tools in the learning environment. As a result of technical developments, it is possible to include a range of functions in the same user interface. The kind of learning environments built on Web-based technology, for instance, only require students to use a single application (a Web browser). Students only need to have minimal knowledge of information technology. Tutors can use an increased range of alternative channels to provide efficient tutoring (telephone, e-mail, tutorials, etc.) either at a distance or in a face-to-face context.

Which methods can be applied in virtual learning? Most of the teaching techniques for computer-mediated communication mentioned in other studies[6] were found in the cases discussed. With whatever kind of techniques being used, it becomes clear that pedagogues need special training for online-education. They must be especially qualified in knowing

- how to decrease anonymity and to establish the atmosphere of a learning community
- how to motivate and keep the motivation of learners high; how to avoid student frustrations
- how to establish and maintain interaction among students, between teacher and students and between the user and the system,
- how to moderate discussions.

However, we cannot ignore the increase in work for the teacher since new task areas have to be covered by the teacher as well. Implementing teaching in VLEs requires competence in technological and organisational aspects as well as new qualifications in applying relevant didactical methods within this context. Even if the technology and software tools implemented, such as user administration, cover several steps, a lot of other work remains for the design, implementation and evaluation process of Virtual Learning Environments.

Since virtual teaching cannot be left only to enthusiasts and third party funded projects, new qualifications for teachers are needed. It is important that teacher training is updated in these new forms of education, reflecting all crucial aspects already found and pointed out by the available literature. Future teachers must be introduced to technology and its

[5] Four types of tutor role were already described in one of the cases studied in IVETTE: tutor as a participator in conversation of the philosophic and challenging variety; tutor as modeller, which implies someone who stimulates the learner by creating materials and situations for active learning, being a collaborator in the learning process and exemplifying citizenship; tutor as coach, consultant, referee, assessor and 'helpline'; and tutor as scaffold, as a guide and monitor than co-learner, bringing parties together as manager, provider or broker and an implied notion of an agent of change.

[6] For instance, Paulsen (1998) mentions the following teaching techniques in order of importance: project groups, discussion groups, Case Studies, Online Journals, Nominal Group Techn.Internships Debates, Learning Contracts, Apprenticeships, Simulations or Games, Software Libraries, Online Applications, Forums, Role Plays, Brainstorming, Online Databases, Online Interest Groups, Online Interest Groups, Symposiums, Transcript Based Assignments, Delphi Techniques, Skits, Interviews, and Lectures.

application in the educational area in order to be able to measure the whole range of possibilities available for organising education and teaching in this virtual context.

3.7. How are VLE being implemented in terms of institutional issues

Universities worldwide have apparently not changed very much during the last two decades. It is widely assumed that the sources of institutional conservatism aren't found only in the administrative bureaucracies, but also in tenured faculty, and even on students. In this sense, to think that the structure of Universities and other educational institutions will dramatically change in the future because of the new possibilities of telematics networks is an optimistic prognosis.

Innovation polices do not seem to exist in an "overt sense". However, institutions clearly have some driving forces due to the activities they undertake, even if it is only an ad-hoc response to external pressures such as changes in the student population.

The development of VLEs in institutions, as with all social activity, has a human origin. In institutional activity, there is a danger of dichotomising the origin of innovation to either the work of individuals or groups of individuals working in the institution (bottom-up innovation), or for innovation to come from institutional management as a directive to staff (top down innovation approach).

The study of the transformation, such as the introduction of VLEs, or the transformation agents themselves is not enough to understand the nature of change in a system. In fact, institutions of higher education are social organisations characterised by traditions, cultures, norms, and institutional missions. Universities themselves carry out the so-called "learning patrimony" in a country. The learning patrimony refers in these cases to a set of values, dispositions and attitudes in regard to education and training. The pedagogic relation between students and trainers is an example of how the pre-established roles of knowledge transmitters and acquirers are mediated by the attitudes embedded in the learning patrimony.

It is usually assumed that the major obstacles to organisational change and technology adoption reside in the realm of technological feasibility and cost-benefit analysis. In reality, organisational change is contingent on a set of social and human factors and dynamics that are much more difficult to manage and manipulate. In academia, obstacles to change are closely associated with the established practices and cultural traditions of the teaching faculty.

Changes, then, do not exist in a vacuum. Some innovations will change ways organisations are put together. There will be a variety of cultural attributes at the site of the change. Goals, structures and roles do not emerge accidentally but arise from experiences of current contexts. It was our concern for viewing innovation in relation to contemporary society, and lead us to think that we need to look at broader systems of activity, which are placed in their social and cultural context.

The following sections examine the aspects taken into account in the implementation of VLE's from the institutional point of view. The opportunities, constraints, and consequences at all levels of introducing VLE in educational organisations are considered.

Institutional traits on implementation

There was little evidence of major initiatives to handle the problems of mainstreaming VLE activities or consider the ramifications of such expansion for the overall life of the institutions. On the contrary, many universities do not have enough support to use Virtual Learning Environments in their regular teaching structures. At the undergraduate level, there is a consistent tendency to introduce VLEs as part of new initiatives, such as new curriculum contents and course activities, new optional courses, etc. Generally speaking, these are innovations that are in process of validation, or are part of research and demonstration projects both at the national or international level.

In all of Europe, most Universities are autonomous public bodies, and all are subject to public statutes. They have obligations to their pre-existing operations. Any regulations established within the University itself are enforced by the University and can be changed by the University if required. The internal politics of each institution play a very big part in the way decisions are made. VLE activities are currently operating at either a level that does not demand new legislation or did not place any pressure for change on the institution as is sufficiently at the margins of the institution’s duties.

It is not usual for Universities to set up a number of different entities inside the organisation to regulate and promote the expansion of flexible learning systems based on an analysis of the current and future needs. The first decision was based on how the new VLE activities will be integrated into the university structure, taking into consideration the extent of the offer and the target population.

On the other hand, VLEs are seen as instruments that provide access to new students and new geographical areas, and co-operation among institutions. VLEs are taken into consideration to reach more students and other client population that otherwise would not reach educational institutions.

With respect to the local clientele, there is synergy between the development of VLEs for regular University activity and distance education. Methods developed for VLE are changing internal practice, and the materials developed for University-based use are a starting point for institutions to produce VLE materials. Even traditional methodologies (master class) are used for creating materials or educational experiences for virtual learning environments like satellite video conferences, etc.

In conclusion, most of the institutions initially looked for students outside of their regular clientele, either from their own country or elsewhere, independent of whether or not they provided VLE opportunities in the regular face-to-face classrooms. Strategies for co-operation among universities for course offers vary among European countries. They ranged from creating consortiums of universities inside one country to promoting international partnerships between universities running postgraduate course, as well as organising flexible co-operation networks with other institutions world-wide in order to provide international seminars of high quality adapted to the needs and existing competencies in the partner institutions.

Innovation actors

An interesting finding is that many innovation actors involved in VLE do not have tenure; they are research assistants, tutors, and other personnel working on a contract basis. The belief that most of senior staff will not participate in this type of innovation, as we mentioned here before, is also an implicit reason that points to why this occurs. The typical professor's profile is that of a lecturer working individually, unaccustomed to working in the teams necessary for VLE experiences.

In most European universities, initial professor appointments are based on their performance in scientific research. Undoubtedly, this is a major priority for many academics in universities. Maintaining research performance is critical to individual development for those who wish to stay in academic work in their discipline.

On the other hand, the university subjects taught by university teachers are generally based on what the lecturer knows, especially at higher levels. This is in marked contrast to the way education is practised in VLEs, where diverse skills come together to create a course. Historically, European universities have guarded the autonomy of the university faculty. Notions of academic freedom have been highly valued. Whereas this allows the adventurous to venture into VLE, it also means that reluctance is acceptable.

The factors that raise the status of a University teacher therefore seem to act against the adoption of VLE activity. In most cases there is a group of promoters whose career path is specific to research and development of VLEs. This mitigated against mainstreaming VLEs in institutions unless there is a change in the reward structure for university teaching.

There a more credible discourse about ICT that only very recently emerged from the very same University experiences. Teaching innovation can now be considered research in teaching, a phenomenon that it is new for University knowledge areas other than pedagogy. Unfortunately, this type of research still does not have the same status and academic recognition as that of traditional research.

Professional development

Because of the nature of university teaching, knowledge needed for the development and operation of VLEs is concentrated in a relatively small number of staff. Also, because VLE activity requires a large number of different skills, teams generally conduct its design and implementation.

In most cases there are areas within a University where these skills have been developed. These skills are typically found in service units (the unit that supports all computer activity in the University or units specifically established to develop audio-visual material and publications). The other sources of VLE-related knowledge in Universities are found in education, art and design, or information technology (and occasionally psychology) departments that have experience in pedagogy or the development of significant technologies like computer-supported co-operative work. These patterns are true of the institutions in the case studies.

These groups tend to work in collaboration with academic departments and involve a team of teachers. In this way they work towards bringing about a change in teaching practice. In some cases groups drawn from these environments have evolved to become “units” within Universities on their own accord.

There is a clear dilemma for universities. The development of new pedagogic skills in the teaching force and the incorporation of technical and pedagogic skilled personnel into teams require a major reconfiguration of the division of labour in universities. While the development of such teams to undertake additional and/or pilot activity does not pose any particular difficulty, the knowledge gained by the teams working on pilot projects tends to remain within the teams and is barely diffused in the rest of the Institution.

Financial matters

Many of the projects receive funding from a number of sources: government bodies, the University itself, the participants' course fees (often paid by the organisations employing these learners in the case of professional training). Different forms of subsidies are also available from the European Commission. The trend is that most of the initiatives under way now depended on funding that was secured through competitive bidding (either national or European) minus the course fees.

There is a long term feeling that VLEs may either provide new sources of income or reduce current costs, but the overwhelming picture on financing is that there are "special funds" for experimentation. Very few of the institutions seem to have sufficiently developed the capacities and methods that will manage the replacement of existing work with lower cost or marketing based VLE activity to make VLE activity economically self sustaining just now. A source of concern, then, is to secure the long-term financing of VLEs experiences.

Links with External Organisations / Partnerships

Because VLE activity is, generally speaking, supplementary to normal university activity, it is often sustained by special initiatives or in expectation of extending the reach of a university beyond the university campus. This encourages collaboration with external partners as either funding organisations, clients, or suppliers. This adds extra dimensions to the activity system to incorporate the community values and needs of the partner organisations. This is not unusual for modern universities, as research work increasingly depends on such collaborations. However, the effects of collaborative effort may have long-term effects on universities.

Some of the innovations studied used external reviewers to evaluate their content and presentation. The situation suggested that in some institutions VLE development/ implementation will be addressed through a collaborative model approach, where one institution will be responsible for providing the subject matter content and the other partners will address issues of technical specifications and exploitation.

Validation

All award bearing University courses need validation. This is the case of the pilot courses that took place within existing validation structures, and is also an issue in VLE's. Who will be the accreditation bodies in international courses, and how these will be embedded in the organisational regulations of the participant institutions? Who will assure that the content made available by the other providers meets their own quality standards?

At this time, none of the institutions had specific regulations for validating VLE-based learning. This may be an issue in the future, as there are new requirements in assuring the quality of service delivered. These are issues addressed by the new guidelines in some European countries.

Section 4 Conclusions and Policy Implications

This section is a summary of the major findings on the implementation of VLEs in traditional educational institutions. The research concerns and the issues raised have emerged from the case study analyses conducted and the continuous discussions between the project partners.

4.1 Conclusions and implications for change on institutional issues

The project has identified similarities and differences in the VLEs reviewed. Some of them are small-scale interventions of a pilot project nature emerging from the desire of individuals to introduce innovative practices in their teaching; others are experiences of a larger scope. The areas of specialisation or content addressed in VLEs, either at the level of continuous education or undergraduate studies, reside in the sphere of professional education.

Institutional evolutionary process. The Network strongly considered the adoption of VLEs in the context of the traditional face-to-face paradigms of learning as a very important phenomenon. Such a consideration by the institutions implies a step forward in the transition from traditional teaching environments towards newer models of education. There seems to be an evolutionary path that starts from individual experiences promoted by individual teachers at the pilot level, and evolve towards more complex innovations supported by the managerial authorities through specific plans for supporting this type of innovation or through strategic planning. Three levels of evolution were distinguished: initiation, implementation and institutionalisation[7]. Both top-down and bottom-up approaches are present, although it seems unusual that top-down initiatives could work by themselves.

Initiation ⇨	**Implementation** ⇨		**Institutionalisation**
⇨ pilot projects ⇨	- Virtual learning components in face-to-face learning	- Offer of integrated face-to-face and virtual learning	- offer of completely virtual learning
-individual ⇨ initiatives	- Individual and institutional support	-institutional initiative	-independent institutions
- non estructural experiences	- Semi-structural experiences	- structural experiences	- fully structural

Table 3.6 - Evolutionary phases of VLE in institutions

[7] As suggested by Fullan (1991)

In general, undertaking VLE development within institutions of higher learning requires:

- the attention of a variety of institutional actors. These range from developers to administrators and institutional factors. Designing and using VLEs require fundamental changes in the role of academic and technical staff. Academics have to acquire or develop new knowledge and skills to become designers of teaching materials, tutors, facilitators, etc. Additionally, and more importantly, they have to cope with essential changes in the conception of time and space introduced by these technologies. On-going experiences on VLEs provide evidence of substantial transformations in the work carried out by teachers.

- a transdisciplinary approach engaging a multiplicity of disciplines ranging from subject matter specialists, to instructional designers, to system administrators.

- a careful consideration for the integration of socio-cultural elements. The apparent accessibility and time and space flexibility of most VLEs are used by market-oriented agents to sell this "educational technology" as "the panacea" for educational problems and equity issues.

From the above discussion, we summarise the major implications for change consequent to the adoption and implementation of VLEs.

Implications on Staff. Resistance to change when introducing technology in the classroom is a universal problem in organisations. But, when we talk about VLE, resistance become a chief issue, since VLE is a new radical application of instructional technology. Not only do the majority of staff have no intention of utilising this technology, they may also view it as an illegitimate learning mode. For many faculty, it represents a radical departure from prevailing practice that is incongruous with their understanding of the essential nature of teaching and learning. The regular classroom and its teaching arrangements are deeply embedded into the organisational university culture. The classroom, combining both material and symbolic features, is a sacred institution severely institutionalised and especially immune to transformation. VLEs go against that culture. And beyond that, the traditional classroom and traditional tutoring arrangement are part of the professional identity of University lecturers. This would explain, and also prevent, current and future resistance to VLEs.

Assuming that many of the lecturers are not happy with the traditional classroom, the virtual learning arrangements (as found in IVETTE) might be an opportunity to improve their practice. In this respect, examples of good practice and programmes for staff training, as demonstrated in the examples studied, are necessary.

Implications on Division of Labour. Will the introduction of VLEs change the division of labour in Universities? Will it benefit those staff members who have worked hard to become familiar with ICT, or those who have come into the University life offering technical expertise but aren't engaged in teaching? Surprisingly, these studies did not show any one group as having a particular advantage. There is almost a feeling that those who err on the side of inaction and maintaining the status quo were in a stronger position.

It is the nature of pilot projects to minimise changes in an institution. However, it is also clear that there will be a substantial change in the role of teachers if VLEs are to develop. There is a need for teachers to collaborate with fellow teachers and other educational professionals who, when and if they exist, are often in service departments in universities. Current methods of recruitment and rewards for university teachers in all the institutions are in favour of conservatism.

The implications of VLE on other university staff - from the administration (accountancy, marketing, and accommodation) to the ancillary staff (grounds and estate maintenance, catering etc) and those whose employment depends on the physical location of universities - were not tested at all by pilot activity. Although it is not an issue that is on the agenda of the Universities in the survey, it needs to be addressed.

Implications on Students. The benefits that could arise from a large student group engaging in online, collaborative learning have yet to be established.

There are clearly questions for students to ask about the nature of VLEs and the quality of service they can expect. There will be greater demands on the skills of students such as time management and ICT knowledge.

Some cases dealt with students engaged in International collaboration projects. Now they notice that students were not only keener on improving their ICT skills than before, but were also interested in engaging in VLE courses as long as the following two conditions were met: a) initial training in the VLE tools and methodologies, and b) assessment of VLE courses.

Implications on Technical Infrastructure. There were no major technological barriers to the introduction of VLEs. There is a strong commercial impetus to improve Europe's telecommunications infrastructure. The bandwidth available to all the universities is predictably improving. The ability of low cost computers to provide sophisticated multimedia services provides the clients' machines. There is a plethora of software suites providing teaching in a range of pedagogic models.

Universities recognised the need to spend money to improve the hardware available to students. If this is to be a university responsibility in addition to their current responsibilities, it does not see that there will ever be a sufficiency from the point of view of the administrations. Is this because the University is not making the best use of available hardware?

Issues arising from access to other resources for students at a distance (and the non-use of existing resources in the University) were also long term problems that still need to be confronted by the institutions. Will the students need to have their own computer or use a designated laboratory? What problems arise from that?

The pilot actions do not specifically address issues about the community of higher education practitioners and the division of labour we posed at the beginning. One of the reasons is that given the phase of development of VLE in institutions, the answers are still far from being consistent.

Focusing on the small scale implementation of VLE does reveal important factors, however, unless the wider issues are addressed, the ability of traditional HE institutions to respond to any opportunities or threats that VLEs pose for these institutions will be inhibited.

4.2 Conclusions and implications on teaching and learning in VLE

In the discourse on teaching and learning issues, the cases were faced with issues such as:

The context of teaching and learning in VLEs: The central players in a learning environment are the learners and the teachers. Classrooms, which are isolated from real

life, can only simulate reality to a certain extent. This is also true of virtual classrooms constructed by technological means. Based on the evidence, it seems essential that open learning environments be closely connected with learners' real-world activities, situations and social relations.

The changing nature of teaching and students roles: It is evident that the roles of teachers and students vary significantly. Teachers and students roles are interdependent. That is, if the role of the teacher is that of moderator, learners need to be self-reliant. A self-reliant student is connected to a less directed role of the teacher. This raised the level of students' responsibility in learning.

In the traditional face-to-face courses, the teacher plays the central role, dominating the classroom interactions. In the virtual learning model (in which the learners do not necessarily share the same classroom), the teacher is removed from the centre by following up the individual learning processes. The teacher's role in the virtual model moves towards that of a tutor that support the learning process.

In virtual learning the teacher is more of a **"**team of teachers" or a "virtual teacher" than an individual. This is due to the complexity of collaborative courses, as the international or other types of distributed learning arrangements.

The pedagogical design and teaching in VLEs: To analyse key issues in the implementation of teaching and learning in VLEs, we referred to pedagogical functions as being the practical activities and methods in the learning environment that make learning possible.

When teaching and learning take place in VLEs, the fact that there is already a didactical concept incorporated within the environment that determines the scale of pedagogical functions should be kept in mind.

There are pedagogical barriers to overcome and compromises to be made when standardised products that are increasingly available on the commercial sector are chosen. There are a large number of commercial environments available on the market, each with a different pedagogical approach. Some emphasise the abilities of team work, other are strong on promoting the exchange among students and with the tutors, other are concerned with the emulation of all organisational and social features of the classroom, etc. A trade-off has to be made in order to select a particular learning environment, unless a university-made learning environment is chosen. This choice can facilitate adapting the innovation's pedagogical model to the technical possibilities and features of the environment, but can also bring about instability from the technical point of view.

The planning and development of the learning experiences: Teaching in VLEs means that there are a number of organisational aspects to consider. We can infer then, that being a good teacher means that in addition to being a good educator you have to be a good organiser and designer of information, communication, didactical implementation, and media integration. Teaching becomes a much more complex process during several stages than in traditional educational situations. If education takes place on an international and inter-cultural level there are even more aspects to be considered related to the organisation of communication, the basic language to be used, and the cultural particularities one might encounter.

New strategies for teaching*:* Within the context of new educational paradigms the new teaching functions can be characterised by the shift from traditional teaching as a content provider and "transmitter" towards a mentor guiding and supporting learners through the

process of knowledge acquisition. As previously discussed, in an open learning environment, learning is largely self-directed.

Nevertheless, we saw examples of virtual teaching following the paradigm of pure transmission. Since there is no "given" pedagogy in VLEs, due to their variety of potential pedagogic strategies, specific technologies do not necessarily support particular models of teaching and learning.

Special technical tutoring become necessary in open learning environments in order to avoid student frustrations. Tutors can use an increased range of alternative channels to provide efficient tutoring (e-mail, tutorials, etc.) either at a distance or in a face-to-face context.

Whatever kind of technique is being used, it becomes clear that teachers need special training for online-education. Implementing teaching in Virtual Learning Environments requires competence in technological and organisational aspects as well as new skills in applying relevant didactic methods.

Future teachers must be introduced to technology and its application in the educational area in order to be able to measure the whole range of possibilities available for organising education and teaching in this virtual context. Even when work is shared within a team of specialists, a minimum competence of knowing what the others do is required. Some basic skills like working in inter-disciplinary teams become more important in this context and are to be considered in teacher training as well.

4.3 Conclusions and implications of change on cross-cultural and linguistic issues

VLEs often involve co-operation between institutions, teachers and learners belonging to different cultural and/or linguistic environments.

Indeed, a strong feature of VLEs is their potential (technology wise) to operate at an international and even at a global level. VLEs allow institutions to extend their reach beyond local and national geographical borders. However, the fact that most of the cases studied did not optimise on the advantage of this challenging possibility deserves mentioning here. The element of collaboration turned out to be stronger at the intra and inter university (national) level than it is at the European level (independent of whether it is a university/university or university/industry collaboration). It seems that it is only upon a level of maturation that some of these initiatives foresee the establishment of collaboration with other European and international institutions and markets.

The issues of language and cultural differences constitute perhaps the two most important elements for consideration. This diversity should be taken into account in any educational and training programme that is organised either in a single European country or Europe-wide.

Although there have been legislative resolutions referring to cultural diversity at the level of the member-states and Europe, we observe that these have not been embraced by the educational policies of national educational authorities.

This fact gives rise to a number of issues and implications of change, such as:

i) It is necessary for the relevant European bodies to formulate more strongly worded supplementary resolutions and recommendations to national governments referring to the necessity of implementing concrete measures in the field of intercultural approaches in their educational and training system. Should these resolutions and recommendations contain some concrete measures that will facilitate their implementation in the various member-states of the European Union?

ii) It is of crucial importance for the various member-states of the European Union to take the necessary measures which will allow them to immediately implement already existing and forthcoming recommendations made by the relevant European bodies (such as the European Commission, the European Parliament, the Council of Europe etc.) referring to the intercultural approach in education and training. If this is the case, why have they not been implemented so far? In this respect, is it not the responsibility of the national Ministries of Education, the national educational institutions or public opinion? Furthermore, will the implementation of the intercultural approach in education and training have any negative consequences for the education of the majority of the learners in the national educational systems, i.e. the learners who do not belong to the linguistic and/or cultural minorities?

At the practical level we should value language and intercultural differences as an integral and dynamic part of the whole learning process and not as something separate or add-on representing different methodologies and approaches. Language and intercultural issues are identity factors representing the socio-educational contexts of the learners which will be interacting and changing throughout a course as part of ongoing processes of negotiating meaning throughout the learning experience.

4.4 Policy Recommendations

This section introduces a series of policy recommendations identified in the different case studies of innovation initiatives in the higher education institutions. The analysis of the complex characteristics of VLEs necessitates consideration of many different dimensions, which influence how we learn and how we organise learning. Consistent with the design of the IVETTE project, the Network dealt with these dimensions from a holistic perspective Recommendations for policies in this area need to take the dimensions investigated into consideration, and how they are intertwined in situations where learning takes place in VLEs.

The target audience of the policy recommendations are policy makers at the level of university senior management (national higher education authorities, researchers and practitioners, among other parties) able to influence and make decisions in higher education institutions, including training establishments, especially those linked to Universities' further education programmes.

The recommendations below intend to provide guidelines for those stakeholders who are in the process of implementing new virtual learning environments. The approach for policy recommendations adopted by the Network was to take all of the actors involved in VLE into account, not only the traditional so-called policy makers usually linked to managerial instances. In the initiation and implementation phase, educational/training institutions are currently confronting, we need a dialog among all stakeholders. It is hoped this section will contribute to the necessary exchange of opinions and experiences.

4.4.1 Policy recommendations at institutional level

The analysis of case situations identified different institutional factors that need to be taken into account. Since institutions are currently in different phases of utilisation of VLEs, the interpretation of the factors involved in this process needs to be situated in the specific context of each institution, rather than attempting to make blanket recommendations.

In addressing policy recommendations concerning VLE adoption and implementation, a University might adopt one of the following strategic activities depending on the level of experience in the field:

Initiation phase strategy: Production of a Green Paper as the basis for decision-making on the implementation of VLE. Many Universities have an inter-related set of committees that examine particular issues in a pre-arranged order. Thus, it may be that a particular issue must be discussed and approved by different committees before it can be considered for full University approval for implementation.

Implementation phase. Establishing an organisational E-Learning policy: Taking into consideration these conditions, successful planning and implementation of any innovation necessitate swift implementation by a single person or groups who are willing to act as 'champions' of projects. The champions should take the necessary steps to ensure that the project is planned, prepared, approved and implemented in a useful time frame. Universities might have internal bodies set up charged with encouraging innovation by examining proposals and providing a funding and monitoring service for suitable projects.

Implementation is not necessarily easy. Decisions can be greatly facilitated if there has been discussion and planning at a high level in the issues of development and provision. There are three key factors in any policy for implementing VLEs:

- *Infrastructure*: The necessary infrastructure at the locations convenient for staff and students must be established. It includes (if necessary) the provisions of access to learning resources, which need to be created specifically for VLE. Infrastructure beyond the institution needs consideration as well. In order to be effective, VLEs should implement technology that can be reasonably available to the learner without relying too heavily on specific resources.
- *Training and development:* Training of actors in the mechanics of VLE use and how to implement any particular pedagogies chosen is essential. This step includes staff and students in order to ensure they have the appropriate levels of information literacy, as well as the use of techniques that are associated with the pedagogical model chosen.
- *Transforming the organisational culture:* This is the most important, and the most commonly ignored factor of the three presented here. Organisational culture includes the policies, attitudes and personal models of learning, organisational climate, staff rewards, assessment and grading systems, etc.; in other words, those elements which either reward and encourage staff and students for implementing/using VLEs or create barriers and punish them for participating.

The implementation of VLEs will not succeed without an equal, integrated and coordinated investment in all three of the elements of the model proposed. To manage the complexity of this change, Universities need an Organisational Development approach in which resource management, professional development, and shared objectives are key components of change.

Diffusion phase of virtual learning*:* Diffusion of new e-learning strategies/technologies in traditional research institutions that also have extensive teaching programs is already severely constrained by the current culture/mindset of the individuals and the institution, despite the fact that they may produce better learning outcomes for the students. To

encourage staff in taking up these new initiatives, Universities should look for strategies to enhance the teaching/research/consulting triad in a scalable manner. Again, the solution is to develop professional development programs and overt institutional support structures.

The promotion of "research in teaching" to a higher status can help the diffusion of VLE innovations. It is necessary to break the typical professor's profile of being a very good lecturer, working alone in the lecture theatre or seminar room. The development of teamwork is an effective institutional approach to avoid "academic exclusion" associated with VLEs. Experienced and distinguished Professors in their area of expertise should be encouraged to be a part of VLE development groups.

The institutionalisation phase*:* The building of VLEs, as alluded to above, requires the inclusion of expertise from several different areas: pedagogy, instructional design, software authorship, hardware configuration, networking capabilities, and administration tasks related to enrolment, billing, and crediting. A complete infrastructure must evolve in order for this apparent paradigm shift to succeed. In a few words, we suggest that if a University wants to adopt VLEs, they need a ***strategic plan***.

Some of the elements that might contribute to a strategic plan are: a) business plan; b) survey of most used pedagogical model(s)and description of case studies concerning the implementation of VLEs; c) academic research papers, conference reports related to VLEs, to University development, learning and a wide range of related topics; d) surveys of existing hardware, software and communication networks of the kind that are currently used for the implementation of VLEs; e) reports discussing the likely future development of hardware, software and communication networks of the kind that are likely to be used in the future for the implementation of VLEs; and f) market research reports describing the current and possible future markets for knowledge and skills in certain disciplines.

This process might result in establishing of an "institutional policy", by publishing a ***White Book*** for the promotion of VLEs innovations in each institution.

4.4.2 Policy recommendations on teaching and learning

It became clear that teaching/learning issues are multi-dimensional and directly inter-linked with other crucial aspects of activities within and outside of the environment. To formulate policy recommendations in this area, we need to set the teacher and the learner in the academic, social and cultural context in which actors are operating, as we have considered along the project.

On the other hand, VLEs, or any other of the emerging educational technologies we can explore from the teaching /learning point of view, need to be seen primarily as a medium with which we can make our educational wisdom and skills visible and, at the same time, tap into and self-reflect via each others' easily accessible practice. Policy recommendations need to take this broad context into account. We then suggest the consideration of the following aspects:

Developing new strategies for teaching/tutoring. Whatever kind of learning methodology is being used, it becomes patent that pedagogues need special training for online-education. Implementing teaching in Virtual Learning Environments needs competence in technological (called *hard skills*) and organisational aspects as well and new skills in applying relevant didactical methods, moderating/facilitating, etc. (called *soft skills*). Any new professional development program for the trainers needs to deal with new skills.

Supporting innovation units. To support the development of "innovation units", integrating interdisciplinary teams made up of academic staff (subject-matter experts), pedagogical advisors, and technical support, working cooperatively in promoting and implementing VLE experiences are essential.

Pedagogy-technology balance. Decisions on technology purchase should not be based only on economic matters. Looking for a balance between the pedagogical model and the potential of technological tools to be used is part of the institutional policy. A decision to adopt a particular VLE has major implications for the pedagogic model to be adopted by an institution.

Professional development. Teaching using VLEs requires technological and organisational capabilities as well as new skills in applying relevant didactical methods and new strategies for teaching/tutoring and moderating/facilitating. It is necessary to recognise new educational roles for those involved in the development of VLEs at different levels.

Specific VLE resource design. The efficacy of learning materials designed specifically for teaching in VLEs has been proved. However, the cost of developing high quality teaching materials from scratch remains a problem. Institutional innovation units can ease this process.

4.4.3 Cross-cultural policy recommendations

Among the recommendations identified in the project we point out the following:

Careful management of international cooperation. Universities do not always optimise their potential to operate at a trans-European level. The institutionalisation of a virtual learning in institutions would promote this potential, as demonstrated by the examples of institutions collaborating in European virtual learning networks.

VLE used with cross-cultural audiences demonstrate problems of a legal and economic nature as well as problems that emerge from the differences in the national learning patrimonies of the audiences. A clear institutional policy on these factors would promote the spread of VLE across Europe.

Financial considerations are obviously important. VLEs can be expensive to develop. Since the course offer is not limited to students of one particular university, sharing costs has to be discussed. International participation lifts the quantity of students, however, an increase in participation should not allow the quality of the course to be diminished.

Writing guidelines for cross-cultural learning environments. The elaboration of guidelines for the development of cross-cultural strategies in teacher training programs is a necessary step towards good learning practice in VLEs. This is a need that goes beyond particular institutions and should be approached in collaboration within the EU.

Promoting language support. In catering to cultural diversity in a VLE, we need to be mindful of linguistic and cultural diversity rather than viewing it as a problem. Different academic traditions can create disjuncture in a learning group at first, but can later deepen understanding. Different languages facilitate different thinking. VLEs need to build on such language support. In fact, we consider adopting VLE technology only when language support can be integrated into the experiences. Machine translation is not a solution to such complex creation of meaning and identity.

Including cultural differences in the course design and in the course delivery. Developing an approach to course design and in the course delivery means valuing and including participants' socio-cultural and educational identities in the course trajectory and in the course materials. When possible, and depending of the knowledge area, the different discourses (and from different cultures) of a wide range of communities of practice should be accounted for and made explicit.

Section 5 Dissemination and/or Exploitation of results

The IVETTE project has provided empirically founded knowledge on the role of organisations in supporting virtual learning campuses. This enabled the partner institutions across Europe, especially leading staff and policy makers, to foresee and take the challenges that new ways of open and distance learning are bringing to public educational institutions into account. Dissemination, then, has been part of the project outcomes, responding to the needs of the participating institutions by achieving the above mentioned goals.
However, beyond the limits of the partnership, the consortium agreed to take advantage of the reports produced in order to reach larger audiences that included policy makers, practitioners and researchers. Project partners also agreed on promoting the visibility of results by participating in international events, as well as organising meetings and discussions with interested parties at local and regional levels.

At least two deliverables have been devoted directly to diseminating and validating the results produced by the project during the different phases of its development.

5.1. Dissemination strategy

The dissemination strategy of IVETTE intended to take advantage of the possibilities of the Internet in order to facilitate the availability and visibility of the project deliverables and results, as well as to promote worldwide discussions among experts. The dissemination of the results via an international Web discussion forum was also crucial in this project.

The dissemination and exploitation plans contemplated different actions:

a) Setting up a project Web site. This site is available at http://xiram.doe.d5.ub.es/IVETTE/.

b) Dissemination of the results through action by presenting the consortium's points of view in an international virtual Forum.

c) Participation in international conferences and publication of articles. In the near future, a book that will include not only the main results of the project, but also those of an international workshop organised after IVETTE officially ended will be published.

d) Organisation of Workshops with international experts in order to validate the results and promote a European discussion on policy decisions.

The target audiences identified in IVETTE have been taken into account to receive the information produced by the project, both locally and internationally. They include:

- policy makers at local, national and international levels
- researchers and practitioners in the area of virtual learning environments
- users, such as teachers, students, and participants in learning innovations.

5.2. Dissemination activities

- *Web site of the project*

This site can be found at http://xiram.doe.d5.ub.es/IVETTE/. The Web site has been updated regularly and became both a resource place for the project, and the principal way of disseminating the main project deliverables. The site is located at the University of Barcelona and will be maintained for at least two years after the conclusion of the project.

The site describes IVETTE'S main goals. It contains a list of the main deliverables available worldwide. It is also the site for contacting the coordinator and project participants for feedback or requesting further information. The site will be updated with a list of publications produced by this project.

Within the site, there is also an area devoted to an international workshop (IVETTE-WORKSHOP) that took place after IVETTE's conclusion. The combination of both makes the site a place of reference for studying and receiving information on all aspects of VLEs in Europe. Addtionally, the site has been admitted in the main search engines.

- *Virtual Workshop*

In order to disseminate and validate the main outcomes of IVETTE, the group proposed hosting and international virtual workshop to the "International Forum of Educational Technology & Society" (IFETS, see http://ifets.ieee.org/). This Forum is a subgroup of IEEE Learning Technology Task Force (see http://www.ieee.org).

a) The characteristics of IFETS Forum were appropriate for the discussion:Quality of the discussions proposed. Participants of the Forum discussions are academics of recognised international prestige, as demonstrated by the summaries of the discussions. These summaries are published in the Educational Technology & Society Journal. The "Educational Technology & Society" (ISSN 1436-4522) is a quarterly, peer-reviewed online journal of the International Forum of Educational Technology &Society (see http://ifets.ieee.org/periodical/);

b) b) Geographical spread of Forum participants. The number of members of this list is around 3.200 from all over the world;

c) c) Good discussion organisation. The discussions are structured in the form of problem definition and fixed term discussions focusing on some conclusive end. The conclusions are then put into concrete form for public dissemination. The discussion on "Implementing Virtual Learning Environments: Looking for Holistic Approach" took place on May 29th till June 14th, 2000.

- *Participation in national and international networks and events, and in local dissemination activities*

IVETTE has been present in different international events related to the transformation of traditional institutions by the use of ICT in learning. In this respect, it is worth pointing out the participation of several IVETTE partners in the Lisbon 2000 European Conference, "ODL Networking for Quality Learning", an event organised by the European Liaison Committee and sponsored by the European Commission (DG Education and Culture). There were eleven European ODL networks represented at this event, which provided an opportunity to discuss the main issues European learning institutions face related to using telecommunications in learning, reinforcing European inter-institutional cooperation, and raising awareness of key stakeholders on the potential of ODL in education and training. Three papers from IVETTE partners were discussed during the sessions.

IVETTE partners have participated in five international events, presenting different papers and posters. IVETTE contributed at the national level with several papers. And at the local level, all participants have disseminated the research results in their own institutions through a variety of events, such as workshops, participation in discussions at the management level, and sharing information with other specialists. This has promoted a community of learning within the institutions as experts, researchers and practitioners participate in exchanging information.

5.3. Exploitation of results and exploitation plans

- *University of Barcelona, University of Bangor, UNED, EuroPACE2000, University of Tartu*

Organisation of the IVETTE-W Workshop. The goal of the Workshop is:

- To build a European conceptualisation and understanding of Virtual Learning Environments based on how are they implemented in different contexts.
- To draw on top class and cutting-edge European expertise in order to examine the relationships between institutional, teaching and learning, and multi-cultural and multi-lingual issues in VLEs.
- To disseminate and validate the results of the studies undertaken in the Thematic Network IVETTE.

The Workshop will take place on November 19-21 at the University of Barcelona. It shares the same Web site as the IVETTE project, and is supported by the Programme Improving the Socio-Economic Knowledge Base as an Accompanying Measure Action.

One of the outcomes of the Workshop will be the publishing of a book including the IVETTE results.

- *University of Barcelona and FORTH*

Participation and organisation of the “Synergy between Practitioner’s Needs, Research Orientations, and Decision Making on the Usage of ICT in Primary and Secondary Education” (SYPREDEM) project under the “Accompanying Measures” (Measure 2) action.

- *Nottingham Trent University*

Presentation about IVETTE at a conference in Stams, Austria on July 1st. Conference on Regional Identity and Active Citizenship (RIAC). EU-Netzwerkes "Regionale Identität und Schule" 23. Oktober 2000, 14 Uhr, Landesschulrat für Tirol.

The purpose of this conference was to examine just what constitutes regional identity in a global situation, and how virtual environments can help to promote and support understanding of regions and cultures and the etiquette of good citizenship.

- *University of Oulu*

IVETTE has been in discussion with other projects and partners, e.g. "Tempus Phare Joint European Project entitled: "DETECH - Development of the Department for Technology Supported Distance Education".

University of Saarlandes/Institute for Organisation and Learning

IVETTE was presented in the conference "GMW-Fachtagung: Campus 2000: Lehren in neuen Organisationsformen" (Annual conference: Campus 2000: Education in new organisational environments) at: http://gmw2000.uibk.ac.at

- *University of Wales Bangor*

- Three meetings of the UK Socio-Cultural Issues in Education Group, 1999-2000
- Presentation to FLISH Conference. Sheffield 1999
- M. Presentation to ALT-C 2000. Manchester September 2000

Section 6 Acknowledgements

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Annexes

Annex A. Scientific publications

Here we present a list of publications coming out from the different phases of development of the project. Some of them are in press; others are planned to be published in the near future and are not mentioned in this report.

Books

- Barajas M.(coord.) *Virtual Learning Environments in Training and Education: an European View*. UB Press (in press)

This book compiles all the information produced by the project. It does have the following structure:

1. Virtual Learning Environments: an European context
2. What are Virtual Learning Environments?
3. Cross-cultural issues in international settings
4. Teaching and Learning approaches
5. Management and organisational problems in institutions
6. Policy recommendations
7. Conclusions

Articles and Book Chapters

- Barajas M. (2000) *La educación mediada por las TIC a principios del siglo XXI*. In Medina M. and Kwiatkowska (coord.) Ciencia, Tecnología/Naturaleza, cultura en el siglo XXI. Barcelona: Anthropos.

- Barajas M.and Owen M (2000) *Implementing Virtual Learning Environments: Looking for Holistic Approach* . Journal of International Forum of Educational Technology and Society, 3-3. Available at
http://ifets.gmd.de/periodical/vol_3_2000/v_3_2000.html

- Scheuermann F. CSCL in Higher Education: Requirements for teaching and learning in International Environments" (Scheuermann, Larsson & Toto); in: Proceedings
of the ICDE 19th Conference on Open Learning and Distance Education (20-24 June), Vienna, June 1999.

- Scheuermann F. "Lehren und Lernen in Virtuellen Lernumgebungen" [Teaching and Learning in Virtual Learning Environments]; In: Proceedings of Learntec'2000 conference, Karlsruhe).

- Scheuermann F., "*Campus 2000: Lernen in neuen Organisationsformen" [Campus 2000: Learning within new Organisational Structures] (Ed).* Proceedings of the annual conference of the Society of Media in Sciences (GMW), Innsbruck, 19.-21. September 2000, http://gmw2000.uibk.ac.at/, September 2000.

International Conferences

- Kathy Kikis-Papadakis, Juana M. Sancho. *Global Characteristics of Virtual Learning Environments*. The Lisbon 2000 European Conference: ODL Networking for Quality Learning", 19.-21. June 2000, Proceedings, Lisbon, June 2000.

- Barajas M. Owen M. Virtual Learning Environments in Action: Institutional issues in Traditional Higher Education Institutions. The Lisbon 2000 European Conference: ODL Networking for Quality Learning", 19.-21. June 2000, Proceedings, Lisbon, June 2000.

- Scheuermann F. *„Moderating the Future: The Challenge of On-Line Education"* (Scheuermann, Larsson & Toto); in: WebNet'99, World conference on the WWW and the
Internet, (25-28 October), Honolulu, Hawaii, USA, October 1999.

- Aguado Odina, Mª T., Álvarez González, Beatriz, Mavridis, Lissimachos, Browne, Alan. *VirtualLearning Environments in Action: Cross-cultural issues in an European Context.* The Lisbon 2000 European Conference: ODL Networking for Quality Learning", 19.-21. June 2000, Proceedings, Lisbon, June 2000.

- Aguado Odina, Mª T., Álvarez González, Beatriz, Mavridis, Lissimachos, Browne, Alan. *Virtual Learning Environments in Intercultural Contexts*. EADTU (The European Association of Distance Teaching Universities). Paris Millennium Conference, 20-30 September, 2000

Scheuermann F. *"Networking International Higher Education with Aplications for Inter-cultural Computer-supported Collaborative Learning* (CSCL)", in: The Lisbon 2000 European Conference: ODL Networking for Quality Learning", 19.-21. June 2000, Proceedings, Lissabon, June 2000.

- Scheuermann F. *„Nuevas fórmulas para la formación continua / Planteamientos y experiencias en enseñanza y aprendizaje en ambientes virtuales*"; In: Foro Internacional de intercambio de experiencias en formación continua (4-5 March), Madrid, May 1999.

- Scheuermann F. *"New formulas for continuing training. Approaches and experiences with teaching and learning in virtual learning environments";* in: Telematics-Caucassus'99 (18/19 May), Tblissy, Georgia, at:http://www.tech.org.ge/telematicscaucasus99/scheuermann.html; May 1999.

- Pulkinen J., Penttonen A. *"ITK2000"* (Interactive Technology in Education), 6.-8. Apr.2000 Hämeenlinna, Finland

Workshop + poster about IVETTE activities of Research Unit For Educational Technology, University of Oulu

- Pulkinen J., Penttonen A. Netties2000 -Konference 23.-25.Mar., Oulu, Finland Poster + stand about IVETTE

Annex B. List of project Deliverables

Nº	DELIVERABLE TITLE	*WP*	*Type*	**Status**
1	Report on Overview of Innovative Teaching/Learni Experiences	01	**P**	Completed
2	Report on Teaching and Learning Approaches in Virt Environments (one per participant)	02	I	Completed
3	Report on Cross-cultural and Academic dimensions in Europe diversity (one per participant)	03	I	Completed
4	Report on Institutional /organisational factors in fostering VI in public institutions (one per participant)	04	I	Completed
5	Common report on Teaching and Learning Approaches in Virtual Environments	05	**P**	Completed
6	Common report on Cross-cultural and Academic dimensions European diversity	06	**P**	Completed
7	Common report on Institutional /organisational factors fostering VLD in public institutions	07	**P**	Completed
8	Global Report on a framework to integrate VLE in institutic	08	**P**	Completed
9	Sets of Reports based on the areas of the Virtual Conferer and web site containing all documents of the Conference	09	**P**	Completed
10	Policy Implications Report	10	**P**	Completed
11	Two annual Management Control Reports	11	I	Completed
12	Listserver facility / WWW server project	12	**P/I**	Completed

Key to status: P= Public deliverable I= Internal (Partners and Commission)

Annex C. Bibliographic Section

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