# Studies in the Context of the E-learning Initiative: Virtual Models of European Universities (Lot 1)

*Draft Final Report to the EU Commission, DG Education & Culture*

February 2004

*Knowledge creating results*

# *Studies in the Context of the E-learning Initiative: Virtual Models of European Universities (Lot 1)*

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# *Key findings in English*

The Danish consultancy PLS RAMBOLL Management has carried out a strategic study of virtual models of universities for the European Commission, DG Education and Culture during 2002-2003. The aim of the study was to provide the Commission with a report concerning the current and potential future use of ICT by European universities.

The study established that the EU universities could be categorised into four clusters concerning their current use of ICT in the organisational and educational setting: 1) the front-runners; 2) the co-operating universities; 3) the self-sufficient universities; and 4) the sceptical universities. The front-runner universities (18%) are distinguished by their pre-eminence in all respects, including their level of co-operation with other universities and other suppliers of education. The co-operating universities (33%) are characterised by the extensiveness of their involvement in strategic co-operation with both domestic and foreign universities and with other education suppliers. Additionally, they are, like the front-runners, quite advanced in the integration of ICT into their campus-based teaching. The main difference is a more limited use of e-learning courses and digital services than the frontrunners. The self-sufficient universities comprise the largest cluster, encompassing 36% of the universities. Their level of ICT integration in the organisational and educational setting is similar to that of the co-operating universities, but they engage in strategic co-operation with domestic and foreign universities or with other suppliers of education only to a minimal degree. Finally, the sceptical universities (15%) are observed to be lagging behind the rest in almost every respect. They are characterised by a limited use of digital services such as on-line course registration, limited ICT integration in their on-campus teaching, and a very low proportion of e-learning courses in the spheres of both basic academic training and supplementary training. Additionally, their attitudes towards ICT are significantly more sceptical than the rest.

The study found that basic ICT technological infrastructure, including access to computers, the Internet, e-mail accounts and intranets exist in most universities. On-line registration and access to administrative functions are also widespread. The use of ICT for interactive digital services, such as online examinations, is less common.

The study clearly showed that the general level of integration of ICT in teaching has increased greatly over the past two years among the EU's universities, with three out of four of them experiencing a high level of increase in this regard. However, considerable variation exists in this area nevertheless. Most universities are still at the stage where the use of ICT consists of treating the computer as a sophisticated typewriter and as a means of facilitating communication via traditional pedagogy and didactics in the actual teaching situation, e.g. through the use of presentation programs, databases or simulation modules. Other examples are the usage of electronic learning environments for exchanging information, communication, and co-operative activities undertaken in courses and programmes. Only a minority of universities have yet reached the stage of using ICT as a tool to redesign educational programmes, content and curricula on the basis of novel didactic frameworks.

The study concluded that most universities face a major challenge in migrating ICT integration and e-learning from a project level to a more strategic level that encompasses the institution as a whole and not just a segment of it. Experimental and pilot projects are key drivers, but the universities have not yet reached the level at which the results and experiences derived from such initiatives are integrated into their overall strategy and activities. Therefore the need for management focus and priority-setting is crucial, and must be incorporated into any successful ICT strategy. The management level is also important because i) the fragmented organisation of the universities is an obstacle to the process of ICT integration, ii) there is a need to support the trailblazers to a greater extent, and iii) the management level involvement underlines the significance and develops incentives for the teachers to get involved with ICT and e-learning.

The issue of virtual mobility is one of the key aspects of most e-learning models identified in this study, but at present it is still mostly supported on a project basis and is limited in scope.

Around half of the universities in the EU member states are involved in co-operating with other universities in their own country to offer joint e-learning courses, and the tendency to enter into partnerships will certainly grow over the coming years. The existence of consortia among EU universities at trans-national level is not as widespread, although such involvement is increasing. Around one third of the universities in the EU member states are involved in co-operating with universities in other countries with the intent to offer e-learning courses jointly.

According to the study, inflexible national systems are limiting the scope for longer-term partnerships and the development of joint degrees. The universities point to the need for extended EU and national support for the co-operation, i.e. in terms of funding pilot and development projects, the facilitation of partnerships, the pooling of expertise, the further development of common technological standards, and the development and sharing of learning material.

Public-private partnerships and the involvement of EU universities with partners outside the university sector is still a fairly limited phenomenon. The study showed that only 18% of the universities in the EU Member States are involved in co-operating with other suppliers of education, such as private companies, to offer e-learning courses jointly.

## *Executive summary in English*

This summary presents the findings of a strategic study on virtual models of universities carried out by the Danish consultancy PLS RAMBOLL Management for the European Commission, DG Education and Culture in 2002-2003. The study was commissioned as Lot 1 of four studies presented in the context of the e-learning initiative. The initiative was adopted by the European Commission on 24 May 2000 and is part of the eEurope Action Plan, whose aim is to encourage Europe to exploit its strengths and overcome the barriers that are holding back the uptake of digital technologies.

The aim of the study was to provide the Commission with a detailed report on the current and potential future use of ICT by European universities for educational and organisational purposes, and attempts to answer the following key questions:

- What is the current overall status concerning the use of ICT and e-learning in the universities of the EU Member States in terms of both the educational and the organisational settings?
- What trends concerning the integration of ICT in European universities can be identified?
- What are the principal examples of strategic co-operation and partnerships?
- What are the strengths and weaknesses of the various partnership and business models?
- How is virtual mobility being supported in European universities through ICT integration and e-learning?
- What are the possible scenarios for ICT integration in the universities of the EU Member States?

The study was based on interviews with national and regional representatives, experts and stakeholders, a questionnaire-based survey among all universities in the EU Member States, and eight illustrative good-practice case studies in respect of the University of Utrecht in the Netherlands, the Canege Consortium in France, the UK Education Healthcare Partnership, Umeå University in Sweden, the Finnish Virtual University, the University of Bremen in Germany, the Open University of Catalonia in Spain, and the Politecnico di Milano in Italy. The case studies resulted in eight case analyses that comprise interesting and illustrative reading concerning the practical application of ICT in eight very different institutions[1].

**The landscape concerning the current and future level of ICT integration and e-learning in European universities**

The study has provided an analytical overview of the current situation of the EU universities regarding their use of ICT integration and e-learning by using a cluster analysis that characterises the universities into four clusters: 1) the front-runners, 2) the co-operating universities, 3) the self-sufficient universities, and 4) the sceptical universities.

*'The front-runners'*

The first cluster accounts for 16% of the universities. These institutions are clearly the front-runners in integrating ICT in both the educational and the organisational setting. The universities within this cluster are found among all sizes of universities. These universities are well ahead in both integrating ICT in on-campus teaching and in offering a substantial number of e-learning courses as part of both basic academic training and supplementary training. Additionally, they are characterised by their extensive use of on-line course registration. Their ICT development is substantially funded by the universities themselves, which indicates focus and prioritisation at the management level. This focus and prioritisation is also manifested in the fact that three quarters of the front-runner universities have formulated an explicit ICT strategy. What further distinguished these universities are the very positive attitudes towards ICT among management, teachers and students. Finally, the front-runner universities stand out in being significantly involved in strategic co-operation with domestic and foreign universities, as well as with other suppliers of education, e.g. private companies.

The study showed that the front-runner universities are likely to increase their pace and lead in Europe over the coming years. These universities are generally planning

[1] For further information, please refer to the case study profiles in Annex G.

to extend their efforts in terms of their partnerships with national and foreign universities and other public and private partners, as well as in their joint development with other actors of both study material and study programmes and the offering of e-learning courses. In this regard they will truly be setting themselves apart from the remainder of the universities.

*'The co-operating universities'*

The second cluster of universities, the 'co-operating universities', accounted for 33% of European universities. Generally speaking, the co-operating universities are relatively far ahead in their ICT development process, especially in their use of ICT in the organisational setting, although they are not as far advanced as the front-runners. The co-operating universities are heavily involved in strategic co-operation with both domestic and foreign universities and with other education suppliers. The co-operating universities are, like the front-runners, quite far advanced in integrating ICT in their campus-based teaching. However, e-learning courses as such are offered only to a minor extent for basic academic training and supplementary training. Additionally, digital services such as on-line course registration are not as prevalent as they are among the front-runners. The general attitude towards ICT among management and students are positive, but a distinct proportion of sceptical teachers were identified. These universities' ICT development is financed by a mix of government and self-funding.

The co-operating universities are not as enthusiastic as the front-runners in their plans and priorities for the development of ICT, and their lower level of priority in this area suggested that they would probably not catch up with the front-runners in the near future. The study shows that the focus of these universities over the coming years will be on strengthening their teachers' competences and technological support, and on increasing the proportion of their e-learning courses. These universities will additionally continue their co-operation with national and international universities, and will support their extended e-learning focus by increasing their co-operation with other universities in the joint provision of e-learning. International co-operation will also be an objective, but they are more hesitant towards co-operating with private partners.

*'The self-sufficient universities'*

The third cluster – the self-sufficient universities – is the largest, accounting for 36% of the universities. Generally speaking, the self-sufficient universities are similar to cluster two (the co-operating universities) as regards their ICT integration in both the organisational and the educational settings and in terms of their generally positive attitudes towards ICT, but have a larger group of sceptical teachers. However, the self-sufficient universities are much less involved in co-operation with other universities or actors, and place less emphasis on EU initiatives and new forms of co-operation as drivers for their development. In fact, the study found that the self-sufficient universities are engaged in strategic co-operation with domestic and foreign universities or with other suppliers of education only to a very low extent.

28% of the self-sufficient universities are quite large, having more than 20,000 students each.

The future for the self-sufficient universities appears to consist of the internal consolidation and development of ICT-based study material and e-learning courses within their own institutions. The study indicates a small tendency towards opening up to the outside world as regards the joint development of ICT-based study material, but the joint development of programs or e-learning courses and international co-operation seem to be featuring in their actions and strategies only slowly. Additionally, co-operation and partnerships with other suppliers of education, e.g. private companies, are not on the agenda.

*'The sceptical universities'*

The fourth and final cluster is the smallest, accounting for 15% of the universities. It was found that the universities in the fourth cluster are lagging behind the rest in almost all respects. They are characterised by limited use of digital services such as online course registration, limited ICT integration in their on-campus teaching, and by only offering a very limited number of e-learning courses in both basic academic training and supplementary training. Additionally, only 13% of these universities have developed a formal ICT strategy. The attitudes towards ICT are mixed, with substantial numbers of teachers and management being sceptical. Their financing of ICT relies on a mix of government funding, self-funding and EU funding. Finally, the sceptical universities are only involved to a very limited extent in strategic co-operation with domestic and foreign universities or with other suppliers of education

The small universities, plus the large universities with more than 30,000 students, make up the bulk of this group. 45% of the universities in this cluster have less than 10,000 students.

The study showed that the cluster four universities have no specific plans to reinforce their ICT development in order to catch up with the others. There are recognition of the importance of the development of ICT and a certain level of interest among some of the universities, but the overall level of scepticism and the low ranking of key ICT priorities indicate that progress in this area would be relatively slow. The main focus in the coming years will mainly be on upgrading technological infrastructure and making support available to teachers and students.

**The use of ICT in the organisational setting**

The term 'use of ICT in the organisational setting' refers to how the EU universities are using ICT administratively (e.g. for supplying course information or enabling course and exam registration) and for reinforcing and supporting their organisational structures and internal and external communication.

The study showed that almost everyone in all the universities have access to both computers, the Internet and e-mail accounts. In other words, the survey showed that the basic foundation for the use of ICT in both the organisational and educational settings is essentially in place. 9 out of 10 European universities have intranets. These are primarily being used to make administrative information available, such as grades, examination schedules or course-related information like curricula, work plans or assignments. However, the use of intranets to provide interactive digital services such as on-line course and examination registration is not particularly common, with only 5 out of 10 European universities making it available for either some or all courses.

As for the future, it seems that the main focus of the universities in the organisational setting over the next two years will be to upgrade their technological infrastructure. Additionally, almost all universities expect to have an intranet within the next 1-2 years, and nearly all universities which do not yet have on-line administrative information for such things as grades, examination schedules, lists of students or on-line information listing courses, curricula, work plans, projects and assignments intend to do so within the next 1-2 years, including plans by the vast majority of universities to offer digital services such as on-line registration for courses and examinations. Only 7% of the universities participating in the survey did not expect to offer on-line course registration in future years. However, 24% were not expecting to offer on-line exam registration.

ICT development is mostly funded from general university budgets. National programmes, private sponsorships and public-private partnerships play no significant part in most of the universities' ICT financing. EU programme funding appears to play a role as a budgetary supplement, but is not a primary source of funding.

The study indicated that the majority of universities will face a major challenge in promoting ICT integration and e-learning from a project level to a more strategic level. In order to integrate ICT successfully, both a top-down and a bottom-up approach are needed.

The study also concluded that the existence of an ICT strategy is a significantly important driver in the ICT developmental process. Universities with an ICT strategy are more advanced in their integration of ICT in their own administration and organisation, as well as in their educational setting. Also, the existence of an ICT strategy is an indicator of increased networking co-operation in the area of ICT. In line with this, the study showed that focus setting and prioritisation at the university management level is an important precondition of the developmental process and is one of the most important drivers for those universities which are well advanced in their use of ICT. By the same token, the absence of conspicuous support and priority allocated by the university management to ICT integration and e-learning is a critical obstacle in many EU universities. The study indicated that this is partly due to the fact that university managements have historically not been concerned with ICT and e-learning because they have not been regarded as a core business area. In the years to come, ICT integration and e-learning will tend to evolve from project-based and experimental ventures into integrated features of the normal functioning of all university activities. Ensuring the further development and sustainability of ICT integration and e-learning is the major future challenge for management.

The study illustrated that experimental and pilot projects are a key driver in the developmental process. But it concluded that most universities still face a severe challenge in terms of incorporating and anchoring the results and experiences gained from development projects into their overall strategy and activities. Again, the need for management involvement and focus was emphasised.

Limited financial resources were found to be an important barrier to progress in the direction of an extended use of ICT and e-learning. However, the study also showed that the lack of such funding is often the result of university managements' failure to make ICT integration a priority.

The study clearly showed that an effective ICT unit and support structure is a driver for the integration of ICT and e-learning, as well as a precondition for the successful use of ICT in all aspects of a university's activities. However, the current organisational structures of the universities generally appear to impede ICT integration and e-learning in many EU universities. This is due to the highly fragmented approaches that characterise many of those universities that lack an overall support structure for ICT-supported teaching. An effective ICT unit and support structure is in fact a precondition for the successful use of ICT. Central units offering professional support and guidance concerning ICT are of key importance. In the future, ICT will not be limited to individual projects and fragments of an organisation but will be incorporated into all its activities, and therefore the ICT unit will be of significant strategic importance. Additionally, the support systems that are available to the staff for both technical and pedagogical assistance stand out as being a key future challenge for the universities.

The personal experience and enthusiasm of the trailblazers was found to be a key driver. However, the organisational structure and the management need to support the work of these trailblazers. The study concluded that the rewards for facing the challenge of integrating ICT into teaching do not match up to the commitment and interest required to implement it. Incentives such as extra time or extra pay are only seldom used as a management tool for enhancing ICT integration. In the years to come, incentives for the individual faculties, institutes and teachers to push the development of ICT further must be developed. The motivation to do so might be based on an awareness of the benefits obtainable from the integration of ICT, and on the availability of extra time for teachers to develop course material.

Finally, as regards the use of ICT in the organisational setting, the study showed that the development of common standards and compatibility between the administrative and learning systems is not presently seen as a key priority by the universities, nor is its absence regarded as an obstacle. However, we considered that this is mainly due to the current low level of development of ICT-based study materials and programs and the very limited degree of co-operation within universities in this regard. The study concluded that the need and demand for common metadata standards will certainly grow as more universities expand the use and development of ICT-based programs and materials.

**The use of ICT in the educational setting**

The conceptual framework for ICT in the educational setting involves ICT as a tool for campus-based teaching and communication on the one hand, and e-learning as such on the other. E-learning can be 100% virtual, for example when a course is followed via the Internet, but e-learning also includes learning models in which distance learning is combined with physical meetings or seminars held at the university (sometimes referred to as 'blended learning').

*ICT-supported teaching*

The study clearly showed that the general level of integration of ICT in teaching has increased greatly over the past two years among the EU's universities, with three out of four of them experiencing a high level of increase in this regard. However, considerable variation exists in this area nevertheless. Most universities are still at the stage where the use of ICT consists of treating the computer as a sophisticated typewriter and as a means of facilitating communication via traditional pedagogy and didactics in the actual teaching situation, e.g. through the use of presentation programs, databases or simulation modules. Other examples are the usage of electronic learning environments for exchanging information, communication, and co-operative activities undertaken in courses and programmes. Only a minority of universities have yet reached the stage of using ICT as a tool to redesign educational programmes, content and curricula on the basis of novel didactic frameworks.

*Use of e-learning courses*

As regards e-learning, the majority of universities offer some e-learning courses at the level of basic academic training and supplementary training. However, in the majority of subject areas, e-learning does not seem to be a preferred delivery mode in either basic academic training or supplementary education. The study indicated that a large increase in the number of courses offered in e-learning format could be anticipated, since 65% of universities state that this will be one of their key priorities over the next two years.

The study also indicated that in the universities' view, e-learning is most suitable for graduate and post-graduate students and needs to be carefully tailored to the particular target group. Additionally, the approaches to e-learning vary considerably in the different Member States, depending on the focus at national and university levels, market orientation, target group and competition. For instance, the Netherlands and Finland are small countries with languages of geographically restricted currency and no tradition of exporting education. In comparison, the U.K. has quite a strong tradition of exporting education, and is therefore more market-orientated in its approach to e-learning.

The issue of the quality assurance of e-learning courses is considered to be a great challenge, and only a fraction of the universities have yet developed comprehensive quality assurance systems that are designed for e-learning courses.

*Development of ICT competences and support*

The development of ICT competences among both the students and the academic staff is a relatively new focus area for the universities. ICT competence is not just a matter of technical skills, since the students also need to learn how to use ICT in their learning, and the teachers need to learn how to use it pedagogically. Even though student demand is viewed as being a key driver for the extended use of ICT, many students still require basic ICT support and courses. Most universities have taken this task upon themselves. In 77% of the universities participating in the survey, technical support for integrating ICT into their teaching is available to all or a majority of teachers. Half the universities (50%) offer courses or support regarding the pedagogical and didactic aspects of e-learning to the majority of their teachers. Additionally, very few universities expect not to do so within 1-2 years. Nevertheless, even though such courses and support are available to both teachers and students, there still seems to be a long way to go before these courses and support mechanisms become an integrated and essential aspect of normal university life.

The study showed that the universities face four key obstacles and challenges in their developmental progression towards the extended use of ICT and e-learning:

First of all, for most universities a primary challenge is to translate ICT away from individual initiatives into becoming a component of mainstream education, and this is impeded by a combination of the absence of a coherent and comprehensive management approach to ICT integration with a degree of resistance to change in the university culture.

Secondly, most academic staff lack knowledge concerning the potential of ICT and new ways to use it. Since a robust bottom-up approach is needed in universities, there is a necessity to encourage the academic staff in order to provide a counterbalance to the strengthened management approach. Accordingly, there is a corresponding need for the exchange of experiences and good practice examples, and the highlighting of how ICT can support and develop the teaching process.

Thirdly, and related to the preceding point, the study uncovered a shortage of high-quality ICT-based teaching material. This is a natural consequence of the generally still-immature stage of development. But since both management and academic staff require inspiration in order to begin developing their own material, this is an important obstacle to start doing so. Additionally, developing ICT-supported material and e-learning content is very costly. Hence there is a need for greater incentives to undertake such development, for national or regional initiatives to support it, and for co-operation aimed at spreading the development costs.

Fourth and last, US trends will probably reach Europe, with the mass production of teaching materials and the gradual industrialisation of the process. In this connection, the regulations concerning intellectual property rights and payment systems aimed at increasing the sharing and re-use of learning resources will have to be refined. This will challenge the traditional values concerning academic freedom and teaching based on the individual research of tutors.

**Virtual, physical and social mobility**

The study examined the effects of ICT on virtual, physical and social mobility, e.g. through the enlargement of the universities' catchments populations. While physical mobility consists of the national and international exchange of students and teachers among universities, e.g. through the Erasmus programme, virtual mobility refers to following courses at other universities or co-operating with colleagues at other universities through e-learning or other mechanisms that are supported by ICT.

The study showed that the issue of virtual mobility is one of the key aspects of most of the e-learning models identified in this study, although it is currently still mostly supported on a project basis, and is limited in scope.

According to the study, the issue of virtual mobility does not seem to have been having a negative impact on campus culture. On the contrary, ICT integration is considered to have strengthened the campus culture to a high or very high extent among 16% of the universities. In addition, ICT is viewed as a vehicle of social inclusion by most of the countries that participated in the study. At the national level there is a strong focus on broadening the catchments population for university education to include those who are less likely to enter higher education. Regional development and social inclusion go hand in hand in many national ministries' strategies and plans. In order to boost regional development, it is considered important to ensure access to universities and education for geographically-dispersed populations through the development of e-learning as a supplement to campus-based learning.

At the same time, the integration of ICT in the educational setting coheres with the reinforcement of the lifelong learning paradigm. The majority of universities accordingly consider the demand for lifelong learning to be a key driving force for their integration of ICT. However, the study concluded that they still have a long way to go in developing comprehensive strategies for their role in the lifelong learning paradigm.

**Co-operation, partnerships and new business models**

One of the key themes of the study was to investigate how universities are co-operating with each other or with other public and private partners, what kinds of business models exist in connection with these partnerships, and what the main strengths, weaknesses and preconditions of these different models are.

*Co-operation and partnerships with national partners*

The study showed that around half of the EU member states' universities are co-operating with other universities in their own country in order to offer joint e-learning courses. The study indicated three general levels of national co-operation between the universities:

- National networks or consortia supported or initiated at national or regional level, like the Finnish Virtual University or the SURF foundation in the Netherlands[2].
- Bilateral or multilateral partnerships or consortia between universities, e.g. the Nettuno Network in Italy, the Canege consortium in France and the UK Healthcare Partnership[3].
- *Ad hoc* project-based co-operation, for instance between the Centre for Educational Technology at Umeå University and the universities of Oslo and Stockholm[4].

The study observed some clear advantages accruing from such national co-operations and partnerships, for instance in terms of the reduction of costs, access to new educational markets, and the utilisation of different expertises and experiences. In fact, partnerships may be a precondition for the development of ICT, since a variety of sources of expertise and funding are needed to push it forward.

On the other hand, partnerships also build in some weaknesses. The study indicated that the majority of problems that had arisen during partnerships had stemmed from

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[2] For further information, please refer to the case study profiles of the Finnish Virtual University and the University of Utrecht/Annex G.

[3] For further information, please refer to the case study profiles of Politecnico di Milano, the Canege consortium and the UK Healthcare Partnership/Annex G.

[4] For further information, please refer to the case study profile of the University of Umeå/Annex G.

inadequate business models which were the result of insufficient co-operation experience. Joint development is very time-consuming and places heavy demands on resources, especially since it involves a lot of hidden costs that are connected with meetings, co-ordination etc. Several partnerships had experienced problems in estimating the demand for their courses, which is a problematic issue in the student-paid courses. In addition to the business model problems, there often prove to be differences among the partners concerning their working processes and organisational cultures, and it appears to be inherently difficult to get a consortium of autonomous universities to function effectively.

Accordingly, the study indicated some key preconditions for partnerships to succeed:

- The involvement of management, together with a clear strategy concerning how the partnership is connected with and will be included in the general activities of the universities.
- The individual chemistry is crucial. All partners involved must therefore know each other, and it is important to have an extensive information-sharing stage in which all the partners must commit themselves to the project.
- The university partners should have similar internal structures and charter models. This means that they will recognise and understand the associated internal procedures and possible problems. If the structures are dissimilar, it is important to think through how the differences will affect the project.
- A clear partnership strategy and a sound knowledge of the market is a precondition too. For instance, the level of quality and ambition must be agreed. Some institutions aspire to being world champions, while others are more pragmatic. Systematic analysis of the skills needed to develop and implement the various aspects is also required.
- It is essential to have a sound business model which makes clear who is going to be doing what and who is responsible for what.
- A business model must achieve a sound balance between focusing on the administration and resources of the project on the one hand, and the pedagogical and content issues on the other. The partnership and business issues tend to absorb a lot of attention at the risk of diminishing the importance of the educational considerations.
- Finally, the staff needs to feel that the initiative is necessary, and this should be backed up with incentives for them to participate. The involvement of senior staff indicates commitment and priority.

*Co-operation and partnerships with international partners*

The existence of consortia among EU universities at the trans-national level is not widespread, but such involvement is growing. Around one third of the universities in the EU Member States are involved in co-operating with universities in other countries with the intent to offer e-learning courses jointly. The drivers are the educational market outside the EU, the extended integration of the ECTS system, the support for increased co-operation arising from the Bologna process, increased competition for students, and student demands arising from the process of globalisation. The study indicated two main levels of trans-national co-operation between the universities:

- EU-wide co-operation and partnerships, e.g. the MENU project (Model for a European Networked University for e-learning) [5].
- One-to-one partnerships, e.g. between the Open University of Catalonia and universities in Latin America [6].

According to the study, inflexible national systems are limiting the opportunities for more long-term partnerships and the development of joint degrees. The universities point to the need for extended EU and national support for co-operation for the funding of pilot and development projects, the facilitation of partnerships, the pooling of expertise, the further development of common technological standards, and the development and sharing of learning material.

*Co-operation and partnerships outside the university sector*

Public-private partnerships and the involvement of EU universities with partners outside the university sector are still rather rare phenomena. The study showed that only 18% of the universities in the EU member states are involved in co-operating with other suppliers of education, such as private companies, to offer e-learning courses jointly. Among those universities that are involved in partnerships, the study identified three general models of partnerships with private partners:

- Consortia focusing on the joint development of learning material, e.g. the one involving the Open University of Catalonia and the Planeta publishing house [7].
- Co-operation at the project level, e.g. between Politecnico di Milano and Somedia in relation to LaureaOnline, where Somedia is responsible for the

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[5] MENU: http://www.hsh.no/lu/inf/menu/about.htm.

[6] For further information, please refer to the case study profile of the Open University of Catalonia/Annex G.

[7] For further information, please refer to the case study profile of the Open University of Catalonia/Annex G.

technological solution and the Politecnico takes care of the content and teaching input [8].

- Outsourcing of IT services, e.g. at the University of Utrecht, which has outsourced its computing centre to Cap Gemini/Ernst & Young [9].

From the results of the study, there seems to be a trend away from project-based co-operation with different public and private partners towards more consortium-based models. A future business model appears to be one comprising a consortium of different types of partners (technology vendors, multimedia companies etc.).

In spite of the rather limited extent of the public-private partnerships, coupled with some of the challenges facing such co-operative ventures, the study illustrated some valuable advantages which these partnerships confer. The costs of developing ICT-based study materials are high, and one of the benefits is that involvement in co-operation and partnerships with private partners opens up external sources of funding that make such content development possible. By the same token, the private partners need the universities, since they cannot develop content with the same degree of academic value without partnering with them. In addition, the mix of competences in a partnership involving university and private companies can be fruitful. Universities have the academic know-how needed to develop content, and the private companies often have the technological solutions, product marketing knowledge and sense of customer care.

As regards the outsourcing of IT services, the advantages lie in the professionalisation of the services and the reduction of costs. In addition, the university can benefit from the experience and innovative spirit of the outsourcing partner.

The study highlighted some general weaknesses or challenges that one should be aware of concerning the various types of public-private partnerships:

- The co-operation drivers for universities and private companies are fundamentally different. The universities often focus on high content quality, the companies on their return on investment, which can result in unbalanced co-operation goals.

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[8] For further information, please refer to the case study profile of Politecnico di Milano/Annex G.

[9] For further information, please refer to the case study profile of the University of Utrecht/ Annex G.

- The involvement of universities in public-private partnerships requires them to develop business models. This is a beneficial exercise in many ways, but because of the lack of relevant expertise that exists in most universities, they face a great challenge in estimating all the costs involved.

- It is an important precondition for co-operation that the expectations of both the universities and the private partners are adjusted and made explicit on initiating their co-operation. There is a need for mutual understanding concerning the raison d'être and business drivers of the individual organisations that make up the partnerships. The university must acknowledge that the incentives of the private partners are centred on making a profit. Private partners have to accept that universities are judged on their ability to deliver quality.

- Concerning outsourcing, one should firstly be aware that the management of the venture cannot itself be outsourced. Therefore very strict monitoring of the performance of the contract must be maintained. In addition, the contractual terms can inhibit continued innovation, since the outsourcing partner is more strongly motivated to use existing systems and structures rather than to innovate.

**The national approaches to ICT integration and e-learning among the universities of the EU**

The study provided an overview of the different national approaches towards the integration of ICT and e-learning that exists among the universities of the EU.

The study showed that the integration of ICT and e-learning in European universities enjoys a high priority on the political agendas of the EU Member States. However, there are great variations in each country's level of national government influence on its universities, and how active its national or regional ministries are in directly supporting the integration of ICT among the universities. Some Member States, such as Austria, Finland, France, Germany, Greece, Luxembourg and Portugal, have developed national strategies and action plans focusing on the use of ICT and e-learning in universities[10]. Others, such as Denmark, Italy, Ireland and Sweden, either have no national strategies or have integrated these issues into more generalised strategies[11].

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[10] For further information, please refer to the country profiles of Austria, Finland, France, Germany, Greece, Luxembourg and Portugal/Annex G.

[11] For further information, please refer to the country profiles of Denmark, Italy, Ireland and Sweden/Annex F.

A national strategy focused on ICT integration and e-learning is not in itself a precondition for the process of integrating ICT in the EU universities, nor is it an indicator of the actual level of ICT integration which exists in the universities of the country in question. However, the study clearly showed that the priority and attention given to ICT integration and e-learning which exists at the central level (i.e. among either the national ministries or the regional authorities) is an important driver for ICT integration. This can be mediated via national institutions or nationally supported programmes. National institutions like JISC in the UK and the SURF Foundation in the Netherlands, and national programmes such as the UKeU and the Campus Numérique in France, play a very important role in co-ordinating and initiating large-scale projects which the universities cannot undertake on their own [12].

In some countries, e.g. Sweden, Finland, France and the UK, national virtual universities have been established [13]. The study showed that several different models are being applied. There are virtual umbrella institutions, which develop portals for distributing and/or developing e-learning courses, as well as national programmes designed to establish partnerships among those universities that are capable of developing e-learning courses. The tendency in the EU Member States seems to be to move away from embarking on the construction of nationwide virtual universities towards supporting existing networks instead, or towards creating new ones which are smaller in scale than the national ones.

There is considerable agreement in Europe concerning the nature of its universities' key ICT integration drivers. The three mentioned most frequently are:

- The internationalisation and globalisation of education, which on the one hand leads to greater openness towards the EU and a clear focus on the Bologna process, and on the other hand makes the universities more competitive and business-oriented.
- Student demand for ICT. Students following basic courses are accustomed to using ICT in their daily lives, and expect the institutions to be using ICT in their teaching and administration. At the same time, the demand for lifelong learning is increasing, as is the requirement for social inclusion that encompasses new

[12] For further information, please refer to the country profiles of the UK, the Netherlands and France/Annex F.
[13] For further information, please refer to the country profiles of Sweden, Finland, France and the UK/Annex F.

groups of students. Here new markets are opening up to the universities, but these new students are demanding increased accessibility and flexibility.

- The need for the universities to improve the effectiveness and quality of both their teaching and administration. Across Europe, there is an interest in improving the quality of teaching via the development of new ICT-based methods. In addition, there is a general focus on reducing costs and freeing up resources for the very costly development of ICT.

A major issue is the establishment of confidence in those courses which are offered in an e-learning format. In many countries there is a fear of poor-quality uncertified courses. To meet this challenge, there is a need for a system that guarantees the quality of courses and ensures that courses followed in other countries are recognised nationally. For this, a quality assurance and assessment procedure system must be developed, together with an internationally recognised accreditation system.

But even though the issue of quality assurance systems is of great importance for both campus-based teaching and e-learning courses in Europe, it is mainly the virtual universities or partnerships involved with e-learning courses which are tackling the quality assurance issue. In the majority of countries in the European Union, the issue is being tackled neither at the national level nor in most universities.

Another key challenge is the issue of metadata standards. At university level, little attention is paid to the need for metadata standards. Nor is there much concentration on this issue at national level. In the majority of countries, discussion has just begun concerning metadata and the launching of pilot projects, and the issue of metadata standards is considered to be at an early stage. Though metadata standards are not currently regarded as being a key issue or barrier, the absence of metadata standards is expected to become a problem in the near future. With the extended development of digital learning resources, the issue of metadata standards will become an issue in the future as soon as the resources – and therefore their high development costs – are to be shared. Metadata standards and metadata in general are important issues for the re-use, scalability and sharing of digital learning resources and e-learning courses. At both European and global levels, the SCORM, AICC and LOM standards are becoming prevalent.

**Recommendations**

On the basis of its analysis and study conclusions, PLS RAMBOLL Management has generated the following recommendations. These recommendations are targeted at the different levels involved in higher education, namely:

- EU level
- National level
- University level
- Areas in need of research within the field.

*EU level*

In general, the recommendations targeted at the EU level revolve around the facilitation and dissemination of experiences and good practice. Many universities lack inspiration from other universities that are undergoing a similar process or which have experienced some of the same challenges, and the EU has an opportune potential role in facilitating these transactions.

- Several countries have suggested that an association should be formed that comprises those European universities which are experienced in e-learning and are interested in offering joint degrees, as well as in generally publicising good practice and experience relating to ICT pedagogy and content development. We recommend the EU either to directly support such an initiative or to assign this task to an existing organisation. The association could take up the task of disseminating experiences and good practice on the Web.
- Quality assurance and assessment procedures for e-learning are potentially a key issue in future, when the development of e-learning courses and joint ICT-based material begins to take shape. These issues are generally handled at university level, but the study showed that there is still a very long way to go before quality assurance models are developed. We therefore suggest that the EU should initiate support for the development of quality assurance systems by universities. Additionally, extended international co-operation will call for systems focusing on quality assurance standards. The EU initiative could first and foremost pay attention to the development of common standards for quality assurance. In addition, the EU could take it upon itself to disseminate good practice from pre-existing models, and to compile and disseminate checklists of issues that must be taken into account in developing the quality assurance standards.
- The lack of high-quality ICT-based learning material is a key barrier. The process is very resource-hungry, and requires competences that extend beyond disciplinary boundaries. Therefore the EU should encourage and support the

development of learning resources in its future eLearning Programme. Additionally, we recommend that the EU should take an active role in supplying advice on pedagogical issues and course development.

- The development and application of common metadata standards is considered to be of key importance for the future development and sharing of digital learning resources. However, there is a need for clarification concerning the issue of whether the metadata used in European higher education should conform to industry standards, or whether separate standards should be developed in accordance with the pedagogical models that exist in Europe. PLS RAMBOLL Management recommends that the EU should take the initiative to involve representatives from universities, Member States and the business sector in a debate to clarify the issue and reach a decision. The EU is encouraged to investigate the options and to support initiatives for setting common European metadata standards. Additionally, the EU could consider whether a criterion or requirement should be included in the new eLearning Programme for the universities to demonstrate how they are intending to implement the metadata standards.
- Intellectual property rights and payment systems must be regulated in order to increase the sharing and re-use of learning resources. The EU is encouraged to investigate the options and to support initiatives to resolve this issue.
- There is a general trend in the direction of extended partnerships both within and across national borders. However, the study points to a need for EU-level facilitation and support in order to bring together relevant partners sharing common interests and a similar approach and organisational culture. The universities need information concerning what other universities are at a similar stage and facing similar challenges, or which other universities they could learn from. The EU could consider developing a website that includes good practice examples and a 'bank' of potential university partners. Additionally, PLS RAMBOLL Management recommends that the eLearning Programme should involve a strong emphasis on the development of partnerships.
- In this connection, the EU is encouraged to stimulate the establishment of centres for excellence that can assist the universities in jointly targeting new university education markets both inside and outside the EU.
- There is a trend towards the extended involvement in partnerships and co-operation with both other universities and private partners. The study has demonstrated that the development of a workable business model is an important prerequisite for this process to succeed, and that the universities are relatively inexperienced in this area. The EU is encouraged to develop and dis-

seminate guidelines for the development of business models for various forms of partnership, and to highlight relevant good practice examples.

*National level*

- It is crucially important that ICT integration in universities should be labelled as a key priority at the national level, and that strategic goals and objectives should be defined. Whether these are set out in a strategy targeting ICT in universities or are integrated into broader strategies that for instance cover the entire field of higher education or the knowledge society is of subordinate importance.
- The existence of national or regional institutions committed to ICT is of key importance. Such institutions can either kick-start ICT development or give it extra impetus and steer it in a certain direction by supplying means, support and guidance. The development or support of such national institutions is recommended.
- The development of networks which will ensure the general dissemination of good practice and experience in using ICT pedagogy and content development is highly desirable. The national level is encouraged to support such networks.
- The extended development of the ECTS system and the Bologna process is supporting increased co-operation between countries, but still-inflexible national systems are inhibiting more long-term partnerships and the development of joint degrees. The national level is encouraged to start initiatives to increase the flexibility of the national systems, and to participate in the development of common standards or agreements in this area.
- Quality assurance and assessment procedures for e-learning must be developed in order to support e-learning and virtual mobility. This applies equally to accreditation, certification and student authentication. These issues are generally handled at the university level, but the national level is encouraged to support initiatives leading to common standards or agreements.
- The development and use of common metadata standards is considered to be of key importance for the future development of ICT integration and the sharing of digital learning resources. The national level is encouraged to participate in trans-national initiatives concerning the setting of common European standards, as well as to prioritise metadata standards and support their use and development by integrating this issue into national strategies and action plans.

*University level*

- Our analysis indicates that the possession of an ICT strategy is a key driver for ICT integration. Universities are recommended either to develop a specific ICT strategy or to integrate ICT into their general university strategy.
- There is no ideal 'one size fits all' e-learning and ICT integration model. The integration of ICT and e-learning must correspond to the goals of the university and support them accordingly. A holistic view of the university's goals and challenges is recommended, combined with a consideration of which of their aspects ICT is capable of supporting. ICT should be seen as a tool for meeting challenges, not as a problem area.
- Pilot projects are important, but it is recommended that universities should start focusing on integrating ICT into their normal operation and find sustainable models for doing so.
- The involvement of management is crucial to ensuring that the integration of ICT is implemented across the university's operations in their entirety, and does not simply remain stuck at the project level.
- The dissemination of good practice and experience with ICT pedagogy and content development is recommended at university level, as is participation in national and trans-national networks.
- A properly-functioning ICT organisation and support structure can be a driver for ICT integration and e-learning, and is a precondition for the successful application of ICT in all aspects of a university's activities. An organisational structure encompassing professional support for the integration of ICT together with room for local initiative is recommended for ensuring both professional development and grounding.
- For many years, dedicated enthusiasts have been of key value in integrating ICT. In order to support the integration of ICT into the overall operation and activities of the university, the stimulation of the intermediate group of faculties and teachers is recommended, as they are the primary entities for expanding and anchoring the development of ICT integration.
- The primary barriers to the integration of ICT are negative attitudes towards ICT coupled with inadequate ICT knowledge and ICT skills. It is recommended to: 1) Provide incentives to involve the university as a whole, and the university staff in particular, in the development of ICT integration. Teachers need to be rewarded for good teaching. The career development structure for teachers should be developed further, and ICT competences should be an element in this. This should also be linked to the payment structure; 2) Ensure training in the technical, and even more importantly, also the pedagogical use of ICT;

3) Provide both technical and administrative support to the teachers; and 4) Resolve the issue of how professors and teachers should be paid for the development of content.

- Quality assurance and assessment procedures for e-learning must be developed in order to support e-learning and virtual mobility. The same applies to accreditation, certification and student authentication. These issues are generally handled at university level, but participation in trans-national initiatives is encouraged in order to facilitate trans-national mobility.
- The lack of high-quality learning material is a key barrier. The universities are encouraged to develop learning resources and share them with other universities.
- The use of common metadata standards is considered to be of key importance for the future development and sharing of digital learning resources. The universities are encouraged to apply metadata standards, as well as to participate in trans-national initiatives concerning the setting of common European standards.

*Areas in need of further research*

Interviews with experts and government representatives, as well as the case studies, have pointed to the desirability of further research in the following areas:

- Pedagogical and didactic issues: There is a need for research into e-learning pedagogies and the pedagogical interactions between the students and their teachers/tutors. Other areas are: How to develop a 'social infrastructure' for e-learning which ensures that students do not too easily drop out; How to increase the user-friendliness of tools; How to use virtual learning environments to create more effective learning settings; The lack of knowledge about the risks and consequences of taking particular approaches to e-learning.
- Organisational issues of ICT and e-learning in higher education: The management of innovation, the sustainability of solutions, and how to increase the receptiveness of university managements towards innovation.
- Cost/benefit studies of ICT and virtual learning: Where is ICT effective? Where do we need ICT (indeed, do we need ICT)?
- Best practice in terms of content development. Development of common standards.
- Has ICT and e-learning changed the evaluation and examination procedures? Is there a need for the development of new evaluation procedures?

- Are physical surroundings a barrier for the extended use of ICT on university campuses? What comprises best practice for improved support and enabling of the use of ICT in terms of the layout of the physical environment?
- Has the extended use of ICT and e-learning changed the picture among Europe's universities concerning student fees? What are the future models for student fees?
- The development of ways to evaluate and assess the quality of e-learning. How to quality assure and accredit e-learning classes.
- Changing the attitudes and culture of teachers: How can incentives for the improvement of teaching and the use of web-based learning environments be created?
- Gender aspects: Why are the majority of students taking on-line courses in Sweden female? Is this an international trend, and if so, why? How can on-line courses be made more attractive to men?
- Problems of scalability: How can ICT pilot projects undertaken in one or two departments be successfully scaled up to encompass entire universities?

# *Résultats clés en français*

En 2002-2003, la société de conseil danoise *PLS RAMBOLL Management* a réalisé une étude stratégique sur les modèles virtuels d'universités, commandée par la DG Éducation et Culture de la Commission européenne. Le but de cette étude était de fournir à la Commission un rapport sur l'application actuelle et potentiellement à venir des technologies de l'information et de la communication (TIC) par les universités européennes.

L'étude a établi qu'en termes d'application actuelle des TIC dans les contextes organisationnel et éducatif, les universités de l'Union européenne pouvaient être regroupées en quatre catégories: les universités pionnières, les universités coopératrices, les universités isolées et les universités sceptiques. Les universités pionnières (18 %) se distinguent par leur prééminence à tous points de vue, y compris leur niveau de coopération avec d'autres universités et fournisseurs de services éducatifs. Les universités coopératrices (33 %) se caractérisent par leur participation à une coopération stratégique avec d'autres universités nationales et étrangères et d'autres fournisseurs de services éducatifs. En outre, à l'instar des universités pionnières, elles ont déjà atteint un stade avancé pour ce qui concerne l'intégration des TIC dans leurs cours sur campus. La principale différence réside dans leur offre de cours de *e*Learning et de services numériques, plus restreinte par rapport aux universitaires pionnières. Représentant 36 % des universités étudiées, les universités isolées forment la catégorie dominante. Leur niveau d'intégration des TIC dans les contextes organisationnel et éducatif est semblable à celui des universités coopératrices. Néanmoins, les universités isolées ne participent que dans une moindre mesure à une coopération stratégique avec d'autres universités nationales ou étrangères ou d'autres fournisseurs de services éducatifs. Enfin, l'étude a montré que les universités septiques (15 %) accusaient un retard sur leurs homologues à presque tous les égards. Elles se caractérisent par une offre de services numériques (tels que les inscriptions aux cours en ligne) restreinte, une intégration limitée des TIC dans les cours sur campus et un nombre très réduit de cours de *e*Learning tant dans les domaines académiques de base que dans les domaines de perfectionnement. Par ailleurs, elles sont largement plus sceptiques dans leur approche des TIC que les autres universités.

L'étude a établi que la plupart des universités possédaient une infrastructure TIC de base, telle que l'accès à des ordinateurs, à Internet, à des comptes de courrier électronique et à des réseaux intranet. Les inscriptions et l'accès aux fonctions administratives en ligne sont également monnaie courante. En revanche, l'application des TIC pour l'organisation de services numériques interactifs, tels que les examens en ligne, est plus rare.

L'étude a clairement démontré que le niveau général d'intégration des TIC dans l'enseignement s'est considérablement accru dans les universités européennes au cours des deux dernières années : trois universités sur quatre ont fortement progressé à cet égard. Néanmoins, ces chiffres varient amplement. Dans la plupart des universités, l'utilisation des TIC se borne encore à considérer l'ordinateur comme une machine à écrire sophistiquée et comme un moyen de communication au service de la pédagogie et de la didactique classiques dans les différentes situations d'enseignement (par exemple, le recours à des programmes de présentation, bases de données ou modules de simulation). À titre d'exemple, on notera également, dans le cadre des cours et des programmes, l'application d'environnements d'apprentissage électroniques servant à l'échange d'informations, à la communication et aux activités de coopération entreprises. Seul un petit nombre d'universités ont déjà fait des TIC un outil de refonte de leurs programmes éducatifs, du contenu de leurs cours et de leurs programmes d'études sur la base de cadres didactiques inédits.

L'étude a conclu que la plupart des universités faisaient face à un défi majeur, visant à faire passer l'intégration des TIC et le *e*Learning du simple stade de projets à un niveau plus stratégique n'englobant pas seulement un segment, mais l'ensemble de chaque institution. Les projets expérimentaux et pilotes jouent un rôle moteur dans cette phase de transition, mais les universités n'en sont pas encore arrivées à intégrer les expériences et résultats tirés de ces initiatives dans leurs stratégies et activités globales. Aussi, la nécessité d'impliquer la direction et de définir les priorités s'avère-t-elle cruciale et doit-elle faire partie intégrante de toute stratégie de TIC fructueuse. L'importance de la direction tient également à autres facteurs: i) l'organisation fragmentée des universités constitue un obstacle au processus d'intégration des TIC; ii) les universités pionnières doivent être soutenues davantage; iii) l'implication de la direction souligne l'importance des TIC et du *e*Learning et incite les enseignants à s'y engager.

La question de la mobilité virtuelle est l'un des aspects clés de la plupart des modèles de *e*Learning identifiés par l'étude. Néanmoins, à ce jour, cet aspect est principalement encouragé sous la forme de projets et sa portée est limitée.

Environ la moitié des universités des États membres de l’Union européenne coopèrent avec d’autres universités de leur propre pays afin de proposer conjointement des cours de *e*Learning. La tendance à conclure des partenariats ira certainement croissante au cours des prochaines années. L’existence de consortiums transnationaux parmi les universités européennes n’est pas aussi répandue, bien que ce phénomène soit à la hausse. Environ un tiers des universités des États membres coopèrent avec des universités d’autres pays dans l’objectif d’offrir conjointement des cours de *e*Learning.

Selon l’étude, le manque de souplesse des systèmes nationaux restreint la portée des partenariats à long terme et le développement de formations conjointes. Les universités soulignent le besoin d’un plus grand engagement à l’échelle européenne et nationale en faveur de la coopération (c.-à-d. en termes de financement de projets pilotes et de projets de développement), de la mise en commun des expériences, de l’élaboration de normes technologiques communes ainsi que de la mise au point et du partage de matériel d’apprentissage.

Il est encore relativement peu courant de voir des partenariats public-privé et une coopération des universités européennes avec des partenaires externes au secteur universitaire. L’étude a démontré que seules 18 % des universités des États membres coopèrent avec d’autres fournisseurs de services éducatifs (tels que des sociétés privées) dans le but d’offrir conjointement des cours de *e*Learning.

# *Rapport de synthèse en français*

Le rapport de synthèse présente les résultats de l’étude stratégique sur les modèles virtuels d’universités, commandée par la DG Education et Culture de la Commission européenne et réalisée en 2002-2003 par la société de conseil danoise *PLS RAMBOLL Management*. L’étude correspond au lot 1 des quatre études présentées dans le contexte de l’initiative *e*Learning. Cette initiative a été adoptée par la Commission européenne le 24 mai 2000 et fait partie du Plan d’action global "eEurope", dont l’objectif est de permettre à l’Europe d’exploiter ses points forts et de surmonter les obstacles à une intégration et une utilisation accrue des technologies numériques.

L’étude avait pour objectif de fournir à la Commission un rapport détaillé sur l’application actuelle et potentiellement à venir des TIC par les universités européennes à des fins éducatives et organisationnelles, tout en tentant de répondre aux questions clés suivantes :

- Quel est l’état d'avancement actuel de l’application des TIC et du *e*Learning dans les universités des États membres, tant dans le contexte éducatif qu’organisationnel?
- Quelles tendances peut-on identifier en matière d'intégration des TIC dans les universités européennes ?
- Quels sont les principaux exemples de coopérations et de partenariats stratégiques ?
- Quelles sont les forces et les faiblesses des différents modèles de partenariat et d'organisation ?
- Quelle est la contribution apportée par l'intégration des TIC et le *e*Learning à la mobilité virtuelle dans les universités européennes?
- Quels sont les scénarios possibles pour l'intégration des TIC dans les universités des États membres?

L'étude repose sur des entretiens avec des représentants, experts et dépositaires nationaux et régionaux, sur un questionnaire transmis à toutes les universités des États membres ainsi que sur huit cas de bonnes pratiques révélateurs de l'Université de Utrecht (Pays-Bas), du consortium CANEGE (France), du Partenariat britannique pour les formations dans le secteur des soins de santé (Royaume-Uni), de l'Université de Umeå (Suède), de l'Université virtuelle finlandaise (Finlande), de l'Université de Brême (Allemagne), de l'Université ouverte de Catalogne (Espagne) et de l'Université polytechnique de Milan (Italie). Ces études de cas ont débouché sur huit analyses qui présentent des informations intéressantes et caractéristiques de l'application pratique des TIC dans huit institutions très différentes[14].

**Aperçu du niveau actuel et à venir de l'intégration des TIC et du *e*Learning dans les universités européennes**

L'étude a permis d'obtenir une vue d'ensemble analytique de la situation actuelle dans les universités européennes pour ce qui concerne leur recours à l'intégration des TIC et au *e*Learning. Cette vue d'ensemble laisse apparaître un regroupement des

[14] Pour de plus amples renseignements, on se référera aux profils des études de cas à l'annexe G.

universités en quatre catégories: les universités pionnières, les universités coopératrices, les universités isolées et les universités sceptiques.

*"Universités pionnières"*
La première catégorie comprend 16 % des universités. Ces institutions sont clairement en avance quant à l'intégration des TIC tant dans le contexte éducatif qu'organisationnel. Ce groupe englobe des universités de toutes tailles. Celles-ci sont largement en tête en matière d'intégration des TIC dans les cours sur campus et d'offre d'un grand nombre de cours de *e*Learning tant dans les domaines académiques de base que dans les domaines de perfectionnement. Par ailleurs, ces universités se caractérisent par leur recours généralisé aux inscriptions aux cours en ligne. Le développement des TIC est largement financé par les universités elles-mêmes, ce qui indique l'intérêt que porte leur direction à ces technologies et la priorité qu'elle leur accorde. Cet intérêt et cette priorité se traduisent également dans le fait que trois quarts des universités pionnières ont formulé une stratégie explicite en matière de TIC. En outre, ces dernières se distinguent par l'attitude très positive de leur direction, enseignants et étudiants vis-à-vis des TIC. Enfin, les universités pionnières se démarquent par leur coopération stratégique avec d'autres universités nationales et étrangères ainsi qu'avec d'autres fournisseurs de services éducatifs, tels que des sociétés privées.

L'étude a démontré que les universités pionnières étaient susceptibles d'accélérer la cadence et de devenir les leaders européens au cours des prochaines années. Ces universités envisagent généralement d'intensifier les efforts consentis tantôt dans le cadre de leurs partenariats avec d'autres universités nationales et étrangères et partenaires privés, tantôt dans le cadre de leur développement de matériel et de programmes d'études conjointement avec d'autres partenaires, tantôt encore dans le cadre de l'offre de cours de *e*Learning. À cet égard, elles se distingueront clairement des autres universités.

*"Universités coopératrices"*
La deuxième catégorie, dite des universités coopératrices, regroupe 33 % des universités européennes. En règle générale, les universités coopératrices sont relativement en avance dans leur processus de développement des TIC (notamment dans leur application des TIC dans le contexte organisationnel), mais n'en sont pas encore au niveau des universités pionnières. Les universités coopératrices ont établi des liens de coopération stratégique étroits avec d'autres universités nationales et étrangères et d'autres fournisseurs de services éducatifs. En outre, comme les

universités pionnières, elles sont déjà à un stade avancé quant à l'intégration des TIC dans leurs cours sur campus. Néanmoins, leur offre de cours de *e*Learning en tant que tels est restreinte, tant dans les domaines académiques de base que dans les domaines de perfectionnement. De plus, les services numériques, tels que les inscriptions aux cours en ligne, ne sont pas aussi courants que dans le cas des universités pionnières. L'attitude générale de la direction et des étudiants vis-à-vis des TIC est positive, bien qu'un certain nombre d'enseignants sceptiques ait été identifié. Le développement des TIC dans ces universités est financé par les autorités publiques et par les universités elles-mêmes.

Les universités coopératrices ne font pas preuve du même enthousiasme que les universités pionnières dans leurs projets et leurs priorités pour le développement des TIC. Leur niveau de priorité moins élevé dans ce domaine laisse supposer qu'elles ne rattraperont probablement pas les universités pionnières dans un avenir proche. L'étude montre qu'au cours des prochaines années, ces universités ont choisi de mettre l'accent sur le renforcement des compétences des enseignants et du support technologique ainsi que sur une augmentation du nombre de cours de *e*Learning. En outre, ces universités poursuivront leur coopération avec d'autres universités nationales et internationales et assiéront leur intérêt croissant pour le *e*Learning en intensifiant leur coopération avec d'autres universités dans le but de proposer conjointement des cours de *e*Learning. La coopération internationale fera, elle aussi, partie des objectifs, mais ces universités hésitent davantage à coopérer avec des partenaires privés.

*"Universités isolées"*

La troisième catégorie, dite des universités isolées, comprend 36 % des universités européennes. De façon générale, les universités isolées sont identiques à celles du deuxième groupe (universités coopératrices) pour ce qui est de leur intégration des TIC dans les contextes éducatif et organisationnel et de leur attitude généralement positive vis-à-vis des TIC, malgré un plus grand nombre d'enseignants sceptiques. Quoi qu'il en soit, les universités isolées coopèrent dans une bien moindre mesure avec d'autres universités ou acteurs et accordent moins d'importance aux initiatives européennes et nouvelles formes de coopération visant à promouvoir leur développement. En fait, l'étude a établi que les universités isolées n'étaient que très peu engagées dans une coopération stratégique avec d'autres universités nationales ou étrangères ou avec d'autres fournisseurs de services éducatifs.

Accueillant chacune plus de 20 000 étudiants, 28 % des universités isolées sont de taille relativement grande.

L'avenir des universités isolées semble axé sur leur consolidation interne et sur le développement de matériel d'étude basé sur les TIC et de cours de *e*Learning au sein de leurs propres institutions. L'étude indique une légère tendance à l'ouverture au monde extérieur pour ce qui est de l'élaboration conjointe de matériel d'étude basé sur les TIC. Toutefois, le développement commun de programmes et de cours de *e*Learning ainsi que la coopération internationale ne semblent apparaître que lentement dans leurs actions et leurs stratégies. Par ailleurs, la coopération et les partenariats avec d'autres fournisseurs de services éducatifs, tels que des sociétés privées, ne figurent pas à l'ordre du jour.

*"Universités sceptiques"*
Réunissant 15 % des universités, la quatrième et dernière catégorie est la plus petite de toutes. L'étude a établi que les universités faisant partie de la quatrième catégorie étaient à la traîne à presque tous les égards. Elles se caractérisent par une offre restreinte de services numériques (tels que les inscriptions aux cours en ligne), une intégration limitée des TIC dans les cours sur campus et un nombre très réduit de cours de *e*Learning tant dans les domaines académiques de base que dans les domaines de perfectionnement. En outre, seules 13 % de ces universités ont défini une stratégie formelle en matière de TIC. Une grande partie du corps enseignant et de la direction étant sceptiques, leur attitude vis-à-vis des TIC est mitigée. Le développement des TIC est financé par des subventions publiques, des fonds propres et des aides européennes. Enfin, les universités européennes n'ont établi que très peu de liens de coopération stratégique avec d'autres universités nationales et étrangères ou avec d'autres fournisseurs de services éducatifs.

La majeure partie de cette catégorie se compose d'universités de petite taille et de grandes universités comptant plus de 30 000 étudiants. 45 % des universités de cette catégorie comptent moins de 10 000 étudiants.

L'étude a montré que les universités de la quatrième catégorie ne possédaient pas de projets particuliers visant à renforcer le développement des TIC afin de rattraper leur retard sur les autres universités. Certaines universités reconnaissent l'importance du développement des TIC et font montre d'un certain intérêt, mais le niveau général de scepticisme et la relégation des TIC au bas de l'échelle des priorités indiquent que les progrès dans ce domaine seront relativement lents. Au cours des prochaines années, l'accent sera principalement mis sur la mise à niveau de l'infrastructure technologique et sur l'accessibilité des supports technologiques aux enseignants et aux étudiants.

**Application des TIC dans le contexte organisationnel**

L'expression "Application des TIC dans le contexte organisationnel" réfère à la manière dont les universités européennes utilisent les TIC dans leurs tâches administratives (par exemple, pour les inscriptions aux cours et aux examens ou pour la communication des informations sur les cours) et les appliquent pour renforcer et soutenir leurs structures organisationnelles et leur communication interne et externe.

L'étude a montré que presque tout le monde avait accès à des ordinateurs, à Internet et à des comptes de courrier électronique dans toutes les universités. En d'autres termes, l'étude a démontré que l'application des TIC dans les contextes organisationnel et éducatif disposait des bases nécessaires. Neuf universités européennes sur dix possèdent des réseaux intranet. Ceux-ci servent avant tout à permettre l'accès à des informations d'ordre administratif, telles que les années, les horaires d'examen et les informations relatives aux cours (programmes, plannings ou travaux). Néanmoins, les réseaux intranet ne sont habituellement pas utilisés pour fournir des services numériques, tels que les inscriptions aux cours et aux examens en ligne; seules cinq universités sur dix proposent de tels services pour une partie ou l'ensemble de leurs formations.

Pour les deux années à venir, les universités semblent, dans le contexte organisationnel, vouloir principalement mettre l'accent sur la mise à niveau de leur infrastructure technologique. De plus, presque toutes les universités espèrent disposer d'un réseau intranet d'ici un à deux ans. Les universités ne proposant pas encore d'informations administratives en ligne (concernant, par exemple, les années, les horaires d'examens, les listes d'étudiants ou des renseignements pratiques sur les cours, les programmes, les plannings, les projets et les travaux) entendent, presque toutes, développer de tels services au cours des deux prochaines années et envisagent d'offrir des services numériques, tels qu'un service d'inscriptions aux cours et aux examens en ligne. Seules 7 % des universités participant à l'étude ne prévoient pas de proposer un service d'inscriptions aux cours en ligne dans les années à venir. Pour ce qui est des inscriptions aux examens, ce chiffre est néanmoins de 24 %.

Le développement des TIC est principalement financé par le budget général des universités. Dans la plupart des universités, les programmes nationaux, parrainages privés et partenariats public-privé ne jouent pas un rôle prépondérant dans le financement des TIC. Les programmes européens semblent jouer un rôle complémentaire en termes budgétaires et ne constituent pas une source primaire de financement.

L'étude a indiqué que le passage de l'intégration des TIC et du *e*Learning du simple stade de projets à un niveau plus stratégique représenterait un défi majeur pour la majorité des universités. Afin de parvenir à intégrer les TIC, une approche descendante et ascendante est indispensable.

Par ailleurs, l'étude a conclu que l'existence d'une stratégie des TIC jouait un rôle moteur significatif dans le processus de développement des TIC. Les universités dotées d'une telle stratégie sont plus en avance dans leur intégration des TIC au sein de leur propre administration et organisation et dans le contexte éducatif. De même, l'existence d'une telle stratégie indique la présence d'un réseau de coopération plus dense dans le domaine des TIC. Parallèlement, l'étude a montré que l'intérêt et la priorité accordés par la direction des universités constituent une condition préalable cruciale au processus de développement et l'un des principaux facteurs d'encouragement pour les universités en avance dans leur application des TIC. De même, l'absence de soutien et de priorité de la part de la direction à l'égard de l'intégration des TIC et du *e*Learning constitue une véritable entrave pour de nombreuses universités européennes. L'étude a indiqué que cette entrave tenait en partie au fait que la direction des universités, d'un point de vue historique, ne s'est pas intéressée aux TIC et au *e*Learning vu qu'ils n'étaient pas considérés comme des domaines clés. Au cours des prochaines années, l'intégration des TIC et le *e*Learning auront tendance à passer du simple stade de projets et d'expériences au stade de composantes intégrantes du fonctionnement normal de toutes les activités universitaires. Le principal défi de demain pour la direction des universités consistera à garantir le développement ultérieur et la durabilité de l'intégration des TIC et du *e*Learning.

L'étude a démontré que les projets expérimentaux et pilotes jouaient un rôle moteur clé dans le processus de développement. Néanmoins, elle a conclu que la plupart des universités devaient encore relever le défi de l'incorporation et de l'ancrage des expériences et résultats tirés des projets de développement dans leurs stratégies et activités globales. Là encore, la nécessité d'implication et d'intérêt de la part de la direction a été mis en exergue.

L'étude a indiqué que les limites des ressources financières constituaient un obstacle majeur au progrès en faveur d'une utilisation plus intensive des TIC et du *e*Learning. Néanmoins, elle a également démontré que la pénurie de ces ressources résultait souvent de l'absence de l'intégration des TIC dans les priorités de la direction des universités.

L'étude a clairement montré qu'une unité TIC performante et une structure de soutien efficace stimulaient l'intégration des TIC et du *e*Learning et constituaient une condition préalable à l'application fructueuse des TIC à tous les niveaux d'activités d'une université. Cependant, les structures organisationnelles actuelles des universités semblent généralement entraver l'intégration des TIC et le *e*Learning dans un grand nombre d'universités européennes. Ce problème est dû aux approches hautement variées qui caractérisent maintes universités qui ne possèdent aucune structure globale de soutien en faveur de l'enseignement basé sur les TIC. En réalité, une unité TIC performante et une structure de soutien efficace sont une condition préalable à l'application fructueuse des TIC. Les unités centrales offrant une assistance professionnelle en matière de TIC sont d'une importance capitale. À l'avenir, les TIC ne seront pas limitées à des projets et fragments individuels d'une organisation, mais seront intégrées dans toutes ses activités. Aussi, l'unité TIC revête-t-elle une importance stratégique cruciale. Par ailleurs, les systèmes de soutien accessibles au personnel en matière d'assistance technique et pédagogique apparaissent comme le prochain défi majeur auquel les universités seront confrontées.

L'étude a établi que l'expérience personnelle et l'enthousiasme des universités pionnières jouaient un rôle moteur. Toutefois, la structure organisationnelle et la direction doivent soutenir le travail de ces universités. L'étude a conclu que les récompenses liées à l'intégration fructueuse des TIC dans l'enseignement ne sont pas à la hauteur de l'engagement et de l'intérêt requis par sa mise en œuvre. Des mesures d'encouragement (telles que l'octroi d'une prime ou d'un plus grand nombre d'heures à consacrer à l'intégration des TIC) ne servent que rarement d'outils de gestion dans le renforcement de cette intégration. Des mesures concernant les différents instituts, facultés et enseignants et visant à encourager le développement ultérieur des TIC doivent être définies au cours des prochaines années. Une telle démarche pourrait trouver sa motivation dans la reconnaissance des avantages offerts par l'intégration des TIC et dans l'octroi aux enseignants d'un plus grand nombre d'heures à consacrer au développement de matériel de cours.

Enfin, en ce qui concerne l'application des TIC dans le contexte organisationnel, l'étude a démontré que la mise au point de normes communes et la compatibilité entre les systèmes administratifs et d'enseignement ne constituaient pas une priorité clé pour les universités. De même, leur absence n'est pas non plus considérée comme une entrave. Quoi qu'il en soit, nous estimons que cette situation tient principalement au niveau actuellement peu élevé d'élaboration de matériel d'étude et de programmes basés sur les TIC et du degré très limité de coopération entre les universités en la matière. L'étude a conclu que le besoin et la nécessité d'une normalisation conjointe des métadonnées se feraient certainement plus pressants au fur et à mesure que les universités intensifieront leur utilisation et leur élaboration de matériel et programmes basés sur les TIC.

**Application des TIC dans le contexte éducatif**

Le cadre conceptuel des TIC dans le contexte éducatif implique, d'une part, les TIC en tant qu'outil d'enseignement sur campus et de communication et, d'autre part, le *e*Learning en tant que tel. Le *e*Learning peut être totalement virtuel (par exemple, lorsque les étudiants suivent un cours via Internet) ou inclure des modèles d'enseignement combinant l'apprentissage à distance et des rencontres physiques ou séminaires organisés à l'université (formule parfois appelée "formation hybride").

*Enseignement basé sur les TIC*

L'étude a clairement démontré que le niveau général d'intégration des TIC dans l'enseignement s'est considérablement accru parmi les universités européennes au cours des deux dernières années : trois universités sur quatre ont fortement progressé à cet égard. Néanmoins, ces chiffres varient amplement. Dans la plupart des universités, l'utilisation des TIC se borne encore à considérer l'ordinateur comme une machine à écrire sophistiquée et comme un moyen de communication au service de la pédagogie et de la didactique classiques dans les différentes situations d'enseignement (par exemple, le recours à des programmes de présentation, bases de données ou modules de simulation). À titre d'exemple, on notera également, dans le cadre des cours et des programmes, l'application d'environnements d'apprentissage électroniques servant à l'échange d'informations, à la communication et aux activités de coopération entreprises. Seul un petit nombre d'universités ont déjà fait des TCI un outil de refonte de leurs programmes éducatifs, du contenu de leurs cours et de leurs programmes d'études sur la base de cadres didactiques inédits.

*Utilisation de cours de* e*Learning*

Pour ce qui est du *e*Learning, la majorité des universités proposent des cours dans les domaines académiques de base et les domaines de perfectionnement. Toutefois, dans la plupart des matières, le *e*Learning ne semble pas un mode d'apprentissage privilégié, quel que soit le domaine de formation. L'étude a indiqué qu'il était possible d'anticiper une large augmentation du nombre de cours de *e*Learning, 65 % des universités affirmant que cette offre fait partie de leurs priorités clés pour les deux prochaines années.

L'étude a également indiqué que, du point de vue des universités, le *e*Learning correspondait davantage aux étudiants de premier et de deuxième cycle et devait être minutieusement adapté à chaque groupe cible. En outre, les approches du *e*Learning varient considérablement d'un État membre à l'autre, en fonction de l'intérêt qui lui est accordé aux niveaux national et universitaire, de l'orientation vers le marché, du groupe cible et de la concurrence. Par exemple, les Pays-Bas et la Finlande sont de petits pays dont la langue est confinée au sein d'une région géographique restreinte et qui n'ont pas pour tradition d'exporter leurs services éducatifs. En revanche, cette tradition est très marquée au Royaume-Uni dont l'approche du *e*Learning, par conséquent, est davantage orientée vers le marché.

La question de l'assurance qualité des cours de *e*Learning est considérée comme un défi majeur, et seul un petit nombre d'universités ont déjà mis au point de vastes systèmes d'assurance qualité pour les cours qu'elles proposent.

*Renforcement des compétences et de l'assistance TIC*

Le renforcement des compétences TIC des étudiants et du personnel académique ne figure que depuis peu parmi les priorités des universités. Les compétences ne sont pas qu'une simple question de qualifications techniques; les étudiants et les enseignants ont également besoin d'apprendre la façon dont ils doivent respectivement appliquer les TIC dans leur apprentissage et dans leurs méthodes pédagogiques. Bien que les besoins des étudiants soient considérés jouer un rôle moteur dans l'élargissement de l'application des TIC, un grand nombre d'entre eux requièrent encore une assistance de base et des cours en la matière. La plupart des universités en ont fait leur affaire. Dans 77 % des universités participant à l'étude, une assistance technique pour l'intégration des TIC dans l'enseignement est accessible à l'ensemble ou la majorité des enseignants. La moitié des universités (50 %) proposent à la majorité de leurs enseignants des cours ou une assistance concernant les aspects didactiques et pédagogiques du *e*Learning. Par ailleurs, un petit nombre d'universités ne prévoient pas d'offrir de tels cours ou une telle assistance au cours des deux prochaines années. Quoi qu'il en soit, même si les enseignants et les étudiants disposent de tels cours et d'une telle assistance, il reste encore beaucoup à faire avant que ces mécanismes ne deviennent une constante fondamentale du quotidien des universités.

L'étude a montré que les universités étaient confrontées à quatre obstacles dans leur progression développementale vers un renforcement de l'application des TIC et du *e*Learning:

Premièrement, la plupart des universités doivent avant tout parvenir à faire des TIC une véritable composante des formations générales, plutôt que de simples initiatives individuelles, comme c'est le cas actuellement. Cette transition est entravée par l'absence d'une approche globale et cohérente de la direction vis-à-vis de l'intégration des TIC et par un certain degré de résistance face au changement de la culture universitaire.

Deuxièmement, la plupart du personnel académique ne possède pas les connaissances nécessaires sur le potentiel renfermé par les TIC et les nouveaux moyens de l'exploiter. Une solide approche ascendante étant indispensable dans les universités, il est nécessaire d'encourager le personnel académique afin de contrebalancer l'approche renforcée de la direction. En conséquence, il est nécessaire d'échanger les expériences et les cas de bonnes pratiques et de souligner la façon dont les TIC peuvent soutenir et développer le processus d'enseignement.

Troisièmement, en ce qui concerne le point précédent, l'étude a révélé le manque de matériel de cours de haute qualité, basé sur les TIC. Ce manque est la conséquence naturelle du stade de développement encore généralement insuffisant. Toutefois, il constitue un obstacle majeur vu que la direction et le personnel académique ont besoin d'inspiration pour entreprendre l'élaboration de leur propre matériel. Par ailleurs, le développement de matériel basé sur les TIC et du contenu des cours de *e*Learning est très coûteux. Des facteurs d'encouragement plus appréciables sont donc nécessaires pour que les universités entament l'élaboration d'un tel matériel; des initiatives nationales et régionales sont indispensables pour soutenir cette élaboration, de même qu'une coopération ciblée sur l'échelonnement des coûts de développement.

Quatrièmement, du fait de la production de masse de matériel de cours et de l'industrialisation progressive du processus, les tendances américaines arriveront probablement en Europe. À cet égard, les réglementations en matière de droits de propriété intellectuelle et les systèmes de rémunération visant à un plus grand partage et à la réutilisation des ressources d'apprentissage devront être revus. Cette évolution mettra à défi les valeurs traditionnelles de la liberté académique et l'enseignement basé sur la recherche individuelle d'enseignants.

**Mobilité virtuelle, physique et sociale**

L'étude s'est penchée sur les effets exercés par les TIC sur la mobilité virtuelle, physique et sociale, à travers l'élargissement du secteur de recrutement des universités, par exemple. Alors que la mobilité physique se traduit par les échanges nationaux et internationaux d'étudiants entre les universités (grâce au programme Erasmus, par exemple), la mobilité virtuelle réfère au suivi de cours dans d'autres universités ou à la coopération avec des collègues d'autres universités par le biais du *e*Learning ou d'autres mécanismes soutenus par les TIC.

L'étude a montré que la question de la mobilité virtuelle était l'un des aspects clés de la plupart des modèles de *e*Learning identifiés. Néanmoins, à l'heure actuelle, cet aspect est avant tout encouragé sous la forme de projets et sa portée est limitée.

Selon l'étude, la question de la mobilité virtuelle ne semble pas avoir exercé une influence négative sur la culture de campus. Au contraire, l'intégration des TIC est considérée avoir largement, voire très largement, renforcé cette culture dans 16 % des universités. Par ailleurs, les TIC sont considérées comme un vecteur d'inclusion sociale dans la plupart des pays ayant pris part à l'étude. À l'échelle nationale, les efforts sont largement axés sur l'élargissement du secteur de recrutement des universités aux personnes les moins susceptibles d'entreprendre une formation supérieure. Le développement régional et l'inclusion sociale vont de pair dans les stratégies et les projets d'un grand nombre de ministères. Afin de stimuler le développement régional, il est jugé important de garantir l'accès des populations géographiquement dispersées aux universités et à l'éducation en faisant du *e*Learning un complément des cours sur campus.

Parallèlement, l'intégration des TIC dans le contexte éducatif est liée au renforcement du paradigme de l'éducation tout au long de la vie. Ainsi, la majorité des universités considèrent que la demande de telles formations joue un rôle moteur dans l'intégration des TIC. Néanmoins, l'étude a conclu qu'il leur restait encore beaucoup à faire pour développer des stratégies globales concernant leur rôle dans le modèle de l'éducation tout au long de la vie.

**Coopération, partenariats et nouveaux modèles d'organisation**

L'un des objectifs de l'étude consistait à examiner la manière dont les universités coopèrent entre elles ou avec d'autres partenaires publics et privés, les types de modèles d'organisation appliqués dans le cadre de ces partenariats ainsi que les principales forces, faiblesses et conditions préalables liées à ces différents modèles.

*Coopération et partenariats avec des acteurs nationaux*

L'étude a démontré qu'environ la moitié des universités des États membres coopéraient avec d'autres universités de leur propre pays afin de proposer conjointement des cours de *e*Learning. L'étude a révélé trois niveaux généraux de coopération nationale entre les universités:

- réseaux ou consortiums nationaux soutenus ou amorcés à l'échelle nationale ou régionale, tels que l'Université virtuelle finlandaise ou la Fondation néerlandaise SURF[15].
- partenariats ou consortiums bilatéraux ou multilatéraux entre les universités, tels que le réseau Nettuno en Italie, le consortium CANEGE en France et le partenariat dans le secteur des soins de santé au Royaume-Uni[16].
- coopération articulée autour de projets *ad hoc*, telle qu'entre le Centre des technologies éducatives de l'Université de Umeå et les universités de Oslo et de Stockholm[17].

L'étude a observé certains avantages évidents offerts par de tels partenariats et coopérations à l'échelle nationale, notamment en termes de réduction des coûts, d'accès aux nouveaux marchés de services éducatifs et de mise à contribution des expériences de chacun. En fait, les partenariats peuvent être une condition préalable au développement des TIC, étant donné que différentes sources d'expérience et de financement sont nécessaires à la stimulation de ce dernier.

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[15] Pour de plus amples renseignements, on se référera aux profils des études de cas de l'Université virtuelle finlandaise et de l'Université de Utrecht (annexe G).

[16] Pour de plus amples renseignements, on se référera aux profils des études de cas de l'Université polytechnique de Milan, du consortium CANEGE et du partenariat britannique dans le secteur des soins de santé (annexe G).

[17] Pour de plus amples renseignements, on se référera au profil de l'étude de cas de l'Université de Umeå (annexe G).

D'autre part, les partenariats présentent aussi certaines faiblesses. L'étude a montré que la majorité des problèmes survenus au sein des partenariats procédaient de l'inadéquation des modèles d'organisation, due à un manque d'expérience en matière de coopération. Un développement conjoint requiert beaucoup de temps et des ressources énormes, notamment parce qu'il implique maints coûts inapparents, liés aux réunions, à la coordination, etc. Plusieurs partenariats ont eu du mal à estimer la demande en formations, un aspect problématique dans le cas des cours financés par les étudiants. Outre les problèmes liés aux modèles d'organisation, des divergences apparaissent souvent parmi les partenaires quant à leurs processus de travail et leurs cultures organisationnelles, et il s'avère en soi difficile de faire fonctionner efficacement un consortium d'universités autonomes.

Ainsi, l'étude a déterminé plusieurs conditions préalables à la réussite des partenariats :

- l'implication de la direction et une stratégie claire quant au lien et à l'intégration du partenariat dans les activités générales des universités;
- les affinités de chacun. Tous les partenaires impliqués doivent donc se connaître et disposer d'une vaste plateforme de partage des informations afin de pouvoir affirmer leur engagement dans le projet;
- les universités partenaires doivent de préférence présenter des structures internes et des modèles de chartre similaires. Ainsi, elles pourront reconnaître et comprendre les procédures internes apparentées et les problèmes éventuels. En cas de disparité des structures, il est important d'envisager l'impact des divergences existantes sur le projet;
- une stratégie de partenariat claire et de bonnes connaissances du marché. Par exemple, le niveau de qualité et d'ambition doit être convenu. Certaines institutions aspirent à devenir des leaders mondiaux, tandis que d'autres sont plus pragmatiques. Une analyse systématique des compétences requises pour développer et mettre en œuvre les différents aspects est également indispensable;
- un modèle d'organisation sain, qui répartit clairement les tâches et les responsabilités;
- les modèles d'organisation doivent trouver le juste milieu entre, d'une part, l'importance accordée à l'administration et aux ressources du projet et, d'autre part, les aspects liés à la pédagogie et au contenu des cours. Les partenariats et les modèles d'organisation ont tendance à voler la vedette aux considérations d'ordre éducatif, au risque de les marginaliser;

- finalement, le personnel doit ressentir la nécessité de l'initiative entreprise. Son sentiment doit être soutenu par la mise en place de mesures les encourageant à participer. L'implication du personnel dirigeant traduit engagement et priorité.

*Coopération et partenariats avec des acteurs internationaux*

L'existence de consortiums transnationaux entre les universités européennes n'est pas répandue, mais ce phénomène est à la hausse. Environ un tiers des universités des États membres coopèrent avec des universités d'autres pays dans l'objectif d'offrir conjointement des cours de *e*Learning. Le marché des services éducatifs en dehors de l'Union européenne, l'intégration renforcée du système ECTS, le soutien apporté à l'intensification de la coopération issue du processus de Bologne, la concurrence accrue pour le recrutement des étudiants et les exigences des étudiants sous l'impulsion de la mondialisation sont autant de facteurs qui jouent un rôle moteur. L'étude a révélé deux niveaux principaux de coopération transnationale entre les universités:

- coopération et partenariats à l'échelle européenne, tels que le projet MENU ("Model for a European Networked University for e-learning")[18];
- partenariats individuels, tels qu'entre l'Université ouverte de Catalogne et certaines universités d'Amérique latine[19].

Selon l'étude, le manque de souplesse des systèmes nationaux restreint les possibilités de voir apparaître un plus grand nombre de partenariats à long terme et le développement de formations conjointes. Les universités soulignent le besoin d'une action plus soutenue à l'échelle européenne et nationale en faveur de la coopération (c.-à-d. en termes de financement de projets pilotes et de projets de développement), de la mise en commun des expériences, de l'élaboration de normes technologiques communes ainsi que de la mise au point et du partage de matériel d'apprentissage.

*Coopération et partenariats en dehors du secteur universitaire*

Il est encore relativement peu courant de voir des partenariats public-privé et une coopération des universités européennes avec des partenaires externes au secteur universitaire. L'étude a démontré que seules 18 % des universités des États membres coopèrent avec d'autres fournisseurs de services éducatifs (tels que de sociétés privées) dans le but d'offrir conjointement des cours de *e*Learning. Parmi les

[18] MENU : http://www.hsh.no/lu/inf/menu/about.htm.
[19] Pour de plus amples renseignements, on se référera au profil des études de cas de l'Université ouverte de Catalogne (annexe G).

universités ayant établi un partenariat, l'étude a identifié trois modèles généraux de partenariat avec des acteurs privés:

- consortiums axés sur le développement conjoint de matériel d'apprentissage, tels que le consortium entre l'Université ouverte de Catalogne et la maison d'édition Planeta[20];
- coopération sur la base de projets, telle qu'entre l'Université polytechnique de Milan et Somedia dans le cadre de LaureaOnline, où Somedia est responsable de la solution technique et l'Université polytechnique du contenu des cours et des contributions apportées par les enseignants[21];
- externalisation des services informatiques, telle que dans le cas de l'Université de Utrecht qui a délégué son centre informatique à Cap Gemini/Ernst & Young[22].

Les résultats de l'étude semblent indiquer une tendance à délaisser les coopérations axées sur des projets avec différents partenaires publics et privés en faveur de modèles davantage basés sur des consortiums. Il semble que le modèle d'organisation de demain sera un compromis entre les différents types de partenaires (fournisseurs technologiques, sociétés multimédia, etc.).

L'étude a montré que, malgré leur ampleur plutôt restreinte et les défis qu'ils doivent relever, les partenariats public-privé présentaient des avantages précieux. Les coûts de développement de matériel de cours basé sur les TIC sont élevés. L'un des points forts des coopérations et des partenariats avec des acteurs privés réside donc dans l'accès à des ressources de financement externes qui rendent un tel développement possible. De même, les partenaires privés ont besoin des universités puisque, sans elles, ils ne sont pas à même de produire du matériel présentant le même degré de valeur académique. Par ailleurs, le mariage des compétences au sein d'un partenariat entre une université et des sociétés privées peut s'avérer fructueux. Les universités possèdent les connaissances académiques requises pour développer le matériel tandis que les sociétés privées, souvent, disposent des solutions technologiques, des connaissances relatives à la commercialisation des produits et d'un sens certain de l'assistance à la clientèle.

[20] Pour de plus amples renseignements, on se référera au profil de l'étude de cas de l'Université ouverte de Catalogne (annexe G).
[21] Pour de plus amples renseignements, on se référera au profil des études de cas de l'Université polytechnique de Milan (annexe G).
[22] Pour de plus amples renseignements, on se référera au profil des études de cas de l'Université de Utrecht (annexe G).

Pour ce qui est de l'externalisation des services informatiques, les avantages résident dans la professionnalisation de ces services et dans la réduction des coûts. De plus, l'université peut tirer profit de l'expérience et de l'esprit d'innovation du partenaire externe.

L'étude a souligné quelques faiblesses générales qu'il convient de noter en ce qui concerne les différents types de partenariats public-privé:

- Les facteurs incitant les universités et les sociétés privées à coopérer sont fondamentalement différents. Les universités mettent souvent l'accent sur la haute qualité du contenu de leurs cours, tandis que le regard des sociétés privées est tourné vers le retour sur investissement, ce qui peut déboucher sur un déséquilibre de leurs objectifs respectifs.

- L'implication des universités dans des partenariats public-privé nécessite qu'elles développent des modèles d'organisation. Cet exercice est profitable à plus d'un point de vue. Toutefois, vu qu'elles manquent d'expérience pertinente, la plupart des universités peinent à estimer la totalité des coûts impliqués.

- Toute coopération présuppose que les attentes des universités et des partenaires privés soient ajustées et explicitées dès le début. Une compréhension mutuelle s'impose quant à la raison d'être et aux motivations professionnelles de chacune des organisations participant au partenariat. L'université doit accepter que les motivations des partenaires privés soient axées sur la réalisation de bénéfices. À leur tour, les partenaires privés doivent s'accommoder du fait que les universités sont jugées sur la base de leur aptitude à fournir des cours de qualité.

- Pour ce qui de l'externalisation, on notera avant tout que la gestion proprement dite du partenariat ne peut pas être externalisée. Par conséquent, une surveillance très rigoureuse de l'exécution du contrat est de rigueur. En outre, les échéances contractuelles peuvent entraver une innovation soutenue du fait qu'elles motivent davantage le partenaire externe à recourir aux systèmes et structures existants plutôt que d'innover.

**Approches nationales de l'intégration des TIC et du *e*Learning dans les universités européennes**

L'étude a apporté une vue d'ensemble des différentes approches nationales des universités européennes vis-à-vis de l'intégration des TIC et du *e*Learning.

Elle a montré que l'intégration des TIC et le développement du *e*Learning dans les universités européennes figuraient parmi les principales priorités à l'ordre du jour politique des États membres. Néanmoins, il existe de grandes divergences entre les pays quant au degré d'influence des autorités nationales sur les universités et au rôle actif joué par les ministres nationaux ou régionaux dans le soutien directement apporté à l'intégration des TIC dans les universités. Certains États membres, tels que l'Autriche, la Finlande, la France, l'Allemagne, la Grèce, le Luxembourg et le Portugal, ont défini des stratégies et plans d'action nationaux spécifiquement axés sur l'application des TIC et du *e*Learning dans les universités[23]. D'autres, tels que le Danemark, l'Italie, l'Irlande et la Suède, ne possèdent pas de stratégies nationales ou ont intégré ces aspects dans des stratégies plus générales[24]. En soi, une stratégie nationale axée sur l'intégration des TIC et le *e*Learning n'est ni une condition préalable au processus d'intégration dans les universités européennes, ni un indicateur du niveau réel d'intégration des TIC dans les universités des pays concernés. Toutefois, l'étude a clairement démontré que la priorité et l'attention accordées à l'intégration des TIC et au *e*Learning au niveau central (c.-à-d. soit par les ministères nationaux, soit par les autorités régionales) jouent un rôle moteur crucial dans l'intégration des TIC. Elles procèdent d'institutions nationales ou de programmes bénéficiant d'un soutien national. Des institutions nationales, telles que le JISC au Royaume-Uni et la Fondation SURF aux Pays-Bas, et des programmes nationaux, tels que UkeU au Royaume-Uni et Campus Numérique en France, jouent un rôle crucial dans la coordination et le lancement de projets à grande échelle que les universités ne seraient pas à même d'entreprendre seules[25].

Dans certains pays, tels que la Suède, la Finlande, la France et le Royaume-Uni, des universités virtuelles nationales ont été créées[26]. L'étude a montré que plusieurs

[23] Pour de plus amples renseignements, on se référera aux profils de l'Autriche, de la Finlande, de la France, de l'Allemagne, de la Grèce et du Portugal (annexe G).
[24] Pour de plus amples renseignements, on se référera aux profils du Danemark, de l'Italie, de l'Irlande et de la Suède (annexe F).
[25] Pour de plus amples renseignements, on se référera aux profils du Royaume-Uni, des Pays-Bas et de la France (annexe F).
[26] Pour de plus amples renseignements, on se référera aux profils de la Suède, la Finlande, de la France et du Royaume-Uni (annexe F).

modèles différents étaient appliqués. On trouve des institutions parapluies virtuelles qui développent des portails de diffusion et/ou des cours de *e*Learning ainsi que des programmes nationaux conçus pour établir des partenariats entre les universités à même de développer des cours de *e*Learning. La tendance observée dans les États membres semble se diriger vers un soutien des réseaux existants ou la création de nouveaux réseaux de moindre envergure que les réseaux nationaux plutôt que vers la construction d'universités virtuelles nationales, comme cela a été le cas jusqu'ici.

L'Europe se révèle relativement unanime quant à la nature des facteurs clés incitant les universités à intégrer les TIC. Les trois facteurs le plus souvent cités sont:

- l'internationalisation et la mondialisation des formations, ce qui, d'une part, débouche sur une plus grande ouverture envers l'Union européenne et un intérêt évident pour le processus de Bologne et, d'autre part, accroît la compétitivité et l'orientation des universités vers le marché;
- la demande des étudiants en TIC. Les étudiants suivant des cours de base sont habitués à utiliser les TIC au quotidien et attendent des institutions qu'elles appliquent ces technologiques dans leur enseignement et leur administration. Parallèlement, la demande de formations tout au long de la vie va croissante, tout comme l'exigence d'une inclusion sociale englobant de nouveaux groupes d'étudiants. Ici, de nouveaux marchés s'ouvrent aux universités, mais ces nouveaux étudiants requièrent une plus grande accessibilité et davantage de souplesse;
- la nécessité pour les universités d'améliorer l'efficacité et la qualité de leur enseignement et de leur administration. Partout en Europe, on observe un certain intérêt pour l'amélioration de la qualité de l'enseignement par le biais du développement de nouvelles méthodes basées sur les TIC. Par ailleurs, l'accent est généralement mis sur la réduction des coûts et la libération de ressources au profit du développement très coûteux des TIC.

Il n'en reste pas moins nécessaire d'établir la confiance dans les cours de *e*Learning. De nombreux pays redoutent une qualité médiocre des formations non certifiées. Afin de relever ce défi, il est indispensable de mettre sur pied un système qui garantit la qualité des formations et la reconnaissance nationale des cours suivis dans d'autres pays. Pour ce faire, une procédure d'évaluation et d'assurance de la qualité et un système d'accréditation reconnu internationalement s'imposent.

Quoi qu'il en soit, même si elle est particulièrement importante pour l'enseignement sur campus et les cours de *e*Learning en Europe, la question des systèmes d'assurance qualité se voit éclipsée par les universités virtuelles et les partenariats en matière de *e*Learning. Dans la majorité des États membres, cette question n'est traitée ni au niveau national, ni au sein des universités.

Par ailleurs, la normalisation des métadonnées représente, elle aussi, un défi clé. Tant au niveau universitaire que national, peu d'attention est accordée à la nécessité d'une telle normalisation. La majorité des pays viennent seulement de commencer à débattre des métadonnées et du lancement de projets pilotes, et la question des normes est considérée n'en être qu'à un stade insuffisant. Bien que la normalisation des métadonnées, à l'heure actuelle, ne soit perçue ni comme un élément clé ni comme une entrave, on s'attend à ce que son absence devienne un problème dans un avenir proche. Du fait du développement accru des ressources d'apprentissage numérique, la question de la normalisation des métadonnées sera d'actualité dès qu'il s'agira de partager les ressources (et donc les coûts élevés de développement). La normalisation des métadonnées et les métadonnées en général sont des aspects importants de la réutilisation, de la mise à l'échelle et du partage des ressources d'apprentissage numérique et des cours de *e*Learning. Tant au niveau européen que mondial, les normes SCORM, AICC et LOM se généralisent.

**Recommandations**

Sur la base de ses analyses et des conclusions de l'étude, la société *PLS RAMBOLL Management* a formulé les recommandations ci-après. Ces recommandations visent les différents niveaux impliqués dans les formations supérieures:

- le niveau européen;
- le niveau national;
- le niveau universitaire;
- les domaines nécessitant de plus amples recherches.

*Niveau européen*

De façon générale, les recommandations visant le niveau européen sont articulées autour de la structuration et la diffusion des expériences et des bonnes pratiques. Nombreuses sont les universités qui s'inspirent de leurs homologues faisant l'objet d'un processus similaire ou ayant relevé des défis semblables. L'Union européenne à ici un rôle potentiel à jouer dans la structuration de ces opérations.

- Plusieurs pays ont suggéré de former une association comprenant les universités européennes jouissant d'une certaine expérience dans le domaine du *e*Learning et intéressées par l'idée de proposer des formations conjointes et, de façon générale, de publier leurs bonnes pratiques et leurs expériences en matière de pédagogie basée sur les TIC et de développement de matériel. Nous recommandons à l'Union européenne soit de soutenir directement une telle initiative, soit d'attribuer cette tâche à une organisation existante. L'association pourrait se charger de diffuser les expériences et les bonnes pratiques sur le Web.

- Les procédures d'évaluation et d'assurance de la qualité des cours de *e*Learning deviendront probablement une question charnière lorsque le développement de cours de *e*Learning et de matériel commun basé sur les TIC commencera à prendre forme. Ces questions sont généralement traitées au niveau universitaire, mais l'étude a montré qu'il restait encore beaucoup à faire avant que des modèles d'assurance de la qualité ne soient élaborés. Nous suggérons dès lors à l'Union européenne de commencer par appuyer le développement de tels modèles par les universités. De plus, l'élargissement de la coopération internationale exigera des systèmes axés sur des normes en la matière. L'initiative de l'Union européenne pourrait avant tout consister à définir des normes communes dans le domaine de l'assurance qualité. Par ailleurs, l'Union européenne pourrait se charger de diffuser les bonnes pratiques issues des modèles préexistants et de compiler et diffuser des listes de contrôle sur les questions dont il y a lieu de tenir compte dans l'élaboration des normes d'assurance qualité.
- Le manque de matériel de cours de haute qualité, basé sur les TIC, constitue un obstacle majeur. Le processus exige des ressources énormes et des compétences au-delà des limites disciplinaires. Par conséquent, l'Union européenne devrait encourager et soutenir le développement de ressources d'apprentissage dans son prochain programme *e*Learning. En outre, nous recommandons à l'Union européenne de jouer un rôle actif dans la prestation de conseils en matière de pédagogie et de développement des cours.
- Le développement et l'application de métadonnées communes normalisées sont considérés d'une importance capitale pour le développement et le partage des ressources d'apprentissage numérique. Cependant, il est indispensable de clarifier si les métadonnées utilisées dans les formations supérieures en Europe doivent respecter les normes industrielles ou si des normes distinctes doivent être définies conformément aux modèles pédagogiques existant en Europe. *PLS RAMBOLL Management* recommande à l'Union européenne de prendre l'initiative d'un débat entre des représentants des universités, des États membres et du monde des entreprises en vue de

clarifier cette question et de prendre une décision. Nous encourageons l'Union européenne à examiner les différentes possibilités et à soutenir les initiatives visant à établir des normes européennes communes en matière de métadonnées. De plus, l'Union européenne devrait déterminer s'il y a lieu d'inclure un critère ou une exigence dans le nouveau programme *e*Learning afin que les universités démontrent la façon dont elles entendent appliquer les normes sur les métadonnées.

- Les droits de propriété intellectuelle et les systèmes de rémunération doivent être passés en revue afin d'intensifier le partage et la réutilisation des ressources d'apprentissage. Nous encourageons l'Union européenne à examiner les différentes possibilités et à soutenir les initiatives visant à trouver une réponse à cette question.
- On observe une tendance générale vers une intensification des partenariats nationaux et transnationaux. Néanmoins, l'étude souligne qu'une structuration et un soutien à l'échelle européenne sont indispensables pour rapprocher les partenaires pertinents partageant des intérêts communs ainsi qu'une approche et une culture organisationnelle semblables. Les universités ont besoin de connaître les autres universités se trouvant au même stade et faisant face aux mêmes défis qu'elles ou les autres universités dont l'expérience pourrait leur être profitable. L'Union européenne pourrait envisager de créer un site Web comprenant des exemples de bonnes pratiques et une "banque" de partenaires potentiels parmi les autres universités. De plus, *PLS RAMBOLL Management* recommande que le programme *e*Learning soit largement axé sur le développement de partenariats.
- À cet égard, nous encourageons l'Union européenne à stimuler l'établissement de centres d'excellence capables d'assister les universités dans leur conquête conjointe de nouveaux marchés de formations universitaires tant au sein qu'en dehors de l'Union européenne.
- On observe une tendance en faveur d'une intensification des partenariats et de la coopération avec d'autres universités et partenaires privés. L'étude a démontré que le développement d'un modèle d'organisation réalisable est une condition préalable capitale à la réussite de ce processus et que les universités possèdent relativement peu d'expérience dans ce domaine. Nous invitons l'Union européenne à définir et diffuser des lignes directrices sur l'élaboration de modèles d'organisation pour différentes formes de partenariats ainsi qu'à mettre en avant les exemples de bonnes pratiques pertinents.

*Niveau national*

- Il est crucial de faire de l'intégration des TIC dans les universités une priorité majeure au niveau national et de définir des objectifs stratégiques. Savoir si ces objectifs doivent être définis dans le cadre d'une stratégie visant les TIC dans les universités ou s'ils doivent être intégrés dans des stratégies plus vastes couvrant, par exemple, tout le domaine des formations supérieures ou la société de l'information est d'une importance secondaire.
- L'existence d'institutions nationales et régionales engagées dans les TIC est capitale. Ces institutions peuvent soit donner le coup d'envoi au développement des TIC, soit relancer et diriger ce développement dans une certaine direction, par le biais de leur assistance, de leur soutien et de leurs conseils. L'établissement ou le soutien de telles institutions nationales est recommandé.
- La mise en place de réseaux garantissant la diffusion générale des bonnes pratiques et des expériences en matière de pédagogie et de matériel basé sur les TIC est vivement souhaitable. Le niveau national est invité à soutenir de tels réseaux.
- L'élargissement du système ECTS et le processus de Bologne favorisent un renforcement de la coopération entre les pays. Néanmoins, certains systèmes nationaux manquent encore de souplesse et continuent donc d'entraver l'avènement d'un plus grand nombre de partenariats à long terme et le développement de formations conjointes. Le niveau national est encouragé à prendre des initiatives pour accroître la souplesse des systèmes nationaux et à prendre part à l'élaboration de normes ou d'accords communs en la matière.
- Des procédures d'évaluation et d'assurance de la qualité doivent être définies dans le domaine du *e*Learning en vue de soutenir ce dernier et la mobilité virtuelle. Ainsi en va-t-il également pour les accréditations, les certifications et l'authentification des étudiants. Ces questions sont généralement traitées au niveau universitaire, mais le niveau national est invité à soutenir les initiatives visant des normes ou des accords communs.
- Le développement et l'application de métadonnées communes normalisées sont considérés d'une importance capitale pour le renforcement de l'intégration des TIC et le partage des ressources d'apprentissage numérique. Le niveau national est invité à participer aux initiatives transnationales concernant la définition de normes européennes communes ainsi qu'à privilégier la normalisation des métadonnées et à soutenir leur application et leur développement en les intégrant dans les stratégies et plans d'action nationaux.

*Niveau universitaire*

- Notre analyse indique que l'existence d'une stratégie en matière de TIC joue un rôle moteur dans l'intégration de ces technologies. Il est recommandé aux universités de définir une stratégie spécifique en la matière ou d'intégrer les TIC dans leur stratégie universitaire générale.
- Il n'existe aucun modèle universel de *e*Learning et d'intégration des TIC qui soit optimal. L'intégration des TIC et le *e*Learning doivent correspondre aux objectifs de l'université et les appuyer en conséquence. Il est recommandé d'adopter une approche holistique des objectifs et défis des universités et d'envisager les aspects que les TIC seront à même de soutenir. Les TIC doivent être considérées non pas comme un élément problématique, mais comme un outil servant à relever les défis en présence.
- Les projets pilotes sont importants, mais il est recommandé aux universités de commencer par intégrer les TIC dans leur fonctionnement normal et de déterminer des modèles durables à cet effet.
- L'implication de la direction est cruciale si l'on veut garantir l'intégration des TIC dans toutes les opérations de l'université et pas seulement au niveau de projets individuels.
- Il est recommandé de diffuser les bonnes pratiques et les expériences en matière de pédagogie et d'élaboration de matériel à l'échelle universitaire ainsi que de participer aux réseaux nationaux et transnationaux.
- Une unité TIC performante et une structure de soutien efficace peuvent contribuer à l'intégration des TIC et au *e*Learning et sont une condition préalable à la réussite de l'application des TIC dans tous les aspects des activités d'une université. Une structure organisationnelle englobant une assistance professionnelle pour l'intégration des TIC et permettant des initiatives locales est recommandée si l'on veut garantir une développement professionnel et des connaissances de base.
- Depuis de nombreuses années, de fidèles enthousiastes ont joué un rôle prépondérant dans l'intégration des TIC. Afin d'encourager cette intégration dans le fonctionnement général et les activités de l'université, il est recommandé de stimuler le groupe intermédiaire des facultés et des enseignants, ce groupe étant la clé principale du renforcement et de l'ancrage du développement de l'intégration des TIC.
- Outre le manque de connaissances et de compétences en la matière, les principales entraves à l'intégration des TIC résident dans l'attitude négative adoptée à leur égard. Nous recommandons: 1) de prendre des mesures d'encouragement afin d'impliquer l'ensemble de l'université (et notamment le

personnel universitaire) dans l'intégration des TIC. Les enseignants doivent être récompensés de leur travail. La structure de planification des carrières des enseignants devrait être développée davantage et les compétences TIC devraient y être intégrées. Cette démarche devrait également être liée à la structure de rémunération; 2) de garantir une formation sur l'application technique, et plus particulièrement pédagogique, des TIC; 3) de fournir une assistance technique et administrative aux enseignants; 4) de déterminer le mode de rémunération des professeurs et des enseignants pour l'élaboration du contenu des cours.

- Des procédures d'évaluation et d'assurance de la qualité doivent être définies dans le domaine du eLearning en vue de soutenir ce dernier et la mobilité virtuelle. Ainsi en va-t-il également pour les accréditations, les certifications et l'authentification des étudiants. Ces questions sont généralement traitées au niveau universitaire, mais nous encourageons la participation à des initiatives transnationales afin d'asseoir la mobilité au-delà des frontières nationales.
- Le manque de matériel de cours de haute qualité constitue un obstacle majeur. Nous encourageons les universités à développer les ressources d'apprentissage et à les partager avec d'autres universités.
- L'application de métadonnées communes normalisées est considérée d'une importance capitale pour le développement et le partage des ressources d'apprentissage numérique. Nous encourageons les universités à appliquer des métadonnées normalisées ainsi qu'à prendre part à des initiatives transnationales visant à définir des normes européennes communes.

*Domaines nécessitant de plus amples recherches*

Nos entretiens avec les experts et les représentants gouvernementaux ainsi que les études de cas ont souligné qu'il était souhaitable de poursuivre les recherches dans les domaines suivants:

- Questions d'ordre pédagogique et didactique: Des recherches s'imposent sur les pédagogies de *e*Learning et les interactions pédagogiques entre les étudiants et leurs enseignants. Autres domaines: Comment développer pour le *e*Learning une "infrastructure sociale" qui garantisse que les étudiants n'abandonnent pas trop vite leurs études? Comment accroître la convivialité des outils? Comment se servir d'environnements d'apprentissage virtuel pour accroître l'efficacité des contextes d'apprentissage? Enfin, on réalisera des recherches sur le manque de connaissances quant aux risques et conséquences liés à certaines approches du *e*Learning.

- Questions d'ordre organisationnel liées aux TIC et au *e*Learning au niveau des formations supérieures: la gestion de l'innovation, la durabilité des solutions et la manière de renforcer la réceptivité de la direction des universités à l'égard de l'innovation.
- Études de coûts et de gains sur les TIC et l'apprentissage virtuel: Dans quels cas les TIC sont-elles efficaces? Dans quels cas les TIC sont-elles nécessaires (*avons*-nous d'ailleurs besoin des TIC)?
- Pratiques d'excellence en termes de développement du contenu des cours. Définition de normes communes.
- Les TIC et le *e*Learning ont-ils modifié les procédures d'examen et d'évaluation? Est-il nécessaire de forger de nouvelles procédures d'évaluation?
- L'environnement physique constitue-t-il un obstacle à l'application intensive des TIC sur les campus universitaires? En termes d'agencement de l'environnement physique, quelles seraient les bonnes pratiques qui permettraient d'améliorer l'assistance offerte et d'exploiter les TIC?
- L'application plus vaste des TIC et le *e*Learning ont-ils changé la donne parmi les universités européennes en ce qui concerne les frais d'inscription? Quels sont les modèles à venir pour ces frais?
- Développement de nouvelles méthodes d'évaluation et d'estimation de la qualité du *e*Learning. Comme assurer la qualité des cours de *e*Learning et les accréditer?
- Modifier l'attitude et la culture des enseignants: Comment créer des facteurs incitants à améliorer l'enseignement et à appliquer des environnements d'apprentissage basés sur le Web?
- Questions de genre: Pourquoi la majorité des étudiants suédois suivant des cours en ligne sont-ils des femmes? S'agit-il d'une tendance internationale? Le cas échéant, pourquoi? Comment rendre les cours en ligne plus attrayants pour les hommes?
- Questions liées à la mise à l'échelle: Comment les projets pilotes entrepris en matière de TIC dans un département ou deux peuvent-ils être étendus avec fruit à l'ensemble de l'université concernée?

# 1. Introduction

This Final Report is the third and final deliverable for the project "Study of virtual models of universities", contract no. 2002-0951/001-001 EDU ELEARN. The study is Lot 1 of the four studies presented in the context of the e-learning initiative by the European Commission, DG Education and Culture.

The overall purpose of the study is to provide the Commission with a detailed report on the current and possible future use of ICT by European universities for educational and organisational purposes.

This Final Report presents the results arising from the four overall priorities in the Programme of Work for the study:

- A general description of the current situation regarding the use of ICT in EU universities in both the educational and the organisational setting.
- An in-depth study of selected institutions through case studies.
- A future-oriented analysis.
- A set of recommendations for future action.

## 1.1. Focus of the report – questions to be answered

Below, the study questions and themes contained in the report are presented.

**National approaches to ICT integration and e-learning**

- What are the overall national approaches to the development of ICT integration and e-learning that exist among the EU's universities?
- Have national strategies been developed in the EU Member States concerning ICT integration and e-learning in their universities?
- What examples of national initiatives can be identified regarding ICT integration and e-learning?
- From the national perspective, what are the main drivers for extended ICT integration and e-learning in the EU Member States?
- Have any national actions been taken concerning the quality assurance and accreditation of e-learning courses?
- Have any national initiatives been taken concerning the interoperability of systems and metadata standards?

- What are the experiences of content brokerage at the European and national levels?

**Current status, future trends and scenarios for the EU universities regarding the use of ICT and e-learning**

- What is the current overall status concerning the use of ICT and e-learning in the universities of the EU Member States in both the educational and the organisational settings?
- What trends can be identified as regards the integration of ICT in European universities?
- What are the possible scenarios for ICT integration in the universities of the EU Member States?

**The use of ICT in the organisational setting in the EU universities**

- How is ICT used in the organisational setting?
- How widespread are basic technologies like computers, Internet access and university intranets?
- How is the development of ICT being funded?
- What are the main drivers for the use of ICT in the organisational setting?
- What are the main challenges and obstacles for the use of ICT in the organisational setting?
- What are some good practice examples of ICT integration in the organisational setting?
- What are the main priorities of the universities concerning the integration of ICT in the organisational setting in the future?

**The use of ICT in the educational setting in the EU universities**

- How is ICT being used in the educational setting in the EU's universities?
- What is the status of ICT integration in campus-based teaching?
- What is the status of e-learning initiatives in the universities?
- How are the e-learning courses being accredited?
- How are the e-learning courses being quality assured?
- What are the main drivers for the use of ICT in the educational setting?
- What are the main challenges and obstacles for the use of ICT in the educational setting?
- What examples of good practice in ICT integration and e-learning in the educational setting can be presented?

- What are the main priorities of the universities concerning ICT integration and e-learning in the educational setting in the future?

**Status and trends regarding virtual, physical and social mobility and the use of ICT and e-learning**

- How is virtual mobility being supported in European universities by ICT integration and e-learning?
- How is campus culture being influenced by ICT integration and e-learning?
- How are social inclusion and new groups of students being supported by ICT integration and e-learning?
- How can ICT integration and e-learning support regional development?
- How is lifelong learning being supported by ICT and e-learning?

**Status and trends regarding strategic co-operation, partnerships and new business models**

- What are the main drivers for co-operation and partnerships?
- What is the status concerning co-operation between universities at the national and trans-national levels?
- What is the status of strategic co-operation between the universities and other partners, e.g. public-private partnerships?
- What are the main examples of strategic co-operation and partnerships?
- What are the strengths and weaknesses of the various partnership and business models?
- What are the future trends and scenarios as regards strategic co-operation and partnerships?

The Terms of Reference are presented in Annex D.

## 1.2. Understanding virtual universities – a conceptual framework

In this section we briefly present our understanding of the conceptual framework and the key concepts relevant to this study.

With the 'e-Europe 2005 plan'[27], the 'e-learning action plan'[28] (and the Communication from the Commission entitled *The role of the universities in the Europe of knowledge*[29]), the EU has demonstrated its focus on promoting the development of Europe towards *"becoming the most competitive and dynamic knowledge-based economy in the world, capable of sustainable economic growth with more and better jobs and greater social cohesion".* Europe's universities have an important role to play in attaining this objective, and it is therefore of key importance that they should be capable of meeting the demands of the new information society.

However, for the universities to achieve the goals of e-Europe 2005, and to head off the intensified international competition and other challenges which they are currently facing, they have to find new mechanisms. The integration of ICT is seen both as one of the new challenges and as a tool to meet these challenges. The number of related conferences, projects and publications in recent years indicates that such development is increasing rapidly. The debate has been very intensive, and has covered many aspects of university life.

The emphasis in this study is on the current and possible future deployment of ICT in the universities of the EU for both educational and organisational purposes. This focus is very broad, and therefore a definition of some of the key issues and concepts is in order.

***Universities****:* During recent years, the boundaries between universities and other forms of higher education in Europe have become blurred. In general, a university is understood as being an institution that offers multidisciplinary medium-length and long courses for students of at least 17 years of age who hold an upper secondary qualification (Leaving Certificate or equivalent) and meet institutional and course requirements. Courses can lead to qualifications at degree level, postgraduate level and doctorate level, as well as to some non-university degrees. However, it is almost impossible to get any nearer to a generic definition that is applicable to all member countries. Therefore PLS RAMBOLL Management has chosen to take each member state's own classifications in the Eurydice database of European education systems[30] as its starting point. Accordingly, in this study a university is defined as an educational institution

[27] E-Europe 2005: http://europa.eu.int/information_society/eeurope/2005/index_en.htm
[28] The e-learning action plan:
http://europa.eu.int/eurlex/en/com/cnc/2001/com2001_0172en01.pdf
[29] The role of the universities in the Europe of Knowledge:
http://europa.eu.int/eur-lex/en/com/cnc/2003/com2003_0058en01.pdf
[30] EURYDICE: http://www.eurydice.org/

which is treated as a university by the Member State in which it is located. This means that in some Member States, the Open Universities are included. One should be aware that the Open Universities are rather different from the traditional universities in terms of their strategies and learning models. We have left out universities with less than 500 students, and also some military academies.

***Virtual universities**:* 'Virtual university' is a term used to describe several different types of university which offer their courses in e-learning format. The term 'virtual university' sometimes means a university which exists only virtually, and where no physical contact or meeting place exists. However, there are different organisational models for virtual universities; the term can describe Internet portals that direct their visitors to e-learning courses offered by any of several different universities, consortia of universities that offer their e-learning courses jointly, and also individual universities whose courses are held on a virtual campus instead of a physical one. Some universities with a physical campus are also developing virtual counterparts comprising a virtual campus that offers courses in e-learning format. In this study, we use the term broadly to encompass all the different models mentioned above.

***ICT in the organisational setting**:* The term 'use of ICT in the organisational setting' refers to how the universities are using ICT both administratively (e.g. for supplying course information or enabling course and exam registration) and for reinforcing and supporting their organisational structures and internal and external communication.

An additional focus of this study is the organisational factors that can influence the use of ICT at university level, e.g. the existence of an ICT strategy, the role of the management, the physical environment, the role and structure of the ICT unit, the technological infrastructure, the incentives that encourage the teachers to use ICT, and so on.

***ICT in the educational setting**:* All types of the universities' educational offerings are considered in the study, including both basic academic training and supplementary training. In the educational setting, ICT is used for campus-based teaching as well as for e-learning.

ICT is being integrated into on-campus teaching in lectures (e.g. by the use of presentation programs, databases or simulation modules in the actual teaching situation) or via the use of electronic learning environments for the interchange of information, communication and co-operation during the course.

In this study, the term ‘e-learning’ is used to refer to different forms of ICT-supported learning. By ‘e-learning’, we mean courses where

a) the teaching and learning process involves the use of ICT.
b) there is an element of physical separation between teacher and student.

In e-learning, ICT is used for the interchange of information and for supporting communication between teachers and students. E-learning can be 100% virtual, for example when a course is followed via the Internet, but the definition of e-learning given above also includes formats in which distance learning is combined with physical meetings or seminars held at the university (also known as ‘blended learning’). Courses through which students study at locations other than the university, but where communication with the academic staff of the university is supported by ICT (a model which is also known as decentralised learning) are also described as e-learning in this study.

In this study, the terms ‘ICT integration’ and ‘e-learning’ will encompass all the above-mentioned ways of using ICT in universities.

### 1.3. Data-generating activities and methodology

The analysis and results in the present report are based on:

- A desk study of websites, organisations, strategies and other reports and documentation.
- A questionnaire-based survey undertaken among all EU universities (response rate = 41%).
- Telephone interviews with government and other national representatives from each of the 15 Member States.
- Eight good-practice case studies carried out through on-site visits and involving interviews with management, academic staff, technical staff, students and other stakeholders. The case study institutions selected were:
    - University of Utrecht, the Netherlands
    - University of Umeå, Sweden
    - Politecnico di Milano, Italy
    - University of Bremen, Germany
    - UKeU and the UK Education Healthcare Partnership, United Kingdom
    - Campus Numérique and the Canege Consortium, France
    - The Finnish Virtual University, Finland
    - The Open University of Catalonia, Spain.

- Interviews with experts from the Member States, as well as experts from the accession countries and countries whose universities are well advanced in their use of ICT.
- Interviews with stakeholders.

A thorough presentation of the methodology and the various data-generating activities is presented in Annex B.

### 1.4. The approach and structure of the report

In accordance with the specifications contained in the Terms of Reference (see Annex D), PLS RAMBOLL Management has structured the current report into nine chapters.

**At the beginning of the report,** the findings of the study will be summarised in French and in English. The summaries will be delivered in the Final Report after the incorporation of the Commission's comments. **Chapter 1** describes the scope of the study and the structure and approach of the report. **Chapters 2–7** provide a general description of the current situation in the field, as well as a future-oriented analysis of ICT integration and e-learning in the universities. **Chapters 8 and 9** present conclusions and recommendations for future action.

*Chapter 2* contains an overview of the current and future use of ICT and e-learning in the universities of the EU Member States. The chapter revolves around a cluster analysis of the responses which were supplied by the EU universities during the survey.

*Chapter 3* describes the use of ICT in the universities' organisational settings. The data used in this chapter consist of the survey results, examples drawn from the case studies, expert interviews and information derived from the desk study.

*Chapter 4* presents the use of ICT in the educational setting in the EU Member State universities on the basis of data obtained from the survey, as well as the case studies, the desk study, and interviews with government representatives and experts.

*Chapter 5* discusses the issues concerning virtual, physical and social mobility on the basis of data obtained from the survey, the case studies, expert interviews and the desk study.

*Chapter 6* describes the various types of co-operation, partnerships and business models involving ICT integration and e-learning that exist among the EU Member States' universities. The relevant data have been derived from the desk studies conducted, the survey results and the case studies.

*Chapter 7* presents an overview and analysis of the national approaches and initiatives of the EU Member States concerning ICT integration and e-learning in their universities. This chapter is based mainly on interviews with government and other national representatives.

*Chapter 8* aggregates the conclusions from each of the preceding chapters into an account of the status and trends regarding the use of ICT integration and e-learning in the EU universities. In addition to this aggregated picture, some future scenarios of ICT integration and e-learning are presented.

*Chapter 9* contains PLS RAMBOLL Management's proposals and recommendations for future action and study.

Annex F contains country profiles for each of the 15 Member States.

In Annex G, the eight case studies are presented and analysed in eight separate case profiles.

# 2. *The landscape of ICT integration and e-learning among Europe's universities*

This chapter presents an overview of the current use of ICT in the universities of the EU Member States. On the basis of a cluster analysis of the EU universities' questionnaire responses, we have divided the participating universities into four clusters, representing four models of how the European universities differ in their approaches to ICT in the educational and organisational settings, their use of e-learning, and their involvement in partnerships at both national and international levels[31]. The chapter accordingly answers the following main questions:

- What is the current status concerning the use of ICT in the universities of the EU Member States?
- What trends can be identified regarding the integration of ICT in Europe's universities?
- What are the possible scenarios for ICT integration in the universities of the EU Member States?

Cluster analysis is a statistical methodology that analyses patterns in the responses to key questions. Please refer to Annex B for further methodological information.

The clusters are defined in relation to the responses given to key questions in the questionnaire which quantify the following parameters:

- How ICT is used in an organisational context
    - Whether the universities have an ICT strategy
    - Whether ICT is used for course and examination registration.
- How ICT is used in education
    - Whether support is available to the teachers
    - Whether and how ICT is used in lectures.
- Whether the use of ICT has increased within the past two years.
- Whether the universities offer courses in e-learning format.
- The attitudes towards the use of ICT among management, academic staff and students.

[31] The questionnaire data includes the answers from four Open Universities; three are included in the cluster analysis, with two belonging to cluster 1 and one to cluster 3. Therefore the inclusion of the Open Universities does not distort the picture concerning the more traditional EU universities.

- Whether and how the universities enter into co-operation with national or foreign universities.
- Whether and how the universities enter into co-operation with private sector partners.

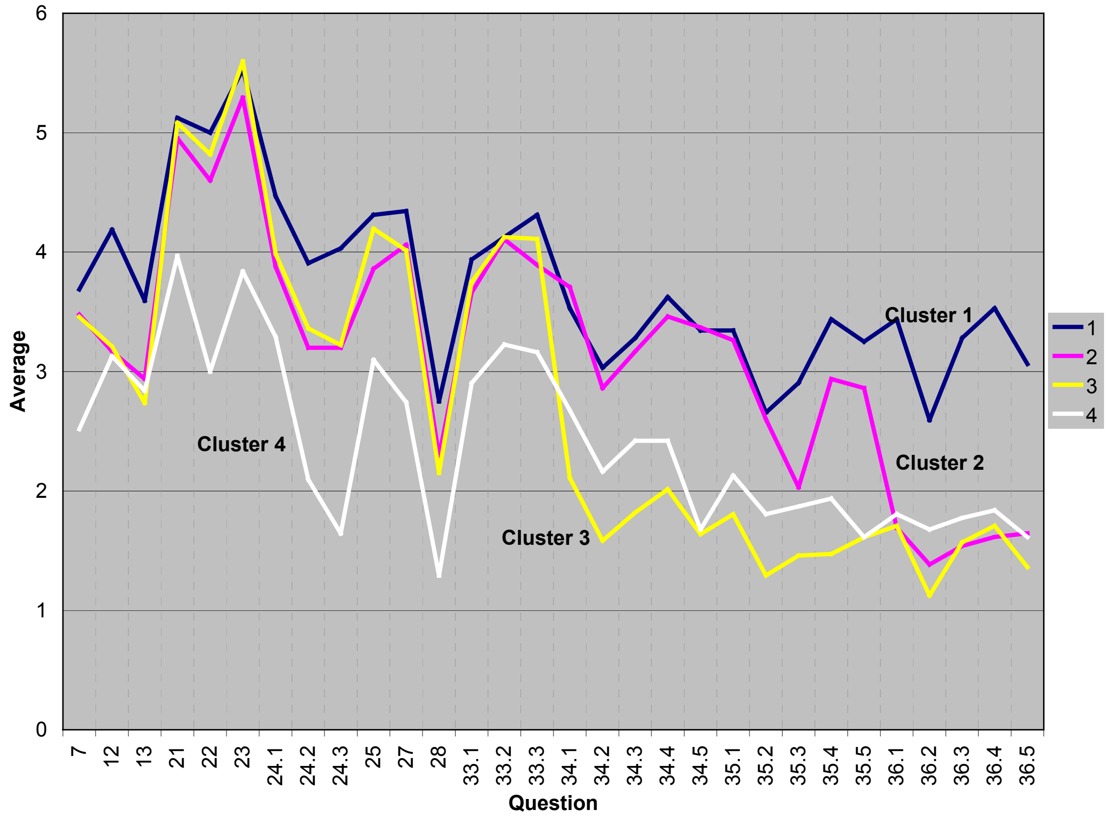
## 2.1. Four clusters

In the analysis, the replies given by the 200 European universities which responded to the survey produced a division into four university clusters which for illustrative purposes we have named in accordance with their main characteristics:

- Cluster 1: The front-runners (16% of the universities, n=32)
- Cluster 2: The co-operating universities (33%, n=65)
- Cluster 3: The self-sufficient universities (36%, n=72)
- Cluster 4: The sceptical universities. (15%, n=30).

The figure below presents an overview of the key issues which differentiate these four clusters, based on their averaged responses to the key questions. The figure shows that although many similarities exist, there is also a clear pattern of differentiation. The first cluster achieved the highest score on all the questions, and accordingly represents those universities which are the furthest advanced in terms of ICT integration / e-learning. Clusters two and three had very similar scores on many of the questions, but differed in their answers to questions 22, 34 and 35 concerning the availability of ICT support for teachers and the level of co-operation with other universities and other partners (such as private sector partners). The fourth cluster received the lowest average score on most questions concerning the level of ICT integration in the organisational or the educational setting, but is a little further ahead than the cluster three universities in its level of co-operation with other entities.

**Figure 2.1: The four clusters distributed according to the universities' averaged responses to key questions**




Before the four clusters and their characteristics are described more thoroughly, their main characteristics will be summarised in the figure below.

**Figure 2.2: The four clusters: Main characteristics**

| Cluster one: 'The front-runners' | Cluster two: 'The co-operating universities' |
|---|---|
| • 75% have a formal ICT strategy<br>• Substantial use of online registration for courses<br>• ICT is integrated in the teaching on campus to a very large extent<br>• Substantial numbers of e-learning courses are incorporated in basic academic training and in supplementary training<br>• Very positive attitudes towards ICT among both management, teachers and students<br>• Substantial funding for ICT from the universities themselves<br>• Huge involvement in strategic co-operation with domestic and foreign universities, as well as with other suppliers of education | • 63% have a formal ICT strategy<br>• Digital services such as online course registration are not as widespread<br>• ICT is integrated in the teaching on campus to a very large extent<br>• E-learning courses are offered to a minor degree in basic academic training and supplementary training<br>• Positive attitudes towards ICT, especially among management and students. Some sceptical teachers.<br>• Funding consists of a mixture of government funding and funding from the universities themselves<br>• Huge involvement in strategic co-operation with domestic and foreign universities, as well as with other suppliers of education |

| Cluster three: 'The self -sufficient universities' | Cluster four: 'The sceptical universities' |
|---|---|
| • 60% have a formal ICT strategy<br>• Digital services such as online course registration are not as widespread<br>• ICT is integrated in the teaching on campus to a very large extent<br>• A considerable number of e-learning courses are incorporated into basic academic training and supplementary training<br>• Positive attitudes towards ICT, especially among management and students. Some sceptical teachers.<br>• Substantial funding for ICT from the universities themselves<br>• Very low extent of strategic co-operation with domestic and foreign universities or with other suppliers of education | • 13% have a formal ICT strategy<br>• Digital services such as online course registration are not as widespread<br>• Limited ICT integration in the teaching on campus<br>• Very limited numbers of e-learning courses are incorporated into basic academic training and supplementary training<br>• Attitudes mixed towards ICT – a substantial number of teachers in particular are sceptical<br>• Funding of ICT is a mix of government funding and funding from the universities themselves. EU funding is also relatively important<br>• Low extent of strategic co-operation with domestic and foreign universities or with other suppliers of education |

The table below shows the division of the four clusters among the 15 EU Member States. The figures should be interpreted with caution, since the southern European countries are under-represented in the survey.

**Table 2.1: The division of clusters among Member States**

| Country/cluster | 1 | 2 | 3 | 4 |
|---|---|---|---|---|
| Austria | 9% | 5% | 3% | 3% |
| Belgium | 0% | 5% | 7% | 3% |
| Denmark | 0% | 3% | 4% | 6% |
| Finland | 13% | 6% | 0% | 0% |
| France | 3% | 14% | 7% | 16% |
| Germany | 9% | 18% | 8% | 23% |
| Greece | 0% | 2% | 1% | 6% |
| Ireland | 0% | 2% | 4% | 0% |
| Italy | 13% | 6% | 10% | 29% |
| Netherlands | 6% | 2% | 4% | 0% |
| Portugal | 0% | 2% | 1% | 6% |
| Spain | 22% | 8% | 6% | 3% |
| Sweden | 6% | 18% | 8% | 0% |
| UK | 19% | 11% | 36% | 3% |
| **Total** | **100%** | **102%** | **99%** | **98%** |
| **Percentage of universities in this cluster** | **16%** | **33%** | **36%** | **16%** |
| **N=** | **32** | **65** | **72** | **31** |

The table above shows no clear trends concerning the distribution of the four clusters among the 15 Member States. Cluster one universities are represented in most countries except Belgium, Denmark, Greece, Ireland and Portugal. Spain and the UK have the largest proportion of cluster one universities (22% and 19%). Cluster two universities are represented in all countries, but Sweden and Germany have the largest proportion (18% each).

36% of the cluster 3 universities occur in the UK. Finally, the cluster four universities mainly occur in Italy and Germany.

Below, the four clusters and their main characteristics are described.

## 2.2. Cluster 1: 'The front-runners'

The first cluster accounts for 16% of the universities in the survey (n=32). They are clearly the leaders in integrating ICT in both the educational and the organisational setting, so we have called them 'the front-runners'.

The front-runner universities are found among both small, middle-sized and larger universities. 28% of the universities in this cluster have between 10,000-15,000 students, and 31% have 20,000-30,000. Two of them are Open Universities.

#### 2.2.1. Use of ICT in the organisational setting

75% of the front-runner universities have a formal ICT strategy or action plan. A very high proportion (84% of the universities) provide access to administrative and course information to all or most of their administrative staff, teachers and students. Online registration for courses is generally possible (84%). The use of online registration for exams is not as widespread (59%).

#### 2.2.2. Use of ICT in the educational setting

The front-runner universities really set themselves apart from the rest as regards ICT integration in the teaching situation and their use of e-learning in basic academic or supplementary training in terms of both the extent to which they use ICT and e-learning in their teaching, and how the use of ICT is supported.

81% of the front-runners offer courses to all or most students to support their use of ICT. 85% offer technical support to teachers wishing to integrate ICT into their teaching, and 61% of the front-runner universities offer support to all or most teachers concerning the pedagogical and didactic aspects of ICT integration / e-learning.

**ICT in teaching**

Among 91% of the universities, ICT integration in teaching has increased to a high or very high extent within the past two years.

**Table 2.2: Cluster one use of ICT in teaching**

| | To a high/very high extent | Total count |
|---|---|---|
| ICT is used in lectures, e.g. projectors and computers are easily available in lecture rooms and teachers are using presentation programs such as PowerPoint | 87% | 32 |
| Learning resources, such as databases, simulation models and programs, are available to teachers and students on-line | 69% | 32 |
| ICT is used to support the sharing of information, communication and collaboration between teachers and students, e.g. in discussion fora | 66% | 32 |

As the table above illustrates, 87% of the universities indicate that ICT is being used in lectures to a high or very high extent. 69% of the universities make learning resources available, and 66% use ICT to support dialogue and co-operation between students and teachers to a high or very high extent.

ICT integration in teaching is relatively higher in cluster 1 than in the other clusters.

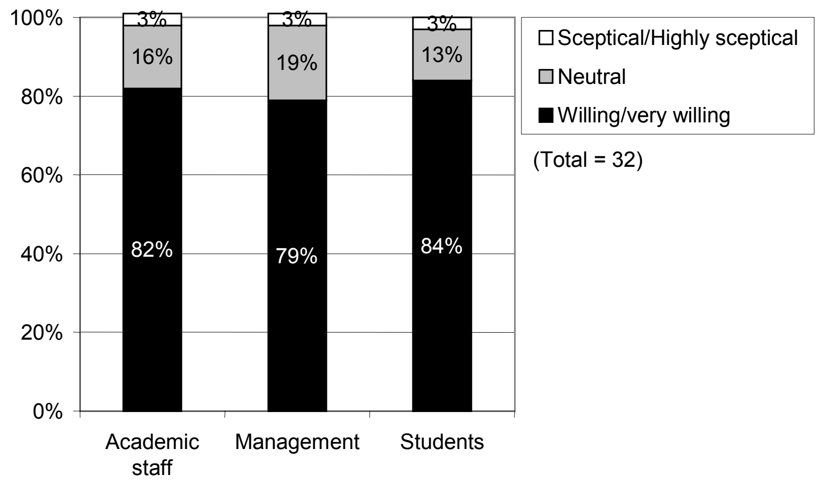
**E-learning**

E-learning courses, where an element of physical distance between teacher and student exists in the course, is primarily offered in the cluster one universities. 34% of these universities offer 25-50% or more of their courses in e-learning format during basic academic training, accounting for up to 55% of their students. For supplementary training, the proportion of universities offering 25-50% or more of their courses in e-learning format is 25%.

### 2.2.3. Attitudes towards ICT integration

One of the main characteristics of the front-runner universities is their positive attitude towards ICT integration and e-learning. As illustrated in the figure below, between 79% and 84% of the universities state that the academic staff, management and students in these universities are willing or very willing to implement ICT and e-learning. Only 3% are sceptical or highly sceptical.

**Figure 2.3: Cluster one attitudes towards ICT integration and e-learning**




In addition, the cluster analysis indicates that the cluster one universities are more positive than the others in their assessment of the strengths and advantages of the

ICT integration process. None of the clusters have highlighted weaknesses *per se*, but more of the front-runner universities see great advantages in it.

Accordingly, more than half of the front-runner universities consider ICT to have strengthened both their international co-operation, the quality of their education and the relationships among their teachers and students. In comparison, the corresponding figures for the three other clusters are in the 20-35% range.

### 2.2.4. Funding

94% of the front-runner universities are funding their ICT development through the university budgets. This indicates that ICT has a high priority in these universities and that ICT development is strategically valued and planned. Additional sources of funding are government funding and project funding, which close to half of the universities have taken advantage of to a high or very high extent. One of the characteristics of the front-runner universities is that they have been using project funding and private sponsorships more than the other clusters. However, even though private sponsorships occur more widely among the front-runner universities, only 9% of these universities describe them as making up their funding to a high or very high extent.

### 2.2.5. Involvement in strategic co-operation

As is illustrated in the table below, the front-runner universities are generally involved in strategic partnerships at various levels.

**Table 2.3: Cluster one participation in strategic co-operation**

| | Strategic co-operation with national universities | | Strategic co-operation with foreign universities | | Strategic co-operation with other suppliers of education | | N= |
|---|---|---|---|---|---|---|---|
| | Yes | No, but we have taken concrete steps in that direction | Yes | No, but we have taken concrete steps in that direction | Yes | No, but we have taken concrete steps in that direction | |
| Joint supply of e-learning courses | 69% | 16% | 59% | 22% | 59% | 28% | 32 |
| Joint implementation of accreditation or certification systems | 39% | 38% | 25% | 41% | 25% | 38% | 32 |
| Joint development or purchase of technological platforms for learning activities and / or administration of students | 59% | 22% | 47% | 22% | 59% | 19% | 32 |
| Joint development of ICT-based study material | 69% | 25% | 59% | 31% | 63% | 28% | 32 |
| Joint development of new study programmes (e.g. MBAs) where ICT is integrated | 56% | 28% | 50% | 34% | 47% | 22% | 32 |

Most of the front-runner universities have been participating in strategic co-operation with national universities concerning the joint supply of e-learning courses or the joint development of ICT-based study material (69%). This also applies to their co-operation with foreign universities and other education suppliers.

### 2.2.6. What are the main drivers?

The three main drivers for the front-runner universities are:

- Focus and priority at university management level (85% indicate this applies to a high or very high extent).
- Developmental and pilot projects (75% indicate that this applies to a high or very high extent).
- Individual teachers (72% indicate that this applies to a high or very high extent).

Demand for lifelong learning is also regarded as being a key driver (69% indicate that this applies to a high or very high extent).

Cluster one sets itself apart from the other clusters in placing more emphasis on the importance of new forms of co-operation and consortia as drivers, as well as on the existence of increased competition from new education providers (respectively 40% and 51% of the front-runner universities in comparison to between 27% and 44% of the universities belonging to the other clusters). In addition, the front-runners, along with the universities of cluster four, ascribe a lot more significance to EU initiatives as a driver.

### 2.2.7. What are their main obstacles?

The cluster analysis shows that only a small proportion of the front-runner universities consider the potential factors listed in the questionnaire as impeding their progress towards the extended use of ICT. Accordingly, limited financial resources are the only item which more than one third of the universities have indicated as being an obstacle to a high or very high extent.

The three main obstacles for the front-runner universities are:

- Limited financial resources (56% indicate that this applies to a high or very high extent).
- Attitudes and cultures (31% indicate that this applies to a high or very high extent).
- ICT implementation is carried out by individuals but is not anchored strategically (32% indicate that this applies to a high or very high extent).

The front-runner universities do not regard a lack of focus at national or university management level as being an obstacle (63% indicate that it is an obstacle only to a low or very low extent).

### 2.2.8. Key priorities

The responses of the front-runner universities to the question concerning their key priorities over the next two years indicate that they will be proceeding with comprehensive ICT development. Accordingly, a large proportion of the universities indicate that almost all the listed initiatives will be priorities. The four key ones will be:

- Development of ICT-based material (94% indicate that this applies to a high or very high extent).
- Development of teachers' ICT competences (90% indicate that this applies to a high or very high extent).
- Increasing the number of courses offered in e-learning format (88% indicate that this applies to a high or very high extent) .
- Upgrading of technological infrastructure (75% indicate that this applies to a high or very high extent).

The adaptation of buildings to facilitate ICT integration is the initiative prioritised by the fewest universities.

## 2.3. Cluster 2: 'The co-operating universities'

The second cluster accounts for 33% of the universities (n=65). In general, the second cluster universities are relatively far advanced in the ICT developmental process, especially as regards the use of ICT in the organisational setting, though they lag behind the front-runners. The universities in the second cluster differentiate themselves from those in the third cluster mainly through their much greater involvement in strategic co-operation with both national and foreign universities and other education suppliers. Accordingly, we have called the second cluster 'the co-operating universities'.

29% of the co-operating universities have 10,000-15,000 students, but otherwise they represent universities of all sizes.

### 2.3.1. Use of ICT in the organisational setting

Close to two thirds of the universities (63%) have a formal ICT strategy, and 26% are in the process of developing one. 75% of them have an intranet, but fewer universities in this cluster make administrative and course information available to academic staff, students and management (approximately 50%).

It is possible to register for courses and exams on-line in 43% of the universities, which is a considerably lower proportion than among the universities in cluster one.

### 2.3.2. Use of ICT in the educational setting

The 'co-operating universities' are almost equal to the front-runner universities in terms of the ICT support they offer to students and teachers. 74% of the universities offer technical courses to all or most students, 52% offer courses or support concerning pedagogical ICT issues to all or most teachers, and 85% offer technical support to teachers.

**ICT in teaching**

As illustrated in the table below, the ICT used in teaching mainly takes the form of the ready availability of projectors and computers in lecture rooms. The use of ICT-based learning resources or ICT to support communication between students and teachers occurs in approximately one third of the universities.

**Table 2.4: Cluster two use of ICT in teaching**

| | To a high/very high extent | Total count |
|---|---|---|
| ICT is used in lectures, e.g. projectors and computers are easily available in lecture rooms and teachers are using presentation programs such as PowerPoint | 68% | 65 |
| Learning resources, such as databases, simulation models and programs, are available to teachers and students on-line | 34% | 65 |
| ICT is used to support the sharing of information, communication and collaboration between teachers and students, e.g. in discussion fora | 33% | 65 |

For 74% of the universities, the use of ICT in teaching has increased to a high or very high extent within the past two years.

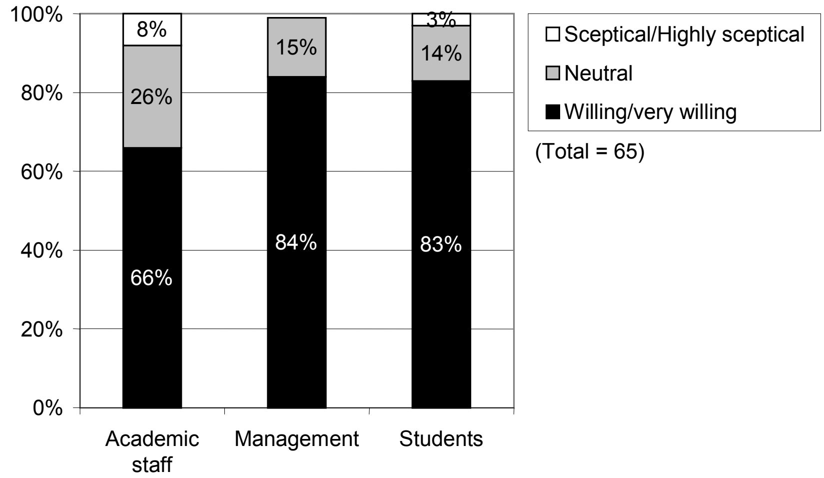
**E-learning**

E-learning is generally little used in the co-operating universities. 14% of the universities offer 25% or more of their basic academic training courses in e-learning format, and 11% do so for supplementary training.

### 2.3.3. Attitudes towards ICT integration

The attitudes towards ICT integration and e-learning among the co-operating universities are generally positive. What separates them from the front-runners is that a smaller proportion of the academic staff appear to be willing or very willing to integrate ICT into their activities. In addition, 8% of the academic staff in these universities are viewed as being sceptical or highly sceptical.

**Figure 2.4: Cluster two attitudes towards ICT integration and e-learning**




### 2.3.4. Funding

The main sources of funding are government funding (54% indicate that this applies to a high or very high extent) and the university budget (62%). Project funding and private sponsorships are less widespread than for the cluster one universities.

### 2.3.5. Involvement in strategic co-operation

Their participation in strategic co-operation is what particularly distinguishes cluster two from cluster three universities.

As is illustrated in the table below, 80% of the cluster two universities are currently involved in strategic co-operation with national universities in the joint supply of e-learning courses, and 62% are involved in the joint development of ICT-based study material. The co-operating universities are also involved at an international level, but to a lesser degree. 51% of the universities are involved in the joint supply of e-learning courses with foreign universities. Strategic co-operation with other suppliers of education is greatest in relation to the joint development of new study programmes (e.g. MBAs) where ICT is integrated (51% of the universities)

**Table 2.5: Cluster two participation in strategic co-operation**

| | Strategic co-operation with national universities | | Strategic co-operation with foreign universities | | Strategic co-operation with other suppliers of education | | N= |
|---|---|---|---|---|---|---|---|
| | Yes | No, but we have taken concrete steps in that direction | Yes | No, but we have taken concrete steps in that direction | Yes | No, but we have taken concrete steps in that direction | |
| Joint supply of e-learning courses | 80% | 11% | 51% | 26% | 9% | 8% | 65 |
| Joint implementation of accreditation or certification systems | 43% | 17% | 26% | 28% | 6% | 5% | 65 |
| Joint development or purchase of technological platforms for learning activities and / or administration of students | 57% | 15% | 12% | 22% | 8% | 6% | 65 |
| Joint development of ICT-based study material | 62% | 25% | 37% | 29% | 8% | 3% | 65 |
| Joint development of new study programmes (e.g. MBAs) where ICT is integrated | 54% | 31% | 29% | 37% | 8% | 9% | 65 |

However, it should be noted that the front-runners of cluster one are further ahead, especially in trans-national co-operation and co-operation with other education suppliers.

### 2.3.6. What are the main drivers?

The universities in the second cluster have indicated the same key drivers as those in cluster one:

- Focus and priority at university management level (90% indicate that this applies to a high or very high extent).
- Developmental and pilot projects (70% indicate that this applies to a high or very high extent).
- Individual teachers (71% indicate that this applies to a high or very high extent).

What separates them from cluster one in their assessment of the drivers is that they do not see increased competition from new education providers as being a driver (39% say that this is the case to a low or very low extent). In addition, they ascribe less importance than cluster one to new forms of co-operation and consortia (40% versus 51%).

### 2.3.7. What are their main obstacles?

The cluster analysis shows that as with the universities in cluster one, the co-operating universities see limited financial resources as being the main obstacle, but to a greater extent (68% versus 56%).

The main obstacles are seen to be:

- Limited financial resources (68%)
- Attitudes and cultures (38%)
- Lack of high-quality ICT-based teaching material (34%).

### 2.3.8. Key priorities

The responses of the co-operating universities to the question concerning their key priorities in the next two years indicate that they are anticipating significant ICT development, but that their expectations are not as high as those of the front-runner universities of cluster one. Their key priorities in the next two years will be:

- Development of teachers' ICT competences (82% indicate that this applies to a high or very high extent).
- Increasing the number of courses offered in e-learning format (74% indicate that this applies to a high or very high extent).
- Upgrading of technological infrastructure (64% indicate that this applies to a high or very high extent).
- Development of ICT-based teaching material (64% indicate that this applies to a high or very high extent).

## 2.4. Cluster 3: 'The self-sufficient universities'

The third cluster is generally very similar to cluster two as regards ICT integration in both the organisational and the educational setting, but differs from it in being much less involved in co-operation with other universities or actors, and in placing less emphasis on EU initiatives and new forms of co-operation as drivers; hence we have called these 'the self-sufficient universities'. The third cluster is the largest, accounting for 36% of the universities (n=72).

The universities in the third cluster represent all sizes of university: 22% of them have between 5000 and 10,000 students, 26% have 10,000-15,000, and 28% have more than 20,000 students.

### 2.4.1. Use of ICT in the organisational setting

60% of the self-sufficient universities have an ICT strategy. Administrative and course information is available to academic staff, students and management in approximately 60% of the universities. It is possible to register for courses and exams at 51% and 42% of the universities respectively. These figures are lower than for the front-runner universities and at almost the same level as the co-operating universities.

### 2.4.2. Use of ICT in the educational setting

The self-sufficient universities are considerably advanced in their support for teachers and students in their use of ICT. Accordingly, 76% of the universities offer courses to their students to support their basic use of ICT, 60% offer support concerning the pedagogical and didactic aspects of ICT to teachers, and as many as 89% of the universities offer technical support to teachers. These numbers are higher than at the co-operating universities.

**ICT in teaching**

The table below depicts the proportion of self-sufficient universities which have indicated that they are using ICT in their teaching to a high or very high extent. This picture is very similar to the second cluster.

**Table 2.6: Cluster three use of ICT in teaching**

| | To a high/very high extent | N= |
|---|---|---|
| ICT is used in lectures, e.g. projectors and computers are easily available in lecture rooms and teachers are using presentation programs such as PowerPoint | 70% | 72 |
| Learning resources, such as databases, simulation models and programs are available to teachers and students on-line | 37% | 72 |
| ICT is used to support the sharing of information, communication and collaboration between teachers and students, e.g. in discussion fora | 31% | 72 |

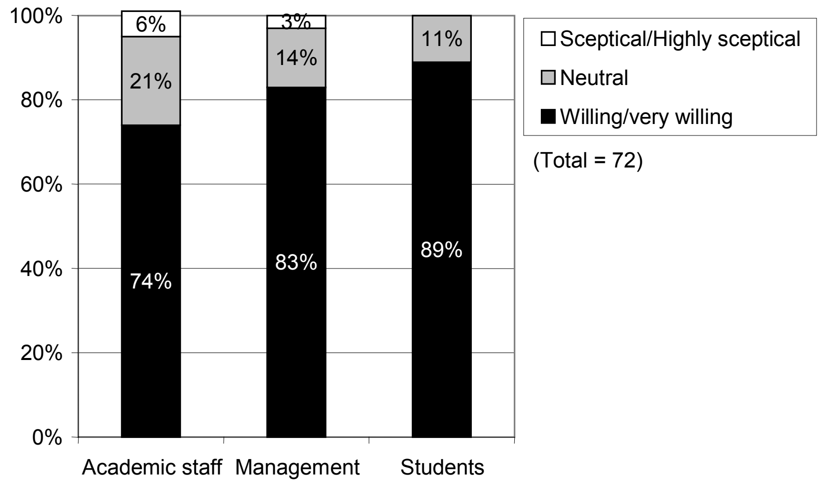
**E-learning**

27% of the self-sufficient universities offer more than 25% of their basic academic training courses in e-learning format. For supplementary training, the proportion decreases to 11%. The number of e-learning courses offered is higher at the self-sufficient universities than the co-operating universities, but lower than for the front-runners.

### 2.4.3. Attitudes towards ICT integration

The cluster analysis shows that that academic staff, management and students in the self-sufficient universities are generally very positive towards ICT integration and e-learning. The teachers are more positive than among the co-operating universities, but not as positive as the teachers from the front-runner universities.

**Figure 2.5: Cluster three attitudes towards ICT integration and e-learning**




### 2.4.4. Funding

ICT development in the self-sufficient universities is mainly funded by the university budgets. 82% of the universities indicate that this is the case to a high or very high extent. 38% of them take advantage of government funding to a high or very high extent. This indicates that government funding is less widespread among the cluster three universities than among those of clusters one and two.

### 2.4.5. Involvement in strategic co-operation

The table below clearly indicates that the cluster three universities are participating in strategic co-operation with national or foreign universities to a much smaller degree than the cluster two universities. Less than 20% of the universities are involved in any kind of strategic co-operation with national universities, and 13% or fewer are involved with foreign universities or other suppliers of education.

**Table 2.7: Cluster three participation in strategic co-operation**

| | Strategic co-operation with national universities | | Strategic co-operation with foreign universities | | Strategic co-operation with other suppliers of education | | N= |
|---|---|---|---|---|---|---|---|
| | Yes | No, but we have taken concrete steps in that direction | Yes | No, but we have taken concrete steps in that direction | Yes | No, but we have taken concrete steps in that direction | |
| Joint supply of e-learning courses | 18% | 14% | 13% | 6% | 10% | 18% | 72 |
| Joint implementation of accreditation or certification systems | 7% | 8% | 0% | 4% | 0% | 3% | 72 |
| Joint development or purchase of technological platforms for learning activities and / or administration of students | 11% | 11% | 6% | 7% | 10% | 8% | 72 |
| Joint development of ICT-based study material | 10% | 19% | 4% | 4% | 10% | 13% | 72 |
| Joint development of new study programmes (e.g. MBAs) where ICT is integrated | 4% | 8% | 6% | 10% | 7% | 3% | 72 |

### 2.4.6. What are the main drivers?

The three main drivers for the third cluster are:

- Focus and priority at university management level (80% indicate that this applies to a high or very high extent).
- Experimental and pilot projects (60% indicate that this applies to a high or very high extent).
- Increased competition among universities (60% indicate that this applies to a high or very high extent).

The self-sufficient universities ascribe less importance to EU initiatives as a driver than the other three clusters. 42% indicate that they are a driver to a low or a very extent. In addition, increased competition from new education providers is not regarded as being a driver, with 39% indicating that it is a driver only to a low or very low extent.

### 2.4.7. What are their main obstacles?

The three main obstacles for the self-sufficient universities are:

- Limited financial resources (61% indicate that this applies to a high or very high extent).

- Attitudes and cultures (51% indicate that this applies to a high or very high extent).
- Lack of high-quality teaching material (31% indicate that this applies to a high or very high extent).

It seems that attitudes and cultures are regarded as a more serious obstacle among the self-sufficient universities, with 20% more of the universities from among this cluster considering it to be an important obstacle than the front-runners and co-operating universities.

#### 2.4.8. What are the key priorities?

The key priorities for the self-sufficient universities in the next two years are:

- Upgrading of technological infrastructure (65% indicate that this applies to a high or very high extent).
- Increasing the number of courses offered in e-learning format (67% indicate that this applies to a high or very high extent).
- Development of ICT-based teaching material (61% indicate that this applies to a high or very high extent).

The responses of the self-sufficient universities to the question concerning their key priorities in the next two years indicate that they will be focusing on the further development of ICT, but that their expectations are not as high as those of the front-runner universities in cluster one and the co-operating universities in cluster two.

### 2.5. Cluster 4: 'The sceptical universities'

The fourth and final cluster is the smallest, and accounts for 15% of the universities (n=30). The universities in the fourth cluster lag behind the rest in terms of almost all of the cluster analysis parameters.

The small universities, plus the large universities with more than 30,000 students, make up the majority of this group. 45% of the universities in this cluster have less than 10,000 students.

### 2.5.1. Use of ICT in organisational setting

Only 13% of the sceptical universities have yet formulated an ICT strategy or action plan, which is a much smaller percentage than among the other three clusters. However, this seems likely to change in the near future, since almost 48% of the universities indicate that they will be developing one within 1-2 years.

65% of the universities have an intranet, but less than half of the universities provide electronic access to administrative and course information to administrative staff, management and students. It is possible to register for courses and examinations online at the sceptical universities to the same extent as at the co-operating and the self-sufficient universities.

### 2.5.2. Use of ICT in the educational setting

39% of the sceptical universities offer courses to students to support their basic use of ICT, and 35% offer technical support to teachers. Again, this is a much lower percentage than for the other three clusters. Support for the pedagogical and didactic aspects of e-learning and ICT in teaching is largely non-existent at the sceptical universities, since only 6% offer it.

#### ICT in teaching

Compared to the other three clusters, the level of ICT integration in the teaching situation at the sceptical universities is fairly limited. 38% of the universities use ICT in their lectures, compared to 68% in clusters one and two and 70% in cluster three. Learning resources are used to a high extent in 9% of the universities. None of the sceptical universities use ICT to support the sharing of information or communication between students and teachers to a high extent.

**Table 2.8: Cluster four use of ICT in teaching**

| | To a high/very high extent | N= |
|---|---|---|
| ICT is used in lectures, e.g. projectors and computers are easily available in lecture rooms and teachers are using presentation programs such as PowerPoint | 38% | 31 |
| Learning resources, such as databases, simulation models and programs are available to teachers and students on-line | 9% | 31 |
| ICT is used to support the sharing of information, communication and collaboration between teachers and students, e.g. in discussion fora | 0% | 31 |

39% of the universities indicate that the use of ICT in teaching has increased to a high or very high extent during recent years. This is part of the explanation for why the cluster four universities are further behind than the other three clusters, since a much higher proportion of those universities indicate that their use of ICT has increased during the past couple of years.

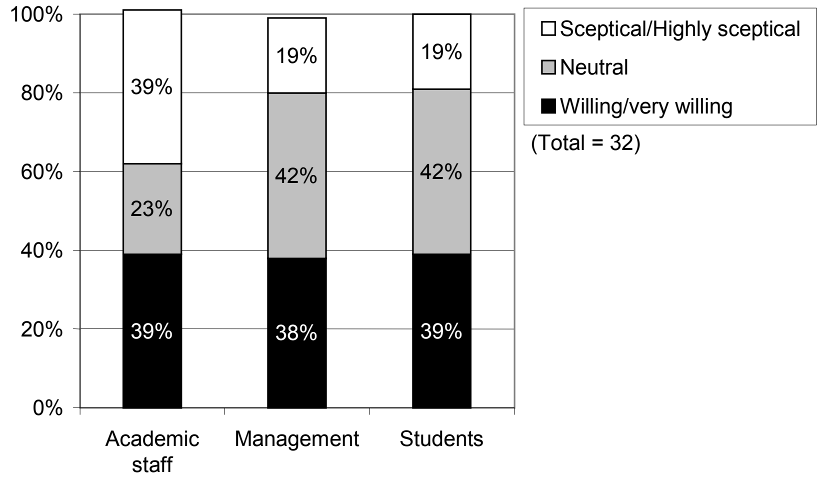
**E-learning**

E-learning is only being used to a limited degree for either basic academic training or supplementary training in the sceptical universities. None of the sceptical universities offer more than 25% of their basic academic training courses in e-learning format.

### 2.5.3. Attitudes towards ICT integration

The attitudes towards ICT integration in the cluster four universities are less positive than in the other three clusters. Between 38% and 39% of the universities indicate that academic staff, management and students are willing or very willing to integrate ICT and e-learning. This is much lower than among the other three clusters. But the interesting point is that 39% of the universities have indicated that their academic staff are either sceptical or very sceptical. Among management and students, 19% of the universities indicate that they are sceptical or highly sceptical towards ICT integration and e-learning.

**Figure 2.6: Cluster four attitudes towards ICT integration and e-learning**



### 2.5.4. Funding

ICT development in the sceptical universities is mainly being funded from the university budgets and government funding. In addition, 10% of the universities responded that ICT development is being funded through EU programme funding to a high or very high extent, which is higher than among the other clusters. An explanation could be that the cluster four universities are not devoting as much of their own budgets to ICT development, and therefore EU funding is relatively more important. This is interesting in terms of what could be done to encourage ICT development among the cluster four universities.

### 2.5.5. Involvement in strategic co-operation

Compared to the self-sufficient universities, the sceptical universities are a little more involved in strategic co-operation with other national or foreign universities.

The table below shows the level of this kind of participation. Approximately one third of the universities are involved with national universities in the joint supply of e-learning courses, and up to 51% of the remainder have taken concrete steps towards doing so.

**Table 2.9: Cluster four participation in co-operation and partnerships**

| | Strategic co-operation with national universities | | Strategic co-operation with foreign universities | | Strategic co-operation with other suppliers of education | | N= |
|---|---|---|---|---|---|---|---|
| | Yes | No, but we have taken concrete steps in that direction | Yes | No, but we have taken concrete steps in that direction | Yes | No, but we have taken concrete steps in that direction | |
| Joint supply of e-learning courses | 32% | 51% | 13% | 13% | 6% | 23% | 31 |
| Joint implementation of accreditation or certification systems | 19% | 13% | 10% | 6% | 10% | 10% | 31 |
| Joint development or purchase of technological platforms for learning activities and / or administration of students | 19% | 26% | 10% | 6% | 10% | 10% | 31 |
| Joint development of ICT-based study material | 23% | 16% | 10% | 10% | 13% | 10% | 31 |
| Joint development of new study programmes (e.g. MBAs) where ICT is integrated | 3% | 6% | 3% | 6% | 6% | 6% | 31 |

### 2.5.6. What are the main drivers?

According to their responses, ICT development here is mainly driven by:

- Focus and priority at university management level (74% indicate that this applies to a high or very high extent).
- Focus and priority at national level (67% indicate that this applies to a high or very high extent).
- Individual teachers (67% indicate that this applies to a high or very high extent).

The cluster four universities ascribe less emphasis to the demand for lifelong learning as a driver than the other three clusters.

### 2.5.7. What are their main obstacles?

The four main obstacles to ICT development among the cluster four universities are:

- Limited economic resources (67% indicate that this applies to a high or very high extent).
- ICT implementation is carried out by individuals but is not strategically anchored (60% indicate that this applies to a high or very high extent).
- Lack of high-quality ICT-based teaching materials (55% indicate that this applies to a high or very high extent).
- Attitudes and cultures (54% indicate that this applies to a high or very high extent).

The sceptical cluster places relatively more emphasis on the organisational structure within the university as representing an obstacle (47% indicate that this applies to a high or very high extent, compared to 22% for clusters one and two, and 14% for cluster three). This is in line with the 60% which responded that their failure to anchor ICT at a strategic level represents an obstacle.

### 2.5.8. What are their key priorities?

In general, fewer universities from the fourth cluster than from the others have indicated that any of the initiatives presented in the questionnaire will comprise key priorities. This suggests that overall, the cluster four universities are not planning to increase their ICT development in order to catch up with the other universities.

The three areas which the greatest proportion of universities have indicated as being a priority to a high or very high extent are:

- Upgrading of technological infrastructure (50%)
- Development of technical support and guidance to staff and students (40%)
- Purchasing software (38%).

These key priorities are highly technology-oriented, so these responses suggest that the sceptical universities are still in the phase of developing / upgrading their basic infrastructure and have not yet reached the point of primarily focusing on the integration of ICT into their teaching and development of e-learning courses.

## 2.6. Future trends among the four clusters

In the section below we aim to outline some of the main trends and tendencies involving the four clusters. Based on the results from the questionnaire, we conclude that the development of ICT integration and e-learning in the EU Member State universities will grow rapidly in the coming years. This scenario applies to all four clusters, but it should be noted that these developments are not expected to occur at the same pace among the sceptical universities of cluster four as the others.

### 2.6.1. The use of ICT in an organisational setting will grow

Almost all universities also expect to have an intranet within 1-2 years, and nearly all universities which do not yet have the following services expect to do so within two years:

- Online information concerning administrative matters such as grades, examination schedules and lists of students.
- Online information listing courses, curricula, work plans, projects and assignments.

However, it should be noted that 16% of the sceptical universities do not expect to have lists of courses etc. on-line for their students during the next two years.

### 2.6.2. The vast majority of universities will have digital services within 1-2 years

The survey shows that digital services such as online registration for courses and examinations will be available to the vast majority of universities within the next two years. Only 7% of them do not expect to have online course registration in future years. However, 24% do not expect to have online exam registration.

There are apparent differences in the expectations that exist among the different clusters. 16% of the sceptical universities do not expect to have online course registration within the next two years, and 29% of the sceptical do not expect to have online exam registration either. Among the self-sufficient universities, 32% do not anticipate having online exam registration.

### 2.6.3. Expected growth in courses for students and teachers concerning the technological and pedagogical issues connected with ICT integration

Courses for students on the basic use of ICT, and pedagogical and technical support courses for teachers are widespread among European universities – not for everyone, but at least for a minority. Very few universities expect not to have such offerings available within 1-2 years. The sceptical universities especially are focusing on this area, which is seen as a positive development.

However, it should be noted that 16% of the sceptical universities, versus 6% of the universities overall, do not expect to offer courses on the basic use of ICT, and 13% of the sceptical universities as opposed to 3% of the total do not expect to be offering courses on pedagogical and didactic support for teachers within two years. This indicates that a proportion of EU universities will still be lagging behind in terms of their available basic support.

### 2.6.4. Huge increase in e-learning courses for basic academic training and supplementary training

The universities of the EU Member States expect the development of e-learning courses to be a major focal point during the next two years. Only 3% and 5% respectively of all universities do not expect to offer e-learning courses for basic academic training or supplementary training within the next 1-2 years. The sceptical universities are the most reluctant, with 23% having no plans to offer supplementary training courses in e-learning format.

### 2.6.5. Co-operation – the point of separation

The study shows that expectations concerning co-operation with domestic and foreign universities and other education suppliers differ significantly among the four university clusters.

None of the front-runner and co-operating universities expect not to be co-operating with other domestic universities on the joint supply of e-learning courses. Among the self-sufficient and sceptical universities, 39% and 16% respectively have no plans in this regard. As for the joint development of new study programmes, 53% and 45% respectively of the self-sufficient and sceptical universities do not have plans to co-operate at the national level, whereas only 6% and 2% respectively of the front-runners and co-operating universities have no plans in that direction.

The same pattern is evident concerning co-operation with foreign universities. However, it should be noted that there is also some reluctance among the front-runners and co-operating universities regarding the joint implementation of accreditation or certification systems and the joint development or purchase of technological platforms – but this still applies only to a minority of these two groups.

Only 3% of the front-runners do not expect to have entered into some kind of co-operation in the joint supply of e-learning courses with other education suppliers, such as private companies, over the next few years. On the other hand, 57%, 67% and 55% respectively of the co-operating, the self-sufficient and the sceptical universities do not expect to be co-operating with other education suppliers. A similar pattern exists regarding the joint development of ICT-based study material.

The scenarios for future co-operation in the area of ICT integration and e-learning are interesting. It appears that the front-runners among the universities have already begun co-operating with different partners, and that this trend will accelerate in future years. The co-operating universities will also be maintaining their progress in this area, but have no plans to co-operate with non-university education suppliers. The self-sufficient institutions seem to be mostly planning to stick to their current non co-operation strategy, whereas the sceptical universities are slightly keener on pursuing co-operation.

# 3. The use of ICT in the organisational setting

This chapter focuses on the use of ICT in the organisational setting of the universities of the EU. The main questions are:

- How is ICT used in the organisational setting?
- How widespread are basic technologies like computers, Internet access and intranets in the universities?
- How is ICT development being funded?
- What are the main drivers for the use of ICT in the organisational setting?
- What are the main obstacles to the use of ICT in the organisational setting?
- What examples of good practice of ICT integration in the organisational setting are there?
- What are the main priorities of the universities concerning ICT integration in the organisational setting in the future?

The data used in this chapter consist of our survey results, case study examples, expert interviews, and desk study-derived data.

## 3.1. Universities are equipped with the basic technologies required for ICT integration

A basic technological infrastructure and access to core IT services is a precondition for the use of ICT in the organisational and educational settings.

The survey undertaken among all the universities of the EU Member States shows that almost every individual in them has access to both computers and the Internet, and that students, teachers, administrative staff and management are all being issued with e-mail accounts. In other words, it shows that the foundation for the use of ICT in both the organisational and educational settings is in place. Meanwhile, even though the basic technology is there, the universities are well aware that there is a constant need to update the infrastructure in particular. Additionally, the study indicates that the vast majority of universities are not yet at the stage of exploiting the potential of ICT to develop new forms of teaching and teaching materials, and therefore they have not yet encountered the technical problems which may be latent in their IT infrastructure. Accordingly, the fact that the universities are not currently identifying an inadequate technological infrastructure as being an obstacle does not mean that their infrastructure is ideal, or that it will not throw up problems in the years to come.

### 3.1.1. 9 out of 10 universities have an intranet

The data shows that intranets are a common tool in European universities. An intranet can be used both as an electronic blackboard for messages and as a standardised gateway to a university's digital services. Such a gateway can exist for administrative functions, or to host a platform that gives access to services related to e-learning, or both.

Nine out of ten European universities have intranets. The vast majority (74%) have an intranet that covers the entire university, while in a minority of institutions (14%) one or more departments have their own local intranets. In addition to this, the five universities which gave the answer 'other' (2%) state that they are using some combination of the two, e.g. one global administrative intranet plus individual intranets in departments, or one intranet for administrative purposes and another for the rest of the university.

**Table 3.1: Does your university have an intranet?**

| | Number of universities | Percentage |
|---|---|---|
| Yes, there is an intranet for the whole university | 168 | 74% |
| Yes, one or more departments have their own local intranets | 32 | 14% |
| No, but we are in the process of developing an intranet | 14 | 6% |
| No, but we plan to develop an intranet within 1-2 years | 6 | 3% |
| No, and we have no plans to develop one | 2 | 1% |
| Other | 5 | 2% |
| Total | 227 | 100% |
| Not answered | 14 | 6% |

### 3.1.2. Intranets are being used for administrative information

Intranets are being used to make available administrative information about grades, examination schedules or lists of students to the different groups working or studying in a university to a significant extent. In roughly two thirds of European universities, this information is available to all or a majority of the academic and administrative staff and management, and to a slightly lesser degree also to students. Overall, less than one in ten universities are either failing to make this information available even to a minority of these groups or have no plans to do so.

**Table 3.2: Is administrative information (for example grades, examination schedules, lists of students) available on-line to the following groups?**

| | Yes, information is available to all | Yes, information is available to the majority | Yes, information is available to a minority | No, but we are in the process of making it available | No, but we plan to make it available within 1-2 years | No | Don't know | Total |
|---|---|---|---|---|---|---|---|---|
| Academic staff | 45% | 19% | 18% | 9% | 4% | 4% | 2% | 222 |
| Administrative staff | 43% | 25% | 20% | 6% | 3% | 2% | 2% | 222 |
| Management | 45% | 22% | 14% | 7% | 4% | 5% | 4% | 222 |
| Students | 37% | 18% | 10% | 15% | 9% | 8% | 3% | 222 |

Course-related information like curricula, work plans and assignments are even more accessible. At eight out of ten European universities, such information is available to all or most academic staff and students. If those universities are included where this information is available to a minority of the two groups, or where the university is in the process of making it available, course information is available in more than 19 out of 20 European universities, or soon will be.

**Table 3.3: Is information about the specific courses (for example list of courses, curricula, work plans, projects, assignments) available on-line to the following groups?**

| | Yes, information is available to all | Yes, information is available to the majority | Yes, information is available to a minority | No, but we are in the process of making it available | No, but we plan to make it available within 1-2 years | No | Don't know | Total |
|---|---|---|---|---|---|---|---|---|
| Academic staff | 61% | 19% | 9% | 5% | 4% | 1% | 2% | 223 |
| Students | 59% | 18% | 11% | 5% | 4% | 1% | 2% | 223 |

### 3.1.3. Interactive digital services are not yet commonplace

Progress is slower with regard to online course registration. Here, the universities are split four ways. At a sixth of the EU's universities (16%), it is possible to register for all courses on-line. Among the second and largest group covering roughly a third of the EU's universities (36%), it is possible to register for some courses. A third group of universities (38%) is either planning to make online registration possible or is in the process of implementing it. Finally, a small minority of less than 10% either have no plans for online registration or do not know what they intend to do in this area.

**Table 3.4: Is it possible to register for courses on-line?**

| | Number of universi-ties | Percent-age |
|---|---|---|
| Yes, it is possible to register for all courses on-line | 36 | 16% |
| Yes, it is possible to register for some courses on-line | 80 | 36% |
| No, but we are in the process of making online registration possible | 41 | 19% |
| No, but we plan to make online registration possible within 1-2 years | 41 | 19% |
| No, and we have no current plans to make online registration possible | 16 | 7% |
| Other | 3 | 1% |
| Don't know | 3 | 1% |
| Total | 220 | 100% |
| Not answered | 21 | 9% |

As regards online examination registration, once again the largest single group consists of universities where it is only possible to register for some examinations online (27%). If the 18% of universities where it is possible to register for all examinations online are included, online registration is possible at just under half of the EU's universities. A third group representing circa one third of universities (30%) is either in the process of implementing this facility or is planning to do so within 1-2 years. However, a fairly large group of universities (16%) has no current plans to enable online registration. Note that quite a large group of universities gave the answer 'other'. The reason is that at some universities, e.g. in Spain, students are automatically registered for the relevant examinations when they register for their courses.

**Table 3.5: Is it possible to register for examinations on-line?**

| | Number of universities | Percentage |
|---|---|---|
| Yes, this is possible for all courses on-line | 39 | 18% |
| Yes, this is possible for some courses on-line | 59 | 27% |
| No, but we are in the process of making it possible | 30 | 14% |
| No, but we plan to make it possible within 1-2 years | 36 | 16% |
| No, and we have no current plans to make online registration possible | 36 | 16% |
| Other | 16 | 7% |
| Don't know | 4 | 2% |
| Total | 220 | 100% |
| Not answered | 21 | 9% |

The good practice case studies point to some illustrative examples of how ICT is being used in the organisational setting:

The Open University of Catalonia is an all-virtual university[32]. There is no campus, and no offices where students can show up, with each student instead being connected to the information, teaching and administration systems entirely via the virtual campus, where all contact with the university takes place. There are more part-time employees assigned to the UOC than full-time staff members, and these part-time employees work on the virtual campus from home or elsewhere.

At Politecnico di Milano[33], every student can register for courses and exams on-line through an interactive administrative system. Videoconferencing is used as a common co-operation tool at Politecnico di Milano because the institution consists of seven campuses located in six different cities.

The University of Utrecht[34] has developed an online administration and registration system, Osiris On-line. The system was developed by a small company, but belongs to the University of Utrecht, which now sells it to other universities on a commercial basis.

The aspiration is to transfer all administration information and activity to the Osiris system. Currently the system is being used for enrolment, course planning, the notification of exam results and the delivery of information to students and teachers. The majority of the students use the system, but it is still possible for students who do not wish to use the online system or who do not have the facilities to do so to register in person. In addition, the system is linked to the Blackboard and WebCT digital learning platforms. A digital signature system is also under development and should be implemented in the near future, which will result in even more services becoming available.

The system is being monitored in order to see how the students are using it and how it can be improved. The overall assessment is that the students like it. When it was first introduced there was a short adjustment phase, but very soon the students became aware of its great speed and accessibility advantages. The only complaints currently

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[32] For further information, please refer to the case study profile of the Open University of Catalonia/Annex G.
[33] For further information, please refer to the case study profile of the Politecnico di Milano/ Annex G.
[34] For further information, please refer to the case study profile of the University of Utrecht/ Annex G.

being received are due to technical problems with the students' hardware or software. In addition, there have been discussions concerning the deadlines for registration or the delivery of papers or exams. There have been incidents where students could not deliver material or register before a deadline due to technical problems.

## 3.2. Funding of ICT integration and e-learning development

Even though some national programmes have been set up for this purpose, the implementation of ICT is primarily being funded from general university budgets. The survey conducted among all the universities in the EU Member States shows that in 78% of them, such implementation is being funded to a high or very high extent from their own budgets. In addition, implementation is being funded via direct government funding to a high or very high extent in 47% of the universities. Project funding is the third most important source, being significant to a high or very high extent among 23% of the universities.

EU programme funding is only important to a high or very high extent in 5% of the universities that participated in the survey. However, 35% of them state that EU funding has funded their implementation of ICT to either some or a low extent.

**Table 3.6: How is the implementation of ICT being funded?**

| | To a very high extent | To a high extent | To some extent | To a low extent | To a very low extent | Don´t know | Total |
|---|---|---|---|---|---|---|---|
| Government funding | 19% | 28% | 22% | 7% | 16% | 8% | 214 |
| From the university budget | 42% | 36% | 16% | 2% | 2% | 1% | 214 |
| Project funding | 5% | 18% | 40% | 15% | 15% | 7% | 214 |
| Private sponsorships | 1% | 2% | 11% | 16% | 47% | 23% | 214 |
| EU programme funding | 2% | 3% | 19% | 16% | 36% | 23% | 214 |
| Public/private partnerships | 1% | 2% | 10% | 13% | 46% | 28% | 214 |
| Other | 4% | 1% | 1% | 0% | 24% | 70% | 83 |

Note: Respondents were given the option of choosing more than one answer.

Most countries only have limited and sporadic experience concerning private funding and sponsorships.

Private sponsorships or public-private partnerships do not play any significant funding role among most of the universities that participated in the survey. Less than 5% stated that either was important for funding their ICT programmes to a high or very high extent, while a very large number of universities responded that private sponsorships and public-private partnerships (47% and 46% respectively) were funding their implementation of ICT only to a very low extent.

Private sponsorships seem to be limited to a few projects, or to be connected with research projects. According to the government representatives, there is no tradition of the private sponsorship of university activities. However, even though the experience of private funding is limited, countries like Portugal and France now want to promote contacts between private companies and academic institutions. In France, the government is determining the applicable circumstances and methods for enabling companies and foundations to grant funds to universities in order to encourage private funding. There are currently some obstacles that are connected with taxation issues.

## 3.3. Main drivers and challenges for ICT integration in the organisational setting

The same issues are to a large extent seen as being both key potential driving forces and, conversely, as obstacles or challenges which are currently affecting the ICT integration process among the universities – something that underlines the significance of these issues.

The main drivers for use of ICT in the organisational setting seem to be:

- The existence of an ICT strategy
- Focus and priority at management level
- Experimental and pilot projects
- ICT as a means of overcoming geographical distance.

The study also shows that some aspects of these drivers represent important challenges and obstacles to the ICT integration processes taking place among the EU universities.

The study points to the following key organisational challenges:

- Insufficient focus and priority from the management level
- Absence of incentive schemes
- Insufficient funding
- Insufficient grounding of development and pilot projects
- Absence of clear organisational structures and departments responsible for ICT.

The various aspects of the drivers and challenges are analysed below.

### 3.3.1. ICT strategy – an indicator of ICT integration

The existence of a university-wide ICT strategy is conventionally regarded as a pre-condition for an institution-wide development of ICT that does not rest entirely on the dedication of enthusiasts at department or faculty level. An ICT strategy is viewed as being one of the key drivers for all educational institutions.

Most European universities are already applying (or will apply) a strategy for ICT integration in the future. 55% of the universities participating in the study already have a formal action plan. 29% are in the process of developing one, and 12% are planning to develop one within 1-2 years.

**Table 3.7: Does the university have a formal strategy/action plan for ICT integration?**

| | Number of universities | Percentage |
|---|---|---|
| Yes | 127 | 55% |
| No, but we are in the process of developing one | 67 | 29% |
| No, but we plan to develop one within 1-2 years | 27 | 12% |
| No, and we have no plans to develop one | 10 | 4% |
| Total | 231 | 100% |
| Not answered | 10 | 4.15% |

The small universities (500 – 2000 students) do not have an ICT strategy to the same extent as the larger universities.

The study clearly shows that those universities which have an ICT strategy are further ahead in the integration of ICT in their administration and organisation as well as in their educational settings. An ICT strategy is also an indicator of greater ICT networking co-operation:

- There is a greater likelihood of being able to register for courses online at universities which either have an ICT strategy or are in the process of developing one than at universities which lack such a strategy.
- The student-to-computer ratio at universities with an ICT strategy is lower than at universities without one.
- Courses on the basic use of ICT for students, and courses or support concerning the pedagogical and didactic aspects of e-learning and ICT, are more widespread at universities with an ICT strategy.

- The availability of online learning resources and electronic discussion fora in conjunction with courses is more widespread at universities which have an ICT strategy.
- Supplementary training courses in e-learning format are more widespread at universities with an ICT strategy.
- Models of quality assurance are better developed at universities with an ICT strategy.
- Universities with an ICT strategy are more heavily involved in the joint supply of e-learning courses, the joint implementation of accreditation or certification systems, and the joint development or purchase of technological platforms with universities in other countries and with other partners, e.g. private sector partners.
- Increasing the number of e-learning courses, developing ICT-based teaching material, addressing new target groups and developing teachers' ICT competences are more common key priorities at universities with an ICT strategy than at those without one.

It is not the existence of the ICT strategy as such that makes the difference so much as the process that lies behind the development of the strategy, coupled with the focus and the setting of priorities that the ICT strategy involves.

The content of the ICT strategies varies from university to university. However, as is shown in the table below, the vast majority encompass organisational questions, technological infrastructure issues and pedagogical and didactic aspects. In addition, more than half of them contain sections that cover the competence development of teachers, co-operation with other universities, funding and international co-operation. A minority of strategies cover issues of student mobility or co-operation with other actors. 13 universities have stated that their strategies also include other areas, e.g. knowledge management, student services and research.

**Table 3.8: Which of the following aspects does/will the strategy cover?**

| | Number of universities | Percentage |
|---|---|---|
| Organisational aspects | 193 | 88% |
| Funding | 117 | 53% |
| Technological infrastructure | 193 | 88% |
| Pedagogical and didactic aspects | 177 | 81% |
| Competence development of teachers | 138 | 63% |
| Co-operation with other universities | 133 | 61% |
| Co-operation with other actors | 78 | 36% |
| International co-operation | 114 | 52% |
| Student mobility | 98 | 45% |
| Other aspects | 13 | 6% |
| Total | 219 | 100% |

Politecnico de Milano and Umeå University are examples of two technologically advanced universities whose approaches to their ICT strategies are illustrative:

At Politecnico di Milano[35], the ICT strategy is heavily based on the use of didactic guidelines concerning ICT / e-learning. These basic guidelines, which have been developed through years of experience, ensure the quality of the Politecnico's e-learning projects and represent a common set of values for the university.

Umeå University[36] in Sweden is well advanced in the integration of ICT despite operating without a formal ICT strategy. At one time it did have a strategy that was intended to encourage the integration of ICT, but ICT is now considered to be mainstreamed within the organisation and has instead become an integrated element in the university's overall development programme.

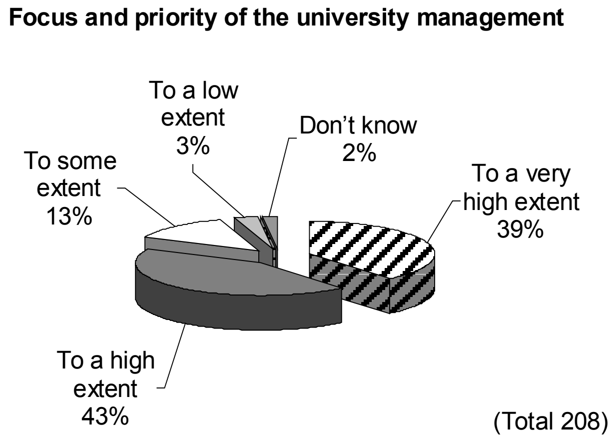
### 3.3.2. The role of the management

The universities themselves see the focus and priority of their managements as being a key driver for ICT integration – in fact, the questionnaire responses show that it is the single most important of them all, with around 82% of the universities considering it to be a driver to a high or very high extent. However, it should be noted that the questionnaires were mainly completed by management personnel.

[35] For further information, please refer to the case study profile of the Politecnico di Milano/ Annex G.

[36] For further information, please refer to the case study profile of Umeå University/Annex G.

**Figure 3.1: To what extent do you consider the following factors are key driving forces for ICT integration in your university?**




The assessment of several of the experts interviewed as well as the case study interviewees is that the involvement of senior management is crucial. The experts recommend that any given management team should not so much be focusing on ICT as an issue in itself as giving broader consideration to the challenges that its university is facing, and to how ICT can be used as a tool for addressing them.

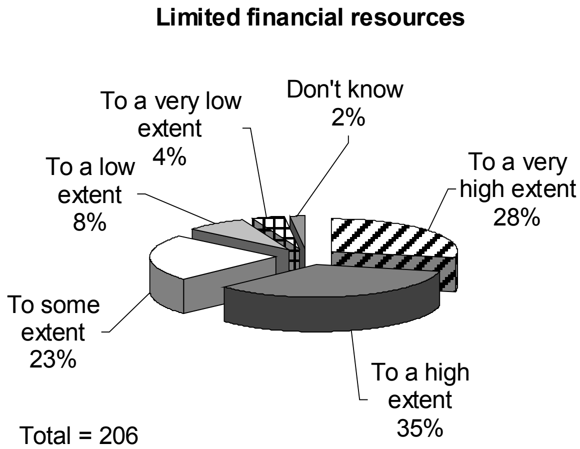
It is the assessment of several of the government representatives as well as the experts interviewed that a lack of obvious support and priority from university managements concerning ICT integration and e-learning is a critical obstacle among many EU universities. According to the experts, this is partly due to the fact that the managements have traditionally not been concerned with ICT and e-learning. Instead, they continue to regard these areas as initiatives which might be undertaken in individual projects or by pioneers rather than as an issue that is of crucial importance to the university as a whole.

Accordingly, the study indicates that there is still a lack of awareness in the universities of the potential of ICT integration and e-learning to enhance the quality of both teaching and administration.

**Lack of funding – partly a question of priorities?**

According to the survey data, limited financial resources are seen as being a key obstacle for the integration of ICT in the universities. 63% of the universities indicate that financial constraints represent an obstacle to either a high or very high extent.

**Figure 3.2: To what extent do you consider the following factors are obstacles for the expanded use of ICT in your university?**




However, several government representatives, experts and case study interviewees noted that a lack of funding is not always due to the universities having insufficient money or to the government not supporting the integration of ICT, but rather to the failure by university managements to give it proper priority.

One way to overcome the financial obstacle is to optimise the way ICT is funded. At the University of Utrecht and Umeå University[37], for instance, the funding for ICT integration comes out of both the general university budget and the individual faculties and departments. Lump sums from the university budget pay for developing and maintaining the infrastructure and other shared facilities, while the faculties and departments pay separately for the services they use, e.g. for training their staff. The advantage of this model is that it not only enables the management to demonstrate its commitment to ICT, but it also ensures commitment and dialogue with the departments concerning the availability and prioritising of resources for their use of ICT services.

Another approach is to seek to embark on projects with private sector partners that will co-finance the development of ICT. This has been the Politecnico di Milano's solution[38]. Further information about this is given in Chapter 7.

[37] For further information, please refer to the case study profiles of the University of Utrecht and Umeå University/Annex G.

[38] For further information, please refer to the case study profile of the Politecnico di Milano/ Annex G.

Finally, at the Open University of Catalonia (UOC)[39], the challenge has been met through a very clear prioritising of resources. The UOC only has a virtual campus, and more money is being spent on staff and technology because less expenditure is needed for buildings and other campus expenses. Accordingly, the UOC's recommendation centres on strict prioritisation.

**Use of incentive schemes**

An important part of the management's role is to ensure the existence of organisational incentives for the university in general, and for the staff in particular, in order to involve them in the development of ICT.

Incentives such as extra time or extra pay are used infrequently as a management tool for enhancing ICT integration, as the table below shows. Only 21% of universities allocate extra time to prepare for classes, and only 16% offer extra pay or bonuses to encourage the implementation of ICT in teaching.

**Table 3.9: To what extent are the following incentives used to encourage the implementation of ICT in the teaching at your university?**

| | To a very high extent | To a high extent | To some extent | To a low extent | To a very low extent | Don't know | Total |
|---|---|---|---|---|---|---|---|
| Extra time to prepare for classes | 6% | 15% | 29% | 21% | 25% | 5% | 207 |
| Opportunities for competence development | 7% | 36% | 35% | 9% | 9% | 5% | 207 |
| Extra pay or bonuses | 4% | 12% | 15% | 16% | 46% | 7% | 207 |
| It is highly prioritised at management level | 19% | 32% | 26% | 11% | 8% | 3% | 207 |
| Other | 6% | 4% | 6% | 0% | 6% | 77% | 48 |

The absence of incentives is seen as a general obstacle for the integration of ICT among both the experts and the government representatives interviewed. Developing teaching and e-learning material does not usually generate academic credits, nor is there generally any prestige for the teachers in doing so. In most universities, research remains a more prestigious activity than the development of teaching and pedagogies.

[39] For further information, please refer to the case study of Open University of Catalonia/ Annex G.

The case studies point to some interesting examples of the attempts that have been made to develop incentive schemes.

The Open University of Catalonia (UOC)[40] has faced the challenge head-on. E-learning and the development of digital learning resources are integrated aspects of the university's operation. All teachers at the UOC are being trained in the new pedagogical model and the new co-operation mode being used at the UOC. The teachers do not develop their course material themselves; specialised and professional staff do this instead. The UOC is run as a business, and has achieved great recognition internationally. The ability of management to think strategically, move fast and take risks is seen as an essential capacity of the university both today and in the future. The UOC is structured as a virtual organisation, which demands both considerable flexibility and strong, visionary leadership.

At Politecnico di Milano[41], the management has been a driver for the development of ICT, and is currently considering the establishment of a private-public partnership which is to encompass a cluster of e-learning activities. Incentives have been offered at the project level. Teachers have been paid to develop content by the private company Sfera, which is the Politecnico di Milano's co-operation partner.

At the University of Utrecht[42], the development of incentive schemes is seen as being both a key driver for the development of ICT and a key challenge for promoting it. The University of Utrecht has started developing its qualifications system towards the acknowledgement of ICT qualifications and good ICT-based teaching in its payment and career structures. The board has decided that the teachers need to demonstrate their teaching abilities, and the use of digital portfolios is playing an important part in this development. However, the inadequacy of incentives is still seen as being one of the key obstacles to the further development of ICT.

The UK is currently responding to this challenge at a national level. The British government's white paper on the future of higher education[43] places special emphasis on improving the quality of teaching. Measures include rewarding the best teaching de-

[40] For further information, please refer to the case study profile of the Open University of Catalonia/Annex G.
[41] For further information, please refer to the case study profile of the Politecnico di Milano/ Annex G.
[42] For further information, please refer to the case study profile of the University of Utrecht/ Annex G.
[43] The Future of Higher Education: http://www.dfes.gov.uk/highereducation/hestrategy/

partments with funding of £500,000 a year for five years, and creating a national academy for teaching quality with the purpose of disseminating best practice. In addition, the white paper proposes that research capacity should no longer be the only criterion for designating an institution as a university, but that this title can also be conferred in accordance with taught-degree awarding powers, student numbers and the range of subjects offered.

**Text box 3.1: Perspectives from Australia**

In many European countries, rewards in higher education – especially promotion – are linked more closely to the quality of research than to the quality of teaching. In contrast to this, the promotion criteria in Australia are not based only on research, but also on the quality of teaching and the level of service given to the university.

This means that there are stronger incentives and rewards for teaching practice innovation in Australia.

At Queensland University of Technology, a university with a large intake of mature and overseas students, the promotion scheme is based on three criteria:

- Research and scholarship
- Teaching and teaching scholarship
- Leadership qualities.

Several fellowships have been awarded for innovation in learning and teaching. In addition, an annual Compassionate Pioneer award has been created for staff who have been helpful in assisting others to use ICT for learning.

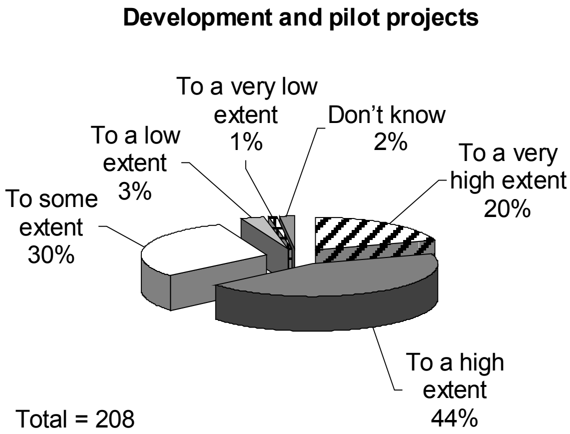
At the University of Melbourne, one of Australia's oldest and most prestigious 'sandstone' universities, lecturers are offered a proportion of the income generated when its multimedia-based resources are sold outside the university.

For further information, please refer to the study of ICT development in Australian universities viewed from a European perspective that was conducted by the Dutch SURF foundation. See http://www.surf.nl/en/download/Australian_book.pdf.

### 3.3.3. Development and pilot projects

Development and pilot projects are also considered to be a key driver by the universities. 64% of the universities think that these kinds of activities are a key driver for ICT integration to a high or very high extent:

**Figure 3.3: To what extent do you consider the following factors are key driving forces for ICT integration in your university?**




Development and pilot projects are necessary tools for initiating the development of ICT integration and creating innovation. But the uniform conclusion that emerges from the experts, the case study interviewees and the desk study is that the challenge will ultimately be to incorporate the results and experiences gained from development projects into the overall strategy of the university. This is currently seen as an important challenge for most universities in terms of bringing the development further.

In several of the case study universities, enthusiasm and the experience gained through projects are the factors which most interviewees highlight as being of key importance for the integration of ICT. In addition, the many years of experience with e-learning are seen as having had a positive influence on the use of ICT on the campus.

However important the development and pilot projects may be as drivers, they also represent an important challenge in terms of grounding the projects and the organisation's experiences. The focus should now be on the support of the projects and the mainstreaming of their results into the universities' general strategies and practices. In that respect, there is a need for extended management focus.

According to several of the experts and prior studies consulted, one of the key challenges in the development process is to migrate from a fragmented project-based approach to a more comprehensive one which involves all parts of the university.

Several of the experts accordingly consider it essential that ICT integration and e-learning should now metamorphose from projects and experiments to integration into the normal operation of the universities. Ensuring the sustainability of ICT integration and e-learning will be the future major challenge, since much of their development has hitherto been financed through extra funding.

In Australia, ICT integration and e-learning has increasingly become a part of core university business. But according to the Australian experts interviewed, the heavy focus on projects and project organisations in Europe could hamper this process. In the Netherlands, for instance, the mainstreaming of ICT needs to be accomplished by its universities, but most of the ICT development is actually being done by the SURF project organisation, which has no incentive – or opportunity – to mainstream ICT.

### 3.3.4. The role and structure of the ICT organisation

An efficient and effective ICT organisation and support structure can be a driver for ICT integration and e-learning, and is a precondition for the successful use of ICT across a university's entire spectrum of activities. The organisational structure of many EU universities is regarded as representing a general obstacle to ICT integration and e-learning.

According to several of the experts interviewed, EU universities often find themselves in the situation of having one department that contains technical expertise, another department with expertise in information structures, yet another with strong pedagogical expertise, and no common ground for linking them. The future challenge is to link such fragmented entities into an overall strategy and approach in which they can all collaborate.

In addition, the organisational structure of the universities is generally seen as a barrier for many of the universities which are not working strategically with ICT integration and e-learning. The universities can be regarded as generally conservative organisations, and there appears to be widespread internal inertia and resistance to change.

The interviewees point to the considerable autonomy existing in the organisation of the universities as an obstacle to the integration of ICT. Because the various departments enjoy such autonomy, they are able to decide individually if they want to integrate ICT and offer e-learning, and many staff members at this level are negatively disposed towards it. Here, the importance of strong leadership and the creation of incentives that support the integration of ICT are noted.

At Politecnico di Milano[44], the METID unit[45] has the task of developing the use of ICT in education on the campus as well as for e-learning projects, such as in supporting the professors in their use of ICT for teaching. The unit is important both in developing the pedagogical basis for the use of ICT and e-learning and being a driver for the current development of ICT tools and e-learning products. METID correspondingly encompasses areas such as technical expertise, expertise concerning information structures and pedagogy.

The University of Bremen has developed its organisational model as the use of ICT has matured over time. During the early phase, computer centres tightly managed the use of ICT. This was followed by a phase of creative diversification with little central management. Now there is a strong demand for harmonization, the setting of standards and the definition of common goals, and the central management is now being involved. However, the management is aware of the need not to suppress the creativity of the various parties, but sees its role as one of mediating conflicts and defining a general framework.

At Umeå University, the organisational model for ICT integration and e-learning combines both centralised and decentralised elements[46]. The interplay of top-down and bottom-up activities is considered to be very important. Centralised units maintain the focus on the overall integration of ICT, ensure core competencies, and function as an expert resource for the integration of ICT, while at the same time allowing room for dedicated enthusiasts and personal experience. The departments and teachers are encouraged to set up new e-learning courses and develop the use of ICT, but they are not forced to do so by centralised goals. Such a model ensures local grounding and involvement.

At the University of Utrecht (UU)[47], the development of ICT integration and e-learning is driven by the Centre for ICT in Education of the IVLOS department (the department for teacher training). The Centre for ICT in Education works with all the university's faculties and units, as well as participating in various co-operation ventures and projects with other Dutch universities, overseas universities, the SURF Foundation and

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[44] For further information, please refer to the case study profile of the Politecnico di Milano/ Annex G.
[45] METID: http://www.metid.polimi.it/
[46] For further information, please refer to the case study profile of Umeå University/Annex G.
[47] For further information, please refer to the case study profile of the University of Utrecht/ Annex G.

other partners. The Centre focuses on developing pedagogies and models for the use of ICT in education, mainly within the university. The Centre has four overall tasks:

- **Supporting the use of ICT in education** at all the UU's levels. This includes digital learning environments and the support and professional development of the teachers. The institutes and faculties pay to use the Centre's services. In addition, the Centre leads and initiates various projects concerning ICT in education. These are selected by a commission which decides how the money it receives from the Board is to be spent.
- **Knowledge exchange** with other universities and partners.
- **Professional development of the UU teachers**. The Centre offers various services and projects for teacher training and professional development which the faculties and services can buy.
- **Knowledge development and research**. Finally, the Centre is supposed to engage in research and knowledge development. This combination of research with teacher training makes the Centre quite unique in the Netherlands.

The centre is seen as an important resource for the development of ICT. However, according to the interviewees, the fact that the educational section is not closely linked to the overall policy level represents a problem. So there is both a policy level which focuses on ICT and an ICT educational centre, but little co-ordination between the two.

#### 3.3.5. ICT as a means of overcoming geographical distance

ICT can be used as a means of overcoming geographical distance for both internal and external communication.

The geographical circumstances of both Politecnico di Milano and Umeå University have been a primary driver for ICT integration.

Politecnico di Milano[48] comprises seven campuses located in six different cities. Distance teaching has historically been a tool to overcome this geographical separation for both teacher co-operation and the teaching itself.

[48] For further information, please refer to the case study profile of the Politecnico di Milano/ Annex G.

Umeå University[49] is co-operating with universities both nationally and internationally. There is a long tradition of co-operation in the Kvarken region where Umeå is situated, but travelling and maintaining contact across the area has been problematic. The use of ICT for communication and collaboration now makes co-operation easier, and new projects have been developed.

## 3.4. Main priorities for the future use of ICT in the organisational setting

On the basis of the questionnaire results, it seems that in the organisational setting the main focus of the universities during the next two years will be to upgrade the technological infrastructure. 63% of the participating universities state that this will comprise a key priority to a high or very high extent. This demonstrates that the universities have already reached the point at which investment in technology is no longer being seen as a key priority. Other aspects, such as the purchase of hardware and software, and the development of technical support and guidance to both staff and students, are also focal points for a little under half of the participating universities. On the other hand, the modification of buildings in order to adapt them for ICT integration does not seem to be a crucial issue for the universities. Only 28% of the universities participating in the survey have stated that this is a key priority either to a high or very high extent.

**Table 3.10: To what extent will the following objectives comprise key priorities for the university over the next two years?**

| | To a very high extent | To a high extent | To some extent | To a low extent | To a very low extent | Don't know | Total |
|---|---|---|---|---|---|---|---|
| Purchasing hardware (computers, AV equipment) | 15% | 30% | 40% | 10% | 3% | 3% | 208 |
| Upgrading of technological infrastructure | 24% | 39% | 30% | 3% | 1% | 3% | 208 |
| Purchasing software (standard programs, teaching programs) | 13% | 37% | 39% | 7% | 1% | 3% | 208 |
| Modification of buildings to adapt them for ICT integration | 6% | 22% | 35% | 24% | 10% | 4% | 208 |
| Development of technical support and guidance to both staff and students | 14% | 40% | 35% | 8% | 1% | 2% | 208 |

49 For further information, please refer to the case study profile of Umeå University/Annex G.

# 4. The use of ICT in the educational setting

This chapter focuses on the use of ICT in the educational setting of the EU Member States' universities. The main questions are:

- How is ICT being used in the educational setting in the EU's universities?
- What is the status of ICT integration in campus-based teaching?
- What is the status of e-learning initiatives among the universities of the EU Member States?
- How are the e-learning courses being accredited?
- How are the e-learning courses quality assured?
- What are the main drivers for the use of ICT in the educational setting?
- What are the main challenges and obstacles for the use of ICT in the educational setting?
- What examples of good practice in ICT integration and e-learning in the educational setting can be presented?
- What are the main priorities of the universities concerning ICT integration and e-learning in the educational setting in the future?

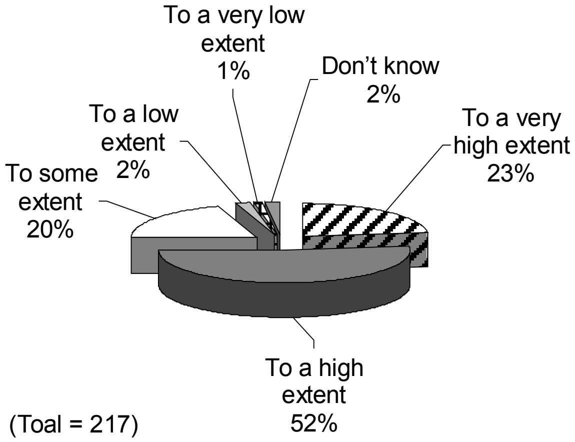
The analysis of the use of ICT is primarily based on the results from our survey and case study examples, as well as interviews with government representatives and experts, and information derived from the desk study.

## 4.1. ICT is primarily used to support traditional ways of teaching on campus

ICT can be integrated into the actual teaching situation in numerous ways and at several levels. Integration can be implemented through treating the computer as a sophisticated typewriter, using mainstream Windows Office applications, developing new forms of content and material, stimulating communication, or using ICT as a tool to develop completely new pedagogies and ways of teaching. The study shows that the EU universities are moving at very different rates in their integration of ICT in teaching.

It also shows that the general integration level of ICT in teaching has increased during the past two years. Three out of four of the universities indicate that this is the case to a high or very high extent, and only 3% of the universities indicate that it is happening to a low or very low extent.

**Figure 4.1: Has the integration of ICT in courses/teaching increased within the past 2 years?**




The trend towards the increased usage of ICT in teaching is underscored by the experience of the case study universities, which all points to the considerable developments that have taken place during the past couple of years while simultaneously underlining that these are only beginning to take definite shape. Most of the services, tools and e-learning courses have been developed during the past two years, and all the universities involved expect this type of development to continue. Since these universities were selected because they are institutions that were well advanced in their integration of ICT, there is reason to believe that most of the EU's remaining universities are a couple of years further behind in this regard. Therefore an increase in the use of ICT in teaching can be anticipated to occur among the majority of the EU's universities.

Two thirds of the EU's universities use ICT in lectures to a high or very high extent, for instance through the availability of projectors and computers in lecture rooms and the use that teachers make of presentation programs such as PowerPoint. Learning resources such as databases, simulation models and other programs are not as widespread. They are available on-line to students and teachers at 37% of the participating universities to either a high or very high extent. Finally, ICT is used to support the sharing of information or for communication and collaboration between teachers and students to a high or very high degree at 33% of the universities that participated in the survey.

**Table 4.1: To what extent is ICT integrated into the following teaching situations?**

| | To a very high extent | To a high extent | To some extent | To a low extent | To a very low extent | Don't know | Total |
|---|---|---|---|---|---|---|---|
| ICT is used in lectures, e.g. projectors and computers are easily available in lecture rooms, and teachers are using presentation programs such as PowerPoint | 30% | 37% | 29% | 2% | 1% | 1% | 217 |
| Learning resources, such as databases, simulation models and other programs are available to teachers and students on-line | 9% | 28% | 44% | 11% | 7% | 2% | 217 |
| ICT is used to support the sharing of information, communication and collaboration between teachers and students, e.g. in discussion fora | 13% | 20% | 44% | 10% | 12% | 1% | 217 |

The data indicate that ICT is still primarily being used in universities in traditional teaching settings, and is thereby supporting existing teaching structures.

### 4.1.1. Examples of innovative models for ICT integration in teaching on campus

The best practice case studies provide some interesting models for the innovative integration of ICT in the educational setting, and illustrate how educational models are changing as a consequence of such integration.

A general tendency that is evident from the case studies is the striving for a more integrated learning approach through opening up the traditional physical setting in the direction of study landscapes that combine library services, study facilities and ICT facilities.

At the University of Bremen[50], a WLAN (Wireless Local Area Network) has been installed, and more and more students have laptop computers. At the Faculty of Education, about 50 lecturers are using a virtual learning space, and the students have direct access to the host server wherever they are on campus. With laptops, the students can work easily either in groups or independently, using Web-based resources.

[50] For further information, please refer to the case study profile of the University of Bremen/ Annex G.

However, it should be noted that the lectures have not yet incorporated any associated didactic changes.

At the Politecnico di Milano[51], an online system (Corsi On-line 2) has been developed to support face-to-face teaching[52]. Materials are posted here for the courses that are held on campus, and virtual communities are created. The system has led to increased dialogue between teachers and students and among the students themselves. At the Politecnico di Milano, several e-learning courses have been developed which are based on a common set of pedagogical standards. The experiences with these have been positive, and they have gradually been shaping traditional teaching methods towards a more dialogue-focused approach.

Umeå University's[53] e-learning experience has also influenced the use of ICT on campus. Its virtual learning environment (Ping Pong) was originally developed for distance learning, but is now also being integrated into campus-based teaching[54], and is seen as a general inspiration for the use of ICT on campus.

**The use of electronic learning platforms**

Among several of the universities visited, an electronic learning platform is the basic framework for the various ways they are integrating ICT into their teaching.

The WebCt and Blackboard platforms are used by a number of universities, but other platforms such as FirstClass or custom-designed platforms are also being used. The learning platforms are used to structure the courses, to supply information concerning courses, study plans and curricula, and as a means of communication between students and teachers via electronic conferencing or discussion fora.

One of the key challenges for the universities is adopting a joint and strategic approach to the use of electronic learning platforms. The universities in several of the case studies are operating with multiple platforms, and have not yet reached the stage of integrating all ICT and e-learning activities into a joint platform, although they have realised the importance of making this a priority during the next few years. The existence of multiple platforms is due to the fact that the academic institutions or teachers have driven a large portion of their ICT development independently from below.

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[51] For further information, please refer to the case study profile of the Politecnico di Milano/ Annex G.

[52] Corsi On-line 2: http://corsi.metid.polimi.it/

[53] For further information, please refer to the case study profile of Umeå University/Annex G.

At Umeå University[55], for example, the process of selecting a learning platform was a long one. In the end the Ping Pong system was chosen. Umeå recognises the dilemma inherent in choosing an ICT system for a university. On the one hand, a shared system will ease communication and the interchange of information and material. On the other hand, academic freedom remains a key value, with the teachers being accustomed to personally selecting or developing the learning resources they use in their teaching. At Umeå University this challenge has been met through compromise. While the Ping Pong learning platform has been officially selected, the teachers still have the option of using other systems. However, central support will only be available for the standard systems.

Another example is the University of Utrecht[56], which is currently running two learning platforms, Blackboard and WebCT, which are managed by two separate consortia within the university and hosted at central university level. The faculties decide for themselves which platform they want to use.

The reason for the Board's decision to go with two consortia was that the development of ICT using the electronic learning environments started at a decentralised level in the faculties and institutes, which decided for themselves which platform they wanted to use. These efforts had to be co-ordinated so that a joint licence could be purchased.

However, the Board did not want to force the faculties to adopt a single platform. This was partly due to the fact that the market for e-learning platforms is still quite immature, and so it is hard to estimate the progression of future developments. Having two platforms gave the university the opportunity to follow the development effort and postpone a decision on which platform to select for a wide-scale implementation.

**The use of electronic portfolios**

The University of Utrecht is currently working with an interesting example of the use of ICT in teaching, namely the digital portfolio.

The university has been working with portfolios since the mid 1990s, but since 2001 it has been working with a digital model. Electronic portfolios were introduced with the

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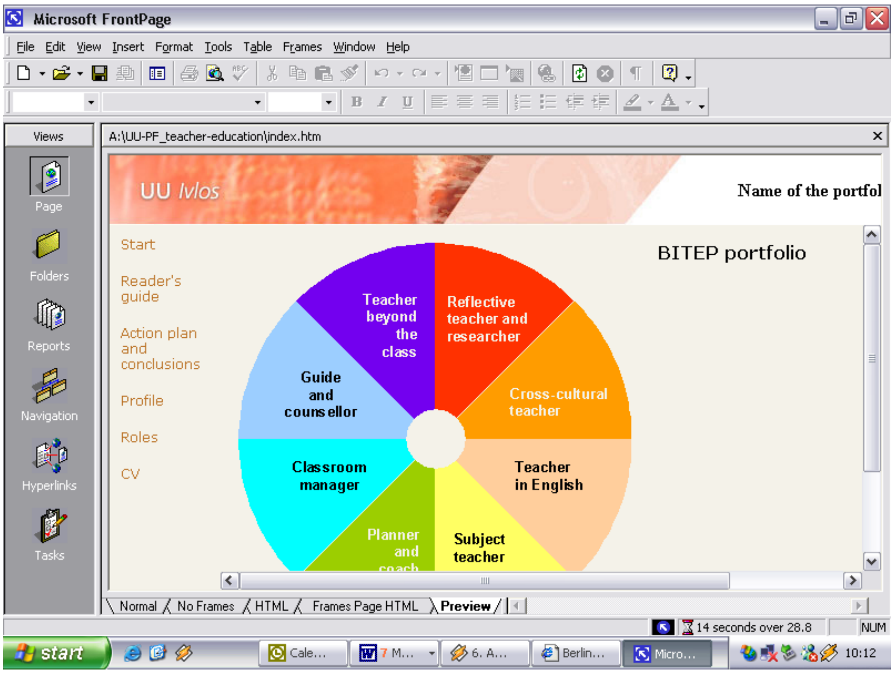
[54] Ping Pong: http://pingpong.umu.se/

[55] For further information, please refer to the case study profile of Umeå University/Annex G.

[56] For further information, please refer to the case study profile of the University of Utrecht/ Annex G.

aim of monitoring the students' academic progress, and to stimulate them to reflect on their own development.

As an experiment, the digital portfolios are being used in a teacher training programme as a means of structuring the entire course and examination. The IVLOS teacher education programme is a one-year masters course which requires a bachelor's degree to enter. The foundation of the programme is the development of an electronic portfolio through which the students are made to experience six different teachers' roles through practical teaching, and then reflect and expand on these roles in their portfolios. The portfolio framework corresponds to the example shown below:




While they are developing the portfolios the students give each other feedback regarding one another's portfolios, how they put themselves across, and their learning process and outcomes.

In addition, the portfolios will replace the exams this year. This implies that the portfolios must incorporate each individual student's academic profile and level of academic skills. Originally it was meant to be a learning device, but now it is also developing into an assessment tool.

The chief issue in discussing the strengths and weakness of using the electronic portfolio in teaching is whether it stimulates the right competences.

The students and teachers involved point to the following strengths:

- The electronic portfolio encourages reflection concerning the learning process, and makes both students and teachers more observant of tacit knowledge, strengths and weaknesses.
- It develops basic ICT skills.
- It is seen as a good instrument for promoting dialogue among students and teachers.
- The electronic format forces the students to focus more on the structure and presentation of the content. The digital versions are much more to the point and reader-friendly than the paper versions, which tend to be very long and confusing.

The weaknesses are seen to be:

- There tends to be too much focus on the portfolio framework and the presentation of results and reflections so that they will fit this framework, thereby removing the focus from the actual teaching. There is a danger of spending too much time on the format and presentation and too little time on the content.
- It is very time-consuming to create.
- Technical problems. Although it is accessible from anywhere, it does not always run well on all platforms.
- The portfolios are also being used as an assessment tool, which might work counter to the students discussing their weaknesses.
- Some students may be poor at successful self-presentation.

### 4.2. The majority of universities have experience of e-learning

In our survey of EU universities we distinguish between the use of ICT for teaching on the one hand, and its use for e-learning on the other. The latter involves an element of physical distance between teachers and students.

The approaches to e-learning among the Member States and universities vary considerably, depending on their focus, market orientation, target groups and competition. The Netherlands, for example, is a relatively small country with a language of geographically restricted currency and no tradition in the export of education. The same applies to the Finnish universities, which due to their language are not focusing on the international market for the time being. At the University of Utrecht[57], the main ICT integration objective is to use ICT to support and enhance face-to-face education, and hence to develop ICT didactics and pedagogy. E-learning as such is not regarded as being of value, since the university believes in maintaining face-to-face contact in the learning situation. The demand for e-learning courses is also seen to be small because of the limited geographical distances and the restricted currency of the Dutch language. Accordingly, various models of blended learning are seen as being much more appropriate to the university's educational setting.

In comparison, the UK has a stronger tradition of exporting education, and is therefore more market-oriented in its approach to e-learning. In Spain, the Open University of Catalonia (UOC)[58] is a new and innovative university in the commercial higher education market. Half of the UOC's courses consist of supplementary education, and accordingly the university is free to offer any course demanded by the market, paid for either by the students or their employers. The UOC also offers courses produced directly for public and private organisations.

#### 4.2.1. E-learning in basic academic training

The survey undertaken among all the EU Member State universities shows that most have some experience of e-learning at the level of basic academic training. However, this does not seem to be the preferred mode of delivering teaching, either for basic academic training or for supplementary education. Most e-learning courses at university level are accredited, and of these the majority are accredited using ECTS, or will be in the near future. A majority of universities participating in the survey have developed quality assurance models to some extent.

Almost all the universities are using e-learning to some degree in delivering their educational output. Only 3% of them have no plans to offer any courses in this format. However, only 1% of universities are offering all of their courses and study programmes in e-learning format. In the majority of universities (62%), less than 25% of courses are offered in this format.

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[57] For further information, please refer to the case study profile of the University of Utrecht/Annex G.

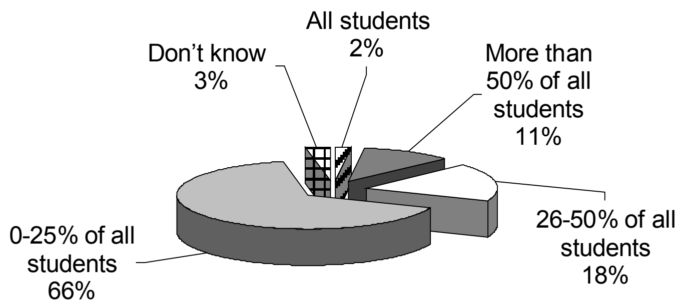
[58] For further information, please refer to the case study profile of the Open University of Catalonia/Annex G.

**Table 4.2: Does your university offer courses organised in e-learning format at the level of basic academic training (i.e. bachelor's degree and masters level)?**

| | Number of universities | Percentage |
|---|---|---|
| Yes, all courses and study programmes are in e-learning format | 2 | 1% |
| Yes, more than 50% of all courses are in e-learning format | 8 | 4% |
| Yes, 25-50% of all courses are in e-learning format | 23 | 11% |
| Yes, less than 25% of all courses are in e-learning format | 132 | 62% |
| No, but we are in the process of developing courses in e-learning format | 28 | 13% |
| No, but we plan to make courses available in e-learning format | 12 | 6% |
| No, and we have no plans to offer courses in e-learning format | 6 | 3% |
| Don't know | 2 | 1% |
| Total | 213 | 100% |
| Not answered | 28 | 12% |

In 13% of the universities, either all or over half of the students are taking e-learning courses. In the majority of universities (66%), between 0-25% of all students are doing so.

**Figure 4.2: What proportion of the students enrolled in your university is participating in e-learning courses?**




(Total = 165)

**Examples of e-learning models in basic academic training**

The case studies include several interesting examples of e-learning models.

The Politecnico di Milano[59] has developed its first fully online degree, Laurea OnLine[60]. The project started in 2000, and its first students will have completed their

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[59] For further information, please refer to the case study profile of the Politecnico di Milano/ Annex G.

[60] Laurea OnLine: http://www.laureaonline.it/

studies in July 2003. The project was set up by a consortium involving the Politecnico di Milano and Somedia (a company belonging to the Espresso-Repubblica publishing group). All the study activities are e-learning based. The course is based on CD-ROMs (33 CD-ROMs have been produced containing material for the 26 modules), a web portal (discussion fora, agenda, notice board, personal e-mail) and virtual class-rooms (two online lectures per week with audio, chat, electronic blackboard and shared applications). The students also have access to a tutor to guide them through the course.

For the teachers and students, the strength of the Politecnico di Milano model is the increased dialogue that takes place in a virtual setting. As a teacher of the Laurea OnLine project said, "The philosophy of teaching in e-learning is completely different". The students strongly agree that the role of a virtual teacher is different to that of a traditional one. "The teachers seem much more enthusiastic", said one of them. According to the Laurea OnLine students, the quality of e-learning is high because the teachers are forced to structure their teaching better in virtual learning environments.

The weakness of the Politecnico di Milano model has been the substantial drop-out rate. There are several explanations for this. First of all, during the project's initial years, the students were not aware of, or were not informed about, the immense workload that an online masters degree involves. Secondly, the Politecnico di Milano was underestimating the need for the support services required by the students in an online setting. It has since prioritised the role of the virtual tutor on the basis of this experience.

Umeå University[61] estimates that about half its basic academic training courses are being offered in e-learning format. It offers two modes of e-learning, decentralised study and internet-based study. In decentralised study the students meet at regional mini-campuses or study centres. In internet-based study, courses are followed via the Internet with little or no face-to-face interaction. In both types of courses ICT is integrated via a virtual learning environment and videoconferencing. Necessity and a commitment to regional development are both drivers for e-learning at Umeå University, since the university is situated in the far north of Sweden, whose population is scattered across a large area. However, even though the students are highly motivated to participate in e-learning, the great importance of face-to-face interaction is still being emphasised.

[61] For further information, please refer to the case study profile of Umeå University/Annex G.

At the Open University of Catalonia (UOC)[62], all the courses are being offered in e-learning format, about half of them for basic academic training. Though the UOC focuses strategically on continuing education, it will continue to offer initial education. This is because it sees some advantages in covering the entire tertiary education market, one of these being the opportunity to split the education material development costs among the different course levels.

### 4.2.2. E-learning in supplementary training

The quantity of e-learning being offered in respect of supplementary training is somewhat less than for basic academic training. 5% of the universities in the survey offer more than half their supplementary training courses in e-learning format. In most universities (48%), less than 25% of all courses are in e-learning format. 21% of universities are still in the process of developing courses organised in this way, or plan to do so.

**Table 4.3: Does your university offer courses organised as e-learning during supplementary training?**

| | Number of universities | Percentage |
|---|---|---|
| Yes, all courses and study programmes are organised as e-learning | 2 | 1% |
| Yes, more than 50% of all courses are organised as e-learning | 9 | 4% |
| Yes, 25-50% of all courses are offered are organised as e-learning | 17 | 8% |
| Yes, less than 25% of all courses are organised as e-learning | 103 | 48% |
| No, but we are in the process of developing courses organised as e-learning | 28 | 13% |
| No, but we plan to make courses available organised as e-learning | 17 | 8% |
| No, and we have no plans to offer courses organised as e-learning | 10 | 5% |
| Don't know | 27 | 13% |
| Total | 213 | 100% |
| Not answered | 28 | 12% |

### Examples of e-learning models in supplementary training

E-learning in supplementary education is one of the key future issues for several of the case study universities. The focus on supplementary training is related both to e-learning target group considerations and to the funding of the courses. It is the assessment of several of the interviewees that e-learning courses are most suitable for

62 For further information, please refer to the case study profile of the Open University of Catalonia/Annex G.

experienced and highly motivated learners, which means older learners and professionals. Supplementary training courses are funded by student fees to a greater extent than with basic academic training, and therefore more funds are available to develop e-learning courses as a result of the greater market incentive. The expectation among the case study universities is that the market for supplementary e-learning courses will grow.

The Politecnico di Milano[63] has developed a Masters in Net Economy in conjunction with Sfera (a company in the ENEL group). Around 80 students are following this masters course, which provides innovative management training for the Net Economy. There are online classes and tutoring[64].

Umeå University[65] estimates that about half its courses consist of supplementary education, but finds it hard to set the dividing line since what is regarded as basic academic training in academia may be viewed as continuing education for working practitioners. Its supplementary training is offered in the same formats as the basic academic training. However, to ensure the relevance of its courses to regional development, Umeå University is partially developing its courses through dialogue with the municipalities and local industry, and in this way it is reaching new groups of students.

The Open University of Catalonia (UOC)[66] has a strong focus on the continuing education market. The market for lifelong learning is growing, and there are many potential students fitting the e-learning target group profiles:

- They have Internet access either at home or at work
- They have the necessary skills to be able to navigate a virtual campus
- The students are working alongside their courses, and either they or their employers are willing to pay for upgrading their skills.

Private course providers are also active in this market, but as they cannot offer a university degree the UOC has a competitive advantage.

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[63] For further information, please refer to the case study profile of the Politecnico di Milano/ Annex G.
[64] Master NBA: http://www.masternba.it/
[65] For further information, please refer to the case study profile of Umeå University/Annex G.
[66] For further information, please refer to the case study profile of the Open University of Catalonia/Annex G.

A strong market focus also exists in the UKeU and the UK Healthcare Education Partnership. The purpose of the partnership is to develop fully online courses for the professional development of nurses. The UKHEP courses have not been developed on the basis of a particular learning model, but are based more on what the partners believe works.

At the UKHEP, the keyword is flexibility. The courses will be designed so that the nurses can construct their own degrees to fit their particular needs. Hence the modules are designed to be combined together into degrees, and the modules of other educational institutions can also be accredited and recognised in the programme. In addition, the students can choose whether they want credits for their courses or not. This is important, since not all the students need them. The payment model is adjusted accordingly.

All modules are 100% e-learning in format, so there is no physical meeting. In practice, the learning approach of the modules combines web-based text with various kinds of reflection and interaction involving the students, teachers and learning material. Software is being developed to guide the students in certain directions, for instance a video clip designed as the starting point for a discussion and further interaction among themselves. They also use other media, as well as links to texts and literature. Every student has a tutor, with the ratio being approximately 15:1. The tutor's role is to comment on the discussions, engage in dialogue, help the students and answer questions. The students are assessed through online examinations.

The learning model of the Canege consortium is similar to the basic concept outlined in the example given above. The learning model's overall approach is to make available all the resources (including teachers) which are necessary for students to be able to work independently via the internet. Each course or module comprises a number of lessons which the students can access at their own pace.

Each course is composed of the following three key aspects:

- online tutoring with questions, discussions and exercises
- interactive content: links to curricula, quiz and evaluations
- access to databases.

The course developers have tried to include videoconferencing in order to develop the methodologies further and reinforce the interactive approach. An important consideration in this respect is that the students must supply their own hardware and software.

Therefore the developers cannot include features that require multimedia or other kinds of high-speed technology or hardware.

The Canege administration is generally encouraging its teachers to track their students on the Internet in order to keep an eye on how they are progressing, when they are accessing the system, and what parts of it they are using. One of the key challenges is to make sure that the students stay focused and committed and do not drop out, and that is difficult when there is no face-to-face contact. There is some discussion among the teachers about how much responsibility they should be taking for this. Some of them argue that the students are responsible for their own learning, but most of the teachers agree that they should be trying to monitor and support their students.

Supporting the students' feeling of commitment during the e-learning process is a key element in the pedagogical model that has been developed for the courses being offered through the virtual campus of the Open University of Catalonia (UOC)[67]. Two different types of teacher are assigned to every course. One is the 'tutors' who are responsible for the course content, and the other is the 'counsellors' who maintain contact with the students and ensure they are making progress in their studies. In this way, the personal support function is being professionally ensured. The low drop-out rates at the UOC indicate that this is a model which can be recommended.

The personal tutor and counsellor support functions are seen as being one of the most important parameters of success for e-learning in supplementary training. The challenge for the universities in this respect is to balance the requirement for tutoring with the necessity of keeping their budgets in line.

[67] For further information, please refer to the case study profile of the Open University of Catalonia/Annex G.

**Text box 4.1: A perspective from Canada**

> The distance-teaching University of Athabasca, Alberta, Canada, was the first university in the world to launch a fully online MBA programme in 1994 (www.athabascau.ca/mba). Since 1995 enrolments have grown from 130 students to 1112 in 2002, making it the largest Executive MBA programme in Canada. Currently, Athabasca educates 25% of the MBA market in Canada and 15% of the world's online market. Course materials, readings, assignments, discussions, teamwork and examinations are all online, with occasional supplementation by textbooks. All students work at the same time as they are obtaining their degree. Through strategic partnerships Athabasca offers post-graduate management education for senior military personnel of the Canadian Armed Forces and the Certified General Accountants of Canada.

### 4.2.3. E-learning courses are ECTS-accredited

At most of the universities (34%), e-learning courses are accredited using the ECTS system. However, one in four universities have developed their own accreditation systems, and 14% do not accredit their courses at all.

**Table 4.4: How are the e-learning courses accredited?**

| | Number of universities | Percentage |
|---|---|---|
| We have developed our own accreditation system | 44 | 25% |
| The e-learning courses are accredited using the ECTS system | 59 | 34% |
| The e-learning courses are not accredited | 25 | 14% |
| Other | 28 | 16% |
| Don't know | 20 | 11% |
| Total | 176 | 100 |

72% of those universities which are not currently accrediting their e-learning courses under the ECTS system believe that their courses may be included in the ECTS system in the future, at least to some extent.

**Table 4.5: If your courses are not currently accredited under European Credit Transfer System (ECTS), do you think it is possible that your e-learning courses may be included in the ECTS system in the future?**

| | Number of universities | Percentage |
|---|---|---|
| Yes | 60 | 51% |
| Yes, to some extent | 25 | 21% |
| No | 4 | 3% |
| Don't know | 28 | 24% |
| Total | 117 | 100% |

At both the Open University of Catalonia and Umeå University[68], extended EU and international co-operation is considered to be necessary for the further implementation of ECTS, which will further support the continued co-operation between universities.

The Open University of Catalonia believes that the future trend will be for initial education to develop in step with the ECTS system and the Bologna process.

### 4.2.4. Quality assurance of e-learning

At just over half of the participating universities (53%), a model has been developed for the quality assurance of e-learning courses, even though in most universities it is only partial. Evaluation models include (electronic) student satisfaction surveys and/or external peer evaluation (17 universities), the creation of a special quality assurance body within the university (5 universities), external review (3 universities), and guidelines and standard models for course design (8 universities). In addition to this, most universities (24) responded that they were using the same quality assurance model as for all other courses.

**Table 4.6: Has a model been developed for the quality assurance of e-learning courses?**

| | Number of universities | Percentage |
|---|---|---|
| Yes | 31 | 18% |
| Yes, to some extent | 62 | 35% |
| No | 67 | 38% |
| Don't know | 16 | 9% |
| Total | 176 | 100% |
| Not answered | 65 | 27% |

[68] For further information, please refer to the case study profile of the Open University of Catalonia and Umeå University/Annex G.

At Umeå University[69], the quality assurance of e-learning is the same as for traditional courses. Academic freedom and maintaining the teachers' control of their own courses are the arguments used for not developing purpose-designed models for the quality assurance of e-learning courses.

The UKeU and the UKHEP also see quality assurance as a key priority, and are in the process of developing a model for it. At the Finnish Virtual University, quality assurance will be a major focal point in the future.

**Text box 4.2: An outlook from Hungary**

> In Hungary, the Apertus public foundation for open vocational training has been given the task of developing online solutions for supplementary training, including quality assurance and evaluation. The foundation was created by the Hungarian government in 1997 and is funded by a vocational training contribution paid by employers. In 2001, the foundation funded vocational distance education projects with Euro 4.4 million, favouring online-based programmes.

## 4.3. Various models of e-learning in education and learning – strengths and weaknesses

The case studies illustrate the very different approaches towards ICT integration and e-learning that exist in the EU universities, and underline the fact that there can be no single model for ICT integration. In each case the approach has been to develop the use of ICT in accordance with individual needs and objectives.

It should be emphasised that e-learning does not suit all groups of students. According to the teachers, it is most suitable for graduate and post-graduate students and needs to be adapted carefully to the specific target group. The case studies point to the following strengths and weaknesses in the e-learning models:

Strengths:

- The courses are accessible to people in their own time and do not involve geographical constraints or travel time.
- The courses are very flexible.

[69] For further information, please refer to the case study profile of Umeå University/Annex G.

- Students can follow their own learning process in the e-learning modules more easily than with traditional learning. They can go back and review what they have done, correct it and reflect on the learning process.
- The modules are accessible to new target groups.
- The tutoring that occurs in e-learning classes is generally more personal than education delivered in large classrooms on big campuses. In addition, the tutors can adapt their tutoring to the students' specific needs.
- The combined electronic library and information services make a lot more material accessible to the students.

The weaknesses:

- When the academic staff are teaching e-learning courses they are easily interrupted, and in general it is seen as acceptable to interrupt people who are sitting in front of a computer. This is a weakness in a pure e-learning course.
- Dialogue is more difficult when it is mediated by ICT, but at the same time the amount of dialogue can be greater in e-learning courses than in traditional course settings.
- According to some of the teachers involved, the pure e-learning model involves some learning weaknesses. The best model from a learning perspective is seen as involving some elements of face-to-face interaction (blended learning). This is important for creating a sense of community and making it easier for the teacher to follow the learning process.
- The teacher must be able to see for him/herself how the modules are working in real life, and whether parts of them are working differently to what is expected.
- More students tend to drop out from e-learning courses, especially if the universities do not work diligently with tutors to offer support services.

## 4.4. Development of ICT competences

The development of ICT competences among both the students and academic staff is a relatively new issue for the universities. ICT competences are not just a matter of technical skills, the students need to learn to use ICT in their learning and the teachers need to learn how to use it pedagogically.

In 69% of the participating universities, all or a majority of the students are being offered courses to support their basic use of ICT.

**Table 4.7: Are students offered courses to support their basic use of ICT?**

| | Number of universities | Percentage |
|---|---|---|
| Yes, all the students | 91 | 42% |
| Yes, the majority of students | 59 | 27% |
| Yes, a minority of students | 37 | 17% |
| No, but we are in the process of offering courses | 10 | 5% |
| No, but we plan to offer a course within 1-2 years | 3 | 1% |
| No, and we have no plans to offer such courses to students | 12 | 6% |
| Other | 6 | 3% |
| Total | 218 | 100 |
| Not answered | 23 | 10% |

In 77% of the universities, technical support is available to all or a majority of teachers for integrating ICT into their teaching.

**Table 4.8: Is technical support available to teachers when integrating ICT into their teaching?**

| | Number of universities | Percentage |
|---|---|---|
| Yes, it is available to all teachers | 118 | 54% |
| Yes, it is available to the majority of teachers | 49 | 23% |
| Yes, it is available to a minority of teachers | 30 | 14% |
| No, but we are in the process of offering technical support | 8 | 4% |
| No, but we plan to offer support within 1-2 years | 6 | 3% |
| No, and we have no plans to offer such technical support | 2 | 1% |
| Other, please specify: | 5 | 2% |
| Total | 218 | 100% |
| Not answered | 23 | 10% |

Half the universities (50%) are offering the majority of their teachers courses or support regarding the pedagogical and didactic aspects of e-learning and ICT use.

**Table 4.9: Are teachers offered courses or support concerning the pedagogical and didactic aspects of e-learning and ICT use in their teaching?**

| | Number of universities | Percentage |
|---|---|---|
| Yes, all teachers | 73 | 34% |
| Yes, the majority of teachers | 35 | 16% |
| Yes, a minority of teachers | 59 | 27% |
| No, but we are in the process of offering courses | 25 | 12% |
| No, but we plan to offer a course within 1-2 years | 15 | 7% |
| No, and we have no plans to offer such courses to teachers | 5 | 2% |
| Other | 6 | 3% |
| Total | 218 | 100% |
| Not answered | 23 | 10% |

The development of ICT competences among teachers has generally been an important issue for the Finnish universities, and specifically for several of the Finnish Virtual University's projects:

An example is the Helsinki Business Campus[70], which is a regional teacher support project set up jointly by the Helsinki School of Economics and Swedish School of Economics and Business Administration, which are located close to each other in Helsinki. The project focuses on the development of teachers' competences. The practical outcomes of the project have been:

- A media lab – an open place to work, learn and test
- An advisor – a support person for teachers on campus
- Workshops and courses for teachers on campus
- Co-operation with support personnel on campus.

The focus of the regional Learning Centre project of the Finnish Virtual University is also the development of teachers' competences. The Learning Centre's eduCLINIC supports teachers and personnel in taking advantage of information and communication technology for teaching purposes. For instance, eduCLINIC helps with designing internet-based courses or disseminating information on the creation of study media. The Learning Centre even supports students in absorbing recent study innovations, with a virtual study adviser in the Learning Centre being available for this purpose.

[70] Helsinki Business Campus: http://www.helsinkibusinesscampus.fi

All newly-recruited teachers at the Open University of Catalonia[71] are trained in its pedagogical model and new co-operation modes. Despite these particular examples of the contrary, an overall lack of such knowledge among university teachers in relation to the integration of ICT into their teaching is considered to be a basic obstacle. We shall return to this theme in the next section.

## 4.5. Development of digital learning resources and content brokerage

With the use of ICT, learning resources can be developed in new ways, and the resources can be re-used afterwards and distributed much more easily. Instead of teachers having to develop all their course material by themselves, with the use of digital media they can much more easily co-operate with other teachers in developing learning resources, exchanging material or further developing material that has been produced by others.

However, the study indicates that there is little exchange of digital course material taking place among teachers and universities.

A barrier for many teachers in developing digital learning resources is their limited technical skills and the extra effort they have to make in order to learn about the new working methods. The limited knowledge about, and use of, metadata standards[72], is a technical barrier to the easy and effective exchange of learning resources. Finally, several of the interviewees mentioned the issue of intellectual property rights as being a major barrier. The absence of a simple payment system, or a system that clearly shows which resources can be freely used, is a significant obstacle to the exchange of material. In addition, it is unclear whether the learning resources that are developed in the universities belong to the universities or the teachers.

Experts expect that the professional production of digital resources will expand if the issue of intellectual property rights is resolved, and they anticipate that the various tasks involved will be shared among a greater number of staff members.

However, a few universities are already trying to take advantage of the new opportunities that ICT offers, and have re-organised their organisational models accordingly.

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[71] For further information, please refer to the case study profile of the Open University of Catalonia/Annex G.
[72] The issue of metadata standards is investigated in Section 7.5.3.

The Open University of Catalonia[73] is focused on developing course material professionally, and is trying to share resources with its partner universities or sell them to other universities. This is a new approach compared to that of most other institutions, such as Umeå University[74].

| **Open University of Catalonia** | **Umeå University** |
|---|---|
| • A team of professionals is involved in constructing a course – a teacher, counsellors and tutors | • The teacher is in control of his/her own course |
| • Teams of professionals develop learning resources (author, a publishing house, the finance department) | • The teachers develop their own learning resources |
| • Learning resources are pre-produced | • Learning resources are developed *ad hoc* |
| • Material produced is standardised using XML. Module-based. Possible to reuse and exchange material | • Teachers decide independently what material to produce and how to do it. Free to use standards |
| • Professionally developed learning material, but time-consuming, costly and difficult to update | • Academic freedom. Flexible. Costs depend on the priorities of the teachers' interest and the priority of the individual course |
| • The university owns all material produced. Focus on re-using and selling material | • No archive or co-ordinated re-use of learning resources |

According to our interviews, Australia's experiences until now have been similar to those of the University of Catalonia. Some universities have proceeded to develop learning objects with the expectation of being able to sell the online content they produce. It has turned out, however, that even though many institutions might want to sell, no-one wants to buy.

The UKeU initiative is an exemplary illustration of working with new business models for higher education content and services. As mentioned earlier, the UKeU's chief objective is to sell UK university courses in e-learning format on a strictly commercial basis. The Canege Consortium in France also has the export of university education as its long-term goal.

However, it can be questioned whether the extended use of metadata standards and the increased ease of the direct exchange of course material would generally result in the greater exchange of such material among universities in practice. Our analysis indicates that only a few universities are working on the issues of metadata standards,

[73] For further information, please refer to the case study profile of the Open University of Catalonia/Annex G.
[74] For further information, please refer to the case study profile of Umeå University/Annex G.

content brokerage and new business models for contents and services, and also that this has not yet become an active issue at a national level. The culture and working habits of academic staff are based on the development of their own course material and the control of their course content in accordance with the principles of academic freedom and their own research activities.

On the basis of this study, PLS RAMBOLL recommends that the issues of intellectual property rights and metadata standards should be addressed at both the EU and national levels.

## 4.6. The main drivers and challenges for ICT integration in the educational setting

As with the organisational setting, there is considerable overlap of the factors that can be regarded as drivers, and conversely as the main challenges and obstacles, for the progression towards the extended use of e-learning and ICT in the educational setting.

The main drivers for the use of ICT in the educational setting appear to be:

- Individual teachers who are leading the development
- Positive attitudes towards ICT
- Student demand
- Technological development.

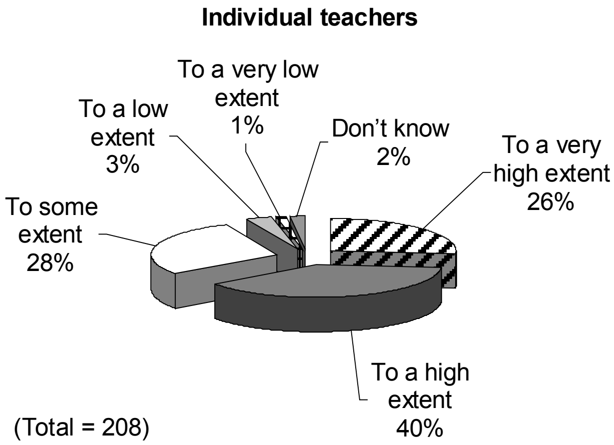
The main challenges/obstacles for the use of ICT in the educational setting appear to be:

- The absence of a joint and comprehensive management approach to ICT integration
- A change-resistant university culture
- Insufficient knowledge of ICT among teachers
- The inadequate availability of high-quality ICT-based teaching materials.

### 4.6.1. Individual teachers as a major driver

Individual teachers are seen as being a major driver in the survey. 66% of the universities believe that individual teachers have been key driving forces for ICT integration to a high or very high extent.

**Figure 4.3: To what extent do you consider the following factors are key driving forces for ICT integration in your university?**




This also applies among the case study universities.

At Umeå University[75], the experienced teachers and staff are seen as important drivers for ICT integration and the extended use of e-learning. It is not just the technical experts but experienced teachers who inspire and help to motivate the other teachers.

According to several of the case study institutions, there will always be front-runners among faculties and teachers, and their work is crucial in any developmental phase. The innovators and front-runners should of course be supported, but a little further along in the process the main focus should be on trying to stimulate the intermediate group of faculties and teachers, as they will be the key actors in any attempt to disseminate and anchor the development of ICT.

Problems are liable to arise if the management and the rest of the staff do not back the individual teachers and trailblazers, or if their innovations and hard work are not anchored in a strategic approach or in the overall organisation. This topic was discussed in Chapter 3.

### 4.6.2. Attitudes and cultures – both drivers and obstacles

Attitudes and cultures are crucial in any change process. In the development towards the extended use of ICT in the educational setting, positive attitudes, especially among particular segments of the academic staff or management, are regarded as

[75] For further information, please refer to the case study profile of Umeå University/Annex G.

being a key driver and precondition for the development process. However, in the context of the overall picture concerning the EU universities, attitudes and some aspects of the university culture are also seen as important obstacles.

According to the university managements contacted in the survey, in most universities the prevailing attitude towards ICT integration and e-learning is positive. In 77% and 76% of the universities respectively, students and management are thought to be either willing or very willing to integrate ICT and e-learning in university education. Academic staff are perceived to be more sceptical by some universities. In 11% of them they are thought to be highly sceptical or sceptical towards the integration of ICT.

**Table 4.10: What is the overall attitude towards ICT integration and e-learning among the following groups?**

| | Very willing to implement ICT and e-learning | Willing to implement ICT and e-learning | Neutral | Sceptical towards implementing ICT and e-learning | Highly sceptical towards implementing ICT and e-learning | Total |
|---|---|---|---|---|---|---|
| Academic staff | 8% | 59% | 23% | 10% | 1.4% | 211 |
| Management | 28% | 48% | 20% | 4% | 0.5% | 211 |
| Students | 19% | 58% | 19% | 4% | 0.5% | 211 |

These tendencies are confirmed by the case study experiences.

According to the Rector of the Politecnico di Milano, a main driver for innovation has been the desire for a change of pedagogical approach among its teachers, who wanted to use e-learning to modify the delivery of the university‘s teaching.

At the University of Bremen, the most important driver consists of enthusiastic staff members who are dedicated to integrating ICT. The experience here is that teachers can easily become drivers once they given the proper support. The importance of a creative, flexible and motivated staff is seen as being more valuable than high-end computers and high-speed Internet access.

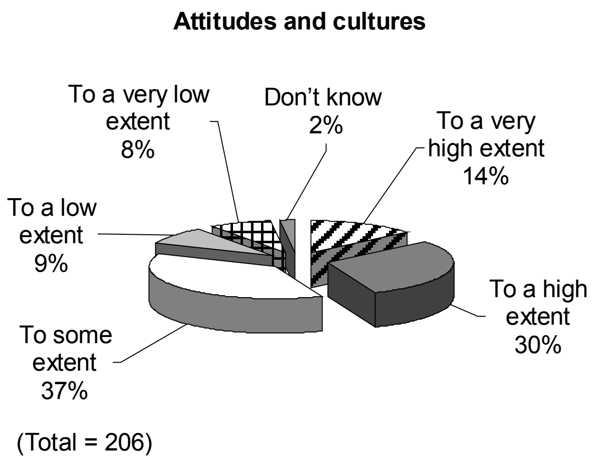
At the Open University of Catalonia[76], the experience has been that those teachers who have worked for many years at other universities have found it hard to adjust to the new pedagogical and organisational model being used. Today, mostly young

[76] For further information, please refer to the case study profile of the Open University of Catalonia/Annex G.

teachers are working at the UOC, something that is regarded as being an important driver for the development of ICT.

As has been mentioned, general attitudes and cultures are also viewed by the universities as presenting a substantial obstacle to the expanded use of ICT, with 44% believing that this is the case to a high or very high extent.

**Figure 4.4: To what extent do you consider the following factors are obstacles for the expanded use of ICT in your university?**




Interviews with experts and government representatives, plus the data from the case studies, highlight the differences in attitudes and cultures that exist among the universities. Teachers must completely rethink their subjects and start doing things in new ways when they integrate ICT into their activities. Many professors are old and have negative attitudes to ICT, which when combined with the great autonomy enjoyed by most teachers, restricts the potential for the integration of ICT. At the same time, many university teachers are already overloaded with work, and there is also an absence of incentives for getting involved with the integration of ICT. Additionally, research is the activity that is most highly valued in the universities, while the adaptation and improvement of teaching methods and the development of e-learning are not rated highly enough.

The universities we visited consider that the readjustment of mentalities and attitudes is the most demanding and difficult of all the challenges involved in the integration of ICT. They have tried to tackle this issue in a variety of ways. At the University of

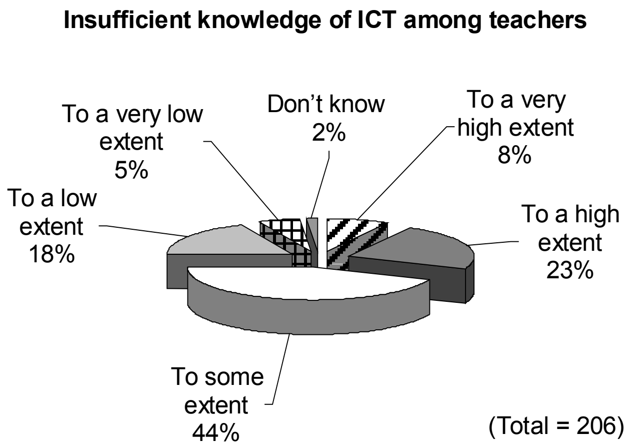
Utrecht[77] and in the Canege consortium[78], the approach has been to acknowledge the problem and not try to force anything through. Participation is voluntary, and the management then tries to back it and support it instead.

### 4.6.3. Insufficient knowledge of ICT among teachers

The problem of sceptical attitudes could be linked to the fact that a number of teachers know too little about how ICT can be used.

On the basis of our survey, an inadequate knowledge of ICT among teachers seems to be a major obstacle. 75% of all the universities indicate that it is a major obstacle to their expanded use of ICT to a moderate, high, or very high extent.

**Figure 4.5: To what extent do you consider the following factors are obstacles for the expanded use of ICT in your university?**




Despite the existence of the competence development initiatives already mentioned, there still seems to be a substantial need for further competence development among the teachers, together with general information and support concerning ICT.

As has been mentioned above, several of the case study universities have tried to meet this challenge.

At the Open University of Catalonia[79], the virtual campus and the pedagogical model used at the virtual university are interconnected, and the teachers are trained in how

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[77] For further information, please refer to the case study profile of the University of Utrecht/ Annex G.
[78] For further information, please refer to the case study profile of the Canege Consortium/ Annex G.
[79] For further information, please refer to the case study profile of the Open University of Catalonia/Annex G.

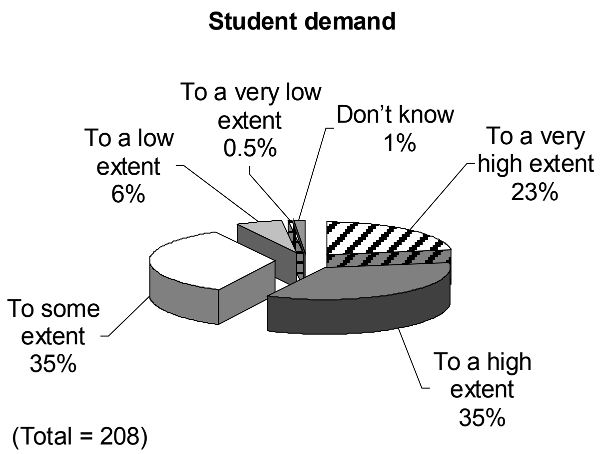
to apply the concept and system. In addition, the teachers are not required to develop the learning resources being used in their own courses, since this is the task of specialized units.

At the University of Bremen, the teaching staff are systematically trained to use appropriate technologies using guidelines prepared by the Teacher Education Department. At the university, the importance of convincing the teachers of the value of using ICT is seen as being of key importance, and the integration of ICT is backed up by 'innovative' and 'good practice' teaching.

### 4.6.4. Student demand

The study points to demand from students as being an important driver in the development process. 58% of universities in the survey think that student demand is a key driving force for ICT integration to a high or very high extent.

**Figure 4.6: To what extent do you consider the following factors are key driving forces for ICT integration in your university?**




This assessment is heavily affirmed by the individuals interviewed during the case studies.

### 4.6.5. Technological development

Technological development is seen as being a major driver. The continuous development of new and better systems for both learning and administration, the improved interoperability of systems, the continuous lowering of hardware prices and general innovation are all major drivers.

Umeå University regards technological development as a very important driver. A new wireless network is currently being rolled out all over its campus. Although not all the security problems connected with wireless networking have yet been solved, it was decided to go ahead with the roll-out to get some experience with it. The development of new and better ICT technology keeps pushing the demands for its integration.

The Open University of Catalonia (UOC)[80] has been at the forefront of technological development, and has developed its own virtual campus. This virtual campus, combined with the pedagogical model of the UOC, is considered to be a leader in its field, and has been awarded several prizes. The UOC is now selling its virtual campus technology and know-how to private companies. In this way it is capitalizing on its first-mover advantage, which is bringing both money and inspiration back into the university.

However, the case studies point to the fact that sometimes an educational innovation can exceed the end users' technical solutions. An innovative and well-thought-through educational model is worthless if the available technology cannot support it or if it is not technically reliable. It is important that the technical solutions should correspond to the technological level of the students and staff – the e-learning courses should not require technology which is much more advanced than is reasonable to expect. For example, the Canege consortium in France is reluctant to include videoconferencing in all its e-learning courses, since few students can be expected to possess the technology necessary to support this.

**Text box 4.3: Perspectives from the accession countries**

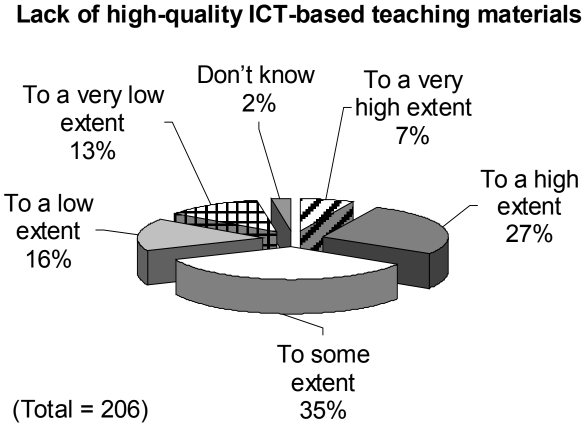
As far as the accession countries are concerned, what is regarded as a major driver varies from country to country, and depends on the general situation of the universities in question. In the Czech Republic, demand from students is pinpointed as being the main driver, while in Lithuania it is the government's information society programme. This reflects some broader differences which exist among the university systems and national strategies of the two countries. In the Czech Republic, the Ministry of Education has had very limited opportunity to influence or control the actions of the universities since the downfall of communism, and therefore the individual universities and the Academy of Science are the only key actors in the development of ICT.

[80] For further information, please refer to the case study profile of the Open University of Catalonia/Annex G.

### 4.6.6. Lack of high-quality ICT-based teaching materials

Another important obstacle is the inadequate availability of high-quality ICT-based teaching materials. 34% of the universities indicate that this is an obstacle to a high or very high extent.

**Figure 4.7: To what extent do you consider the following factors are obstacles for the expanded use of ICT in your university?**




This is also highlighted as being a key challenge in most interviews with government representatives and experts.

Interviews with experts as well as the case studies point to the issues of intellectual property rights and the development of metadata standards as being key obstacles to the extended development of ICT-based teaching material. The issue of intellectual property rights needs to be clarified in order to facilitate the payment for and sharing of learning resources, and metadata standards are needed in order to facilitate the exchange and re-use of already-developed resources.

It is also anticipated that in order to ensure the availability of high-quality ICT-based teaching materials, the universities must modify the manner in which their learning resources are produced. In many universities, teachers are solely responsible for their own courses and are therefore responsible for both providing and developing their own teaching material. To ensure high-quality ICT-based teaching materials, the professional development of digital resources will expand, and the tasks will be shared out among staff.

In the case study universities, we observed new and innovative ways that teaching materials were being produced.

The development of material for e-learning courses has been an important priority at the Politecnico di Milano[81]. Although the teachers of the university have developed the content, they have also had access to technical and didactical support from the METID unit.

In Finland, subject-specific networks have been created among the Finnish universities, partly with the aim of jointly developing material.

The Open University of Catalonia[82] produces all its own teaching material (or learning resources) independently. This is done via collaboration involving an author, a publisher with access to programmers, graphic designers, pedagogical consultants, and the university's finance department. This results in professionally-produced teaching material that conforms with prescribed technical standards, but it is also very time-consuming and expensive.

The development of content is also the objective of the two partnerships described in detail in Chapter 6, namely the UKHEP and the Canege consortium.

**Text box 4.4: Perspectives from Hungary**

A survey of Hungarian universities carried out in 2001 pointed to the following crucial obstacles for the introduction of e-learning and distance education:

- Difficulties with the integration of such educational programmes in the daily life of the institutions
- Lack of student knowledge about how to learn
- Lack of access to and competence in using IT equipment for educational purposes
- Limited digital literacy among teachers
- Need for professional course development, including training of university teachers in the development of e-learning
- Need for more direct government funding.

[81] For further information, please refer to the case study profile of the Politecnico di Milano/ Annex G.

[82] For further information, please refer to the case study profile of the Open University of Catalonia/Annex G.

## 4.7. Main priorities for the future use of ICT in the educational setting

Based on the questionnaire results, it seems that the universities' main focus over the next two years will be to increase the number of courses being offered in e-learning format. 65% of universities state that this will be one of their key priorities over the next two years to a high or very high extent. The universities are also focusing on other aspects, such as the development of ICT-based teaching material, the development of teachers' competences and – on a smaller scale – the development of students' competences.

**Table 4.11: To what extent will the following objectives comprise key priorities for the university over the next two years?**

| | To a very high extent | To a high extent | To some extent | To a low extent | To a very low extent | Don't know | Total |
|---|---|---|---|---|---|---|---|
| Increasing the number of courses offered in e-learning format | 26% | 39% | 27% | 4% | 1.9% | 2.4% | 208 |
| Development of ICT-based teaching material | 23% | 38% | 32% | 3% | 2.4% | 2.4% | 208 |
| Development of teachers' ICT competences | 22% | 46% | 26% | 2% | 1.0% | 2.4% | 208 |
| Development of students' ICT competences | 19% | 37% | 37% | 5% | 0.5% | 2.9% | 208 |

This picture is underlined by the case study experiences.

In the Finnish Virtual University, the focus is heavily on increasing the number of e-learning based courses during the coming years.

At Umeå University, the rector anticipates that the number of students will increase further, just as it has been doing since the 1960s, and that this trend will be even greater in the future. Lifelong learning and more module-based courses will be important features in this development, and ICT will be an important tool for supporting the many new students.

The Open University of Catalonia[83] believes that in the future, universities will be making money from other activities in addition to the government-funded first degrees that it offers. In the future, it believes that universities will be involved in more diverse and numerous activities. The UOC is very aware of new players entering the learning mar-

[83] For further information, please refer to the case study profile of the Open University of Catalonia/Annex G.

ket, and has started preparing for this challenge. Firstly, it has created its own companies to offer consultancy, publishing services and courses in order to become part of this new and expanded educational market. Secondly, the UOC has signed strategic agreements and is co-operating more closely with private enterprises such as the Planeta publishing house.

# 5. Virtual, physical and social mobility

This chapter focuses on the issues of virtual, physical and social mobility. The following questions will be answered:

- How is virtual mobility being supported in Europe's universities through ICT integration and e-learning?
- How is campus culture being influenced by ICT integration and e-learning?
- Are new groups of students being supported by ICT integration and e-learning?
- How is social inclusion being supported by ICT integration and e-learning?
- How can ICT integration and e-learning support regional development?
- How is lifelong learning being supported by the use of ICT integration and e-learning?

The data used in this chapter consist of results from the survey, examples taken from the case studies and expert interviews, and information derived from the desk study.

## 5.1. Virtual mobility is mostly project-based

By 'virtual mobility' we mean how students and teachers supported by ICT and e-learning are able to follow courses and co-operate with students and teachers at other universities without physically going there. This is different from physical mobility, whereby students and teachers are physically exchanged between universities, for example when students travel to another country to live and study there for a semester.

Such physical mobility has been supported by the EU programme ERASMUS for many years. The programme was initiated in 1987, and since then more than one million students have studied abroad under the programme. Currently, Erasmus students can attend universities in 30 participating countries.

The virtual mobility of students is a new opportunity made possible by the integration of ICT and the extended availability of e-learning. Since the 1980s, open distance learning courses have experimented with virtual mobility, and programmes such as CEFES (Creating a European Forum in European Studies) have been initiated.

Marianne Hildebrand, head of the EU Commission's Higher Education Unit, points to the fact that Erasmus' original goal was for 10% of the student population to be mobile, but that only 5% student mobility has actually been achieved. She sees ICT as occupying a great future role in supporting both physical and virtual mobility in Europe.

The question of virtual mobility is one of the key issues in most of the e-learning models identified in this study. The study identifies the existence of three overall approaches among the various virtual mobility models:

- A political goal and strategy for supporting student mobility across the EU and co-operating countries.
- A strategy at national or regional level for increasing regional development and offering university education to target groups outside the university cities.
- A commercial marketing strategy in order to sell university education into new markets.

Our analysis indicates that virtual mobility is still mostly supported on a project basis, and is limited in scope. Only a minority of the universities' ICT strategies cover the issue of student mobility (45%). This is partly due to the fact that several of the EU countries do not see it as a separate priority. This is mostly true for the smaller countries and/or those with minority languages. Countries such as the Netherlands, Greece and Denmark point out that the majority of their students are not very mobile and mostly wish to attend their nearest university. There is also a significant element of tradition involved. So the question is not so much one of developing models to support mobility, but rather one of improving the quality of education.

In Finland, virtual mobility is a national issue. According to the Finnish Ministry of Education, using ICT to promote the development of the sparsely populated areas is regarded as an important goal. When young people leave their place of origin to get an education, they mostly never return. The Finnish Virtual University, with its more flexible learning opportunities, has been developed to support virtual mobility and decrease this problem. A milestone was reached in Spring 2003 when all Finland's universities signed an agreement concerning the general mobility of all their students, i.e. both physical and virtual mobility. The need for a national agreement emerged in the first instance from the virtual environment, but it was soon realised that the issue was important for both virtual and physical mobility. The agreement also covers the financial relationships involved, although more detailed work needs to be undertaken in the future in order to implement the agreement in practice.

Most of the e-learning models and initiatives presented in Chapter 5 include elements of virtual mobility almost by definition. In addition to these, we have seen several other examples concerning projects and initiatives that encompass various models of virtual mobility and how these can be combined with physical mobility:

At the Open University of Catalonia (OUC)[84], a 'meta-campus' that will support virtual mobility is being developed. In this project, which has not yet been fully realized, a meta-campus will connect the virtual campuses of several universities. Through the meta-campus, students at one university will be able to follow courses at the virtual campus of another university.

The Politecnico di Milano's Laurea OnLine project[85] focuses heavily on enabling students from all parts of Italy to embark on its degree course, thereby in effect achieving virtual mobility. The regional dimension is important in Italy, and virtual mobility is high on both the general political agenda and that of the Politecnico di Milano. It is important to give students in the Southern parts of Italy the opportunity to study at the Politecnico without leaving home.

At Umeå University, virtual mobility is supported on a project basis. For example, Umeå University has co-operated with a Slovenian university in the development and delivery of one of its courses. Students from both universities participated in this course, although they only met in a virtual environment. The evaluations of the course from both student groups were very positive. It is expected that the university campus and the virtual offerings will begin to merge together and converge in the future. This will support extended flexibility for the students, and possibly also increase student mobility.

In the pure e-learning models of the UKeU partnerships (including the UKHEP), as well as that of the Canege consortium, virtual mobility is a core feature. However, these models do not focus on how virtual and physical mobility might intertwine and support each other, since for them mobility is not a goal that exists for its own sake but is treated more as a vehicle for reaching new markets and target groups.

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[84] For further information, please refer to the case study profile of the Open University of Catalonia/Annex G.
[85] For further information, please refer to the case study profile of the Politecnico di Milano/ Annex G.

**Text box 5.1: A perspective from Canada**

COHERE (Canada's **C**onsortium for **O**nline **H**igher **E**ducation and **RE**search) (www. http://www.cohere.ca/) is an alliance of eight universities from across Canada that conducts further research into online learning and facilitates virtual mobility for students. Geographically, the co-operation extends from Simon Frasier University in British Columbia on Canada's western seaboard to the most easterly university in the country, Dalhousie University in Nova Scotia. Under COHERE, students register at one institution and gain access to courses offered by partner universities that complement the offerings of the home university's programme.

## 5.2. Campus culture and ICT

Campus culture does not seem to be either strengthened or weakened by ICT integration and e-learning. ICT integration is regarded as having strengthened the campus culture to a high or very high extent by 16% of the participating universities, while 4% indicate that ICT integration has weakened the campus culture to a high or very high extent.

**Table 5.1: To what extent have you experienced the following consequences of ICT integration in your university?**

| | To a very high extent | To a high extent | To some extent | To a low extent | To a very low extent | Don't know | Total |
|---|---|---|---|---|---|---|---|
| A weakened campus culture | 1% | 3% | 9% | 16% | 45% | 25% | 205 |
| A strengthened campus culture | 3% | 13% | 18% | 20% | 21% | 25% | 205 |

Nor do the case studies point to any tendency towards a weakening of the campus culture as a consequence of the use of ICT and e-learning. On the contrary, several of the case study institutions emphasise the spill-over effects from their e-learning courses into other areas of their teaching.

At Umeå University, the e-learning experiences have influenced the use of ICT on campus, with the virtual learning environment which has been used for e-learning now also being used for campus-based courses.

At the Politecnico di Milano[86], the educational setting of the e-learning courses is different from that of the traditional courses. There is much more interaction between

[86] For further information, please refer to the case study profile of the Politecnico di Milano/ Annex G.

students and teachers in the e-learning courses compared to traditional lectures delivered in front of 300 people. It is quite apparent that these new ways of teaching are also beginning to affect how traditional teaching is being conducted at the Politecnico di Milano as a consequence of the increased dialogue between students and teachers.

An enhancement of the relationship between students and teachers has also been experienced by the Canege consortium and the universities participating in the UK-HEP. Here, a stronger interaction between the e-learning courses and the rest of the university is also seen as important in the longer term. At the moment, there are almost no links between the two, due to the still-limited strategic anchoring of the projects in their respective organisations.

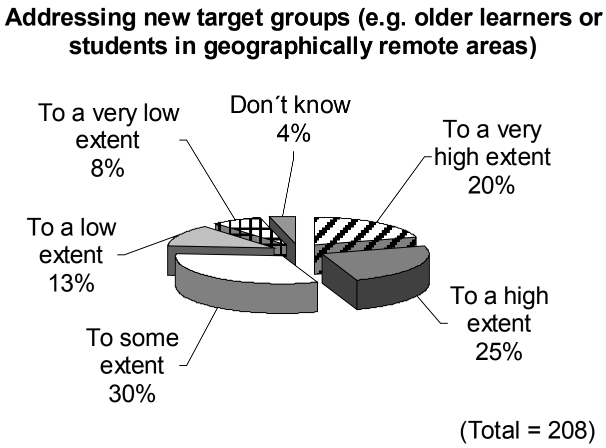
The case studies indicate that there is significant scope for a strengthening of the links between those sections or institutes that are working with ICT integration and e-learning, and the remainder of the university.

## 5.3. Social inclusion as a key priority

Social inclusion is a key priority in most of the national strategies. There is a strong emphasis at the national level on expanding the catchment population of university students to include those individuals who are less likely to enter higher education, arising from a key concern to ensure that people are not limited in their access to study due to work, place of residence, age, physical handicap or other personal factors.

Reaching new groups of students is a key priority at both national level and for the universities. Almost half of the participating universities (45%) indicate that this is so to a high or very high extent.

**Figure 5.1: To what extent will the following objectives comprise key priorities for the university over the next two years?**




Several of the Member States have specific initiatives concerning social inclusion, or have included objectives which address social inclusion in other initiatives or programmes. The study has identified no clear trends concerning how the Member States are focusing on social inclusion. For some Member States and universities, the inclusion aspect is clearly linked to that of expanding student markets, whereas in others the question of inclusion is linked to the normative issue of being able to offer university education to new target groups. Therefore it is hard to reach clear conclusions regarding this point from this study.

In Portugal, for example, the new Portuguese e-U (Electronic University) is intended to facilitate university access for the disabled, Portuguese emigrants and the Portuguese-speaking countries of the world.

The support of social inclusion was one argument for developing the traditional distance universities such as the Open University in the UK and the UNED in Spain, and the virtual universities now represent a new way for universities to support new groups of students.

Countries such as Denmark and the Netherlands have no current plans for using ICT integration and e-learning as a vehicle for promoting social inclusion. In the Netherlands this is based on experiences which show that e-learning is mostly suitable for students who already know how to study, not for those groups which are least likely to access university education in its traditional format.

The case studies point to interesting examples of social inclusion models.

Umeå University[87] is one instance of an attempt to use e-learning courses to support regional development and social inclusion. Most of the students interviewed who were studying at a distance pointed out that they would not have been taking their courses if they had not been available in a distance-learning format (see Chapter 6). This was also the case with the Canege consortium and the Open University of Catalonia.

Social inclusion and an ethical commitment to society are key elements in the strategy of the Open University of Catalonia (UOC)[88]. The UOC was developed in the spirit of the Open University in the UK, in order to make higher education accessible to people who for reasons of work, place of residence, age or other personal reasons could not study at a traditional university, and therefore wished to take advantage of a distance education system.

All courses at the UOC are offered as fully virtual courses, meaning that there are no compulsory meetings; instead, a virtual campus is used to support teaching and learning. This ensures that students are offered full flexibility, since there are no time or space constraints. However, it is highly noticeable that the majority of the students at the UOC are from the Barcelona region, and therefore that residence location still appears to represent a barrier for other potential students. Also, most courses are delivered in Catalan, and some in Spanish, which excludes those individuals who do not have the relevant language skills.

The UOC has an obligation to the Catalan government concerning the offering of initial training to the regional population, but apart from this the university has a strong market orientation and offers other courses targeted on the free market, i.e. companies or students who are willing to finance their own courses. Here the university has to balance its allocation of resources between those courses that are mandated by the government and those activities that generate additional funding.

## 5.4. ICT integration and e-learning is an important tool for regional development

Regional development and social inclusion go hand in hand in many national ministries' strategies and plans. The goals of ensuring an educated work force and developing new industries in rural areas are considered to be of key importance. In

[87] For further information, please refer to the case study profile of Umeå University/Annex G.
[88] For further information, please refer to the case study profile of the Open University of Catalonia/Annex G.

order to promote regional development, it is important to provide access to universities and education for the rural population through the development of either rural universities or local mini-campuses, or via e-learning.

The issue of regional development is particularly relevant in the large EU countries or those which are geographically dispersed, such as Greece, Sweden and France.

In Greece, regional development is an important aspect of the national university policy. New universities are built with an eye to the development of the local community and are therefore not constructed as single-campus universities, but are spread out across a locality. ICT is then used as a tool for keeping the university unified.

In Sweden there is a strong emphasis on regional development and the role of ICT in enabling people to remain in their local environments. Sweden has a long tradition of building study centres all over the country to promote continuing and further education, and with the integration of ICT these centres have been reinforced and acquired new vigour in relation to higher education. Regional development and access to new groups of students were also the objectives in developing a national Net University. In Sweden, the greater availability of distance learning is seen as a way of limiting the depopulation of rural areas. In Italy and Finland too, these aspects are crucial for further ICT integration and e-learning.

In France, e-learning is intended to play a significant role in regional development. By using e-learning, even universities in small towns can attract students from outside their region. One of the objectives of Campus Numérique is to create consortia involving various actors at the regional level.

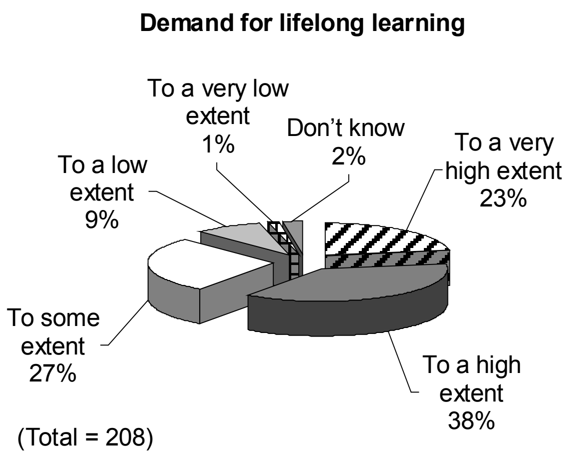
**Text box 5.2: A perspective from Canada**

In Canada, one of the motives underpinning the support of the provincial governments for the integration of ICT in universities has been regional development and facilitating access to higher education across large geographical distances.

## 5.5. Lifelong learning

The demand for lifelong learning is one of the main drivers for the integration of ICT. The majority of universities participating in the survey (61%) consider the demand for lifelong learning to be a key driver for ICT integration in their university. Only about 10% consider it to be a low-level driver.

**Figure 5.2: To what extent do you consider the following factors are key driving forces for ICT integration in your university?**




The lifelong learning paradigm needs to be strengthened in order to ensure the future development of the information society and flexible labour markets.

All over Europe, a demographic change is observable which involves the presence of fewer young people, a decreasing birth rate and a growing ageing population segment. The middle-aged population therefore needs to remain in the labour market for longer. This challenge is compounded by technological change and globalisation, which in Spain – to name an example – have eliminated many unskilled jobs, so in order to secure the new jobs being created the country's workforce requires further education. In this context, the availability of good basic education and lifelong learning is essential. The integration of ICT and e-learning are seen as ways of enhancing what the universities have to offer. Technology is changing the way young people learn and organise their student life. For older students, the use of technology ensures access through a flexible combination of work, family and studies.

The study points to some interesting examples of how ICT can be used to support lifelong learning, most of which have already been presented in Chapter 5 concerning the use of ICT and e-learning in the educational setting, as well as in the previous section. In general, the universities are becoming increasingly focused on offering courses that target lifelong learning and the labour market; at the same time, with the use of ICT they are becoming more accessible to the working population.

The average age of e-learning students is higher than that of students undergoing traditional campus education. For instance, the average age of distance students at Umeå University is 37-38, which is significantly higher than for the campus-based students. At both the Open University of Catalonia, the Politecnico di Milano and the Canege consortium, many of the students are working in parallel with their studies – at the UOC, the figure is as high as 97%. In addition, 57% of the students at the UOC already have a university degree. At the UOC, the strategic focus is on continuing education under the catch-phrase '*From once-in-a-lifetime education to ongoing education'*.

At Umeå University, courses are being developed in co-operation with local municipalities that are targeted on the needs of the local industry and population. The courses are then offered at local study centres, mini-campuses or in e-learning format to ensure access for the local population. The students here emphasise that had it not been for these courses, they would have been unable to study.

# 6. Co-operation, partnerships and new business models

This chapter focuses on ICT integration and e-learning co-operation, partnerships and new business models among the universities of the EU Member States. The main questions addressed in this chapter are:

- What is the status of co-operation at the national and trans-national levels?
- What examples and business models can be identified?
- How are the universities involved in partnerships with other public or private sector partners?
- What examples of business models relating to these partnerships are there?
- What are the main strengths, weaknesses and preconditions for co-operation and partnerships?
- What are the possible future models of partnerships among universities or with other partners?

Although the analysis of the co-operation, partnership and business models is partly based on the survey responses and expert interviews, it mostly draws on the case studies.

## 6.1. Education as a commodity

In the US and Australia, education is already a major export article, and this trend is also becoming increasingly apparent in Europe. Supplementary training is being progressively commercialised in the EU's universities.

The UKeU initiative is driven by a market approach, and in its opinion there is a huge market for e-learning in supplementary training.

The University of Catalonia is very market-oriented. In Spain, the universities are free to offer any courses for which there is a demand in the supplementary training market. The UOC recommends other universities to create companies accordingly and to capitalize on their status and educational know-how.

**Text box 6.1: Perspectives from Australia and the USA**

The August 2001 update to the report commissioned by the Australian government entitled *The business of borderless education* (see http://www.detya.gov.au/highered/eippubs/eip02_1/eip02_1.pdf) sums up the major lessons of the dot-com bust for universities in Australia.

- The corporate education and training market is potentially large, but there is no clear route to making easy money. The market is difficult to operate in because large corporations demand a variety of education from vocational training through to higher education, often for delivery via intranets or corporate management systems. In addition, corporations are keen on cost-effectiveness, and will often demand that providers must be cheaper than the cost of in-house provision.
- Most for-profit providers in the US have found online delivery more costly than they anticipated. Additionally, there is a major challenge for public universities in simultaneously operating in the continuing education market while also taking care of their 'traditional' public grant-financed core business. Both activities make use of the same infrastructure, i.e. lectures, ICT networks etc., which makes a realistic assessment of cost extremely difficult. The true costs of online-based education remain unclear.

One way to enter the market is via co-operation. In the following sections, three different models of co-operation are presented:

- National co-operation between universities
- Trans-national co-operation between universities
- Co-operation and partnerships involving private sector partners.

## 6.2. National co-operation between universities

National co-operation is seen as a very important activity in most Member States, and is also a priority for the universities.

Half of the universities in the EU Member States are involved in co-operating with other universities in their own country to deliver e-learning courses jointly. Only 17% of them have no plans in that direction.

As is indicated in the table below, the universities are not as heavily involved in co-operation involving the joint development of ICT-based material or new study programmes in which ICT is integrated, or in the joint development or purchase of technological platforms for learning activities and / or student administration. However, expectations for the near future are quite high in this area, since between one third and one fourth of the universities have already taken action in this area, or plan to do so within 1-2 years.

**Table 6.1: Is your university involved in any strategic co-operation with other universities in your own country regarding the following initiatives?**

| | Yes | No, but we have taken concrete steps in that direction | No, but we plan to do so within 1-2 years | No, and we have no plans in that direction | Total |
|---|---|---|---|---|---|
| Joint supply of e-learning courses | 50% | 13% | 20% | 17% | 210 |
| Joint implementation of accreditation or certification systems | 27% | 16% | 21% | 35% | 210 |
| Joint development or purchase of technological platforms for learning activities and / or administration of students | 35% | 16% | 20% | 29% | 210 |
| Joint development of ICT-based study material | 39% | 21% | 22% | 18% | 210 |
| Joint development of new study programmes (e.g. MBAs) where ICT is integrated | 30% | 18% | 25% | 27% | 210 |

### 6.2.1. Examples of co-operation between universities at national level

The study indicates three general levels of co-operation between the universities at national level:

- National networks or consortia supported or initiated at national or regional level.
- Bilateral or multilateral partnerships or consortia between universities.
- *Ad hoc* project-based co-operation.

**National networks or consortia supported or initiated at national or regional level**

The Finnish Virtual University is an example of a national network with participation from all universities in Finland. Under the auspices of the Finnish Virtual University there are several regionally-based, subject-specific networks and networks intended to offer different services which support online education. The networks encompass varying numbers of universities. The Finnish Ministry of Education is supplying the FVU initiative with annual funding for these network projects.

According to the Finnish Virtual University's recent 2003 strategy document, its general strategic objectives are "to help its members to improve their capacity to manage their current and future activities with the help of network co-operation and ICT, taking into account the ongoing changes in the university sector and the new challenges brought on by the Bologna process. The objective is to provide support services and research that:

- capitalize on the strength of each university
- enable universities to concentrate better than currently on their core tasks
- promote co-operation and division of labour among universities
- strengthen the international position of the Finnish university system
- improve its attractiveness and competitiveness among students, teachers and stakeholders, and save university resources in the long term."

In Denmark, the future portal listing all supplementary education courses (as well as e-learning and traditional courses) is another example of a national network initiative. The Danish Ministry of Science, Technology and Innovation is funding this initiative.

In the Netherlands, the co-operation among the universities is institutionalised in the SURF Foundation. Here, such co-operation is seen as crucial because of the massive costs involved in ICT development. Even the large universities of the Netherlands are too small to run large ICT projects by themselves, and economies of scale are essential. The participating institutions and the Dutch government both fund the SURF Foundation.

**Bilateral or multilateral partnerships or consortia among universities**

Several organisational models for partnerships or consortia between universities have been identified, the main differentiating factor being whether or not they are funded or facilitated by a national initiative.

In Italy there are three consortia, the Nettuno Network, Campus One and ICON[89]. The Nettuno Network is a consortium of 38 Italian universities which uses broadcasting as its delivery vehicle. The initiative has been funded by the Ministry of Education, University and Research.

In Germany, the universities applying for funding under the national 'New Media in Education' programme had to form consortia involving the co-operation of universities from different Länder. In one project, fifteen universities were co-operating, but typically five to six universities co-operated in each project. The programme was funded by the German Federal Ministry of Education and Research.

[89] See the Italy country profile for further information.

Two primary examples of this kind of co-operation are the Canege consortium in France and the UK Health Education Partnership in the UK. Both are funded by national initiatives.

The Canege consortium exists as a loose structure of six universities and one other semi-public organisation, and has the purpose of jointly developing new study programmes and content in the fields of business, economics and management.

The management of the consortium comprises three strands:

- Board of Directors: This consists of the vice-chancellors of each of the participating universities. They are responsible overall for the programmes and funding.
- Steering Committee: This consists of three representatives from each participating institution. The Steering Committee manages the co-ordination of the Consortium, and among other things is responsible for:
    - Finance and the funding of the programmes and subcontracts
    - Contracts with academic and technical staff
    - Logistics
    - The development of course content and the pedagogical approach.
- Scientific Committee: The Scientific Committee's responsibility is to validate the content of the programmes.

The participating universities appoint a member of the academic staff to be responsible for the development and content of each of the three programmes.

The annual Canege consortium budget is 1,750,000 Euro. The funding is sourced as follows:

- The French Ministry of Education: 350,000 Euro
- The participating universities: 400,000 Euro
- CNED: 650,000 Euro
- The remainder comes from student tuition fees.

According to the interviewees, the business model is quite loosely defined. The funds are distributed among the participating universities according to the number of modules to be developed.

The UKHEP (Healthcare Education Partnership) is a partnership consisting of one professional organisation (Royal College of Nursing [RCN]) and three universities. As it has only existed for about a year, it is still at the stage of developing its partnership and business model. As was the case with the Canege consortium, its main purpose is the joint development of e-learning study programs and content. The basic idea is that the four of them can achieve more together than they can separately, since greater expertise can be applied to developing the courses.

The main innovation of the partnership is that its courses are being developed and offered jointly; specifically, the partners have joint degree-awarding power. This means that the students will receive a joint degree from the three universities and the RCN. To begin with this was not possible according to the original charters of several of the participating universities, which therefore underwent the fairly onerous process of amending them. This underlines the commitment of the participating universities.

The partnership has been set up as an equal partnership between the four parties, i.e. between the three universities and the RCN.

The overall management is conducted by the Board of directors, which consists of eight directors from the four participating institutions. They are responsible for the overall strategy, policy and finances. The chair rotates every second year. The executive director, who has yet to be hired, will carry out the daily management of the partnership. In addition, a newly established project executive team will carry out the policies and co-ordinate the development of the modules.

The partnership is funded by a loan from the UKeU of £2 million. The loan conditions are that if the business fails the partnership will not repay the loan, but if it succeeds the partnership will pay back the loan plus interest. The UKeU funding covers the development of 14 modules for undergraduate students that will lead to a bachelor's degree.

The business model includes plans to sell the courses both to individual students and to professional health care companies, both nationally and internationally. As the partnership is still in a very early phase, these plans are currently still being discussed. The interviewees emphasise that in an ambitious and large-scale partnership like this which involves a great deal of innovation and the development of entirely novel ways of doing things, it is important not to move forward and expand too quickly.

The ambition is to create a sustainable financial model involving committed participants who accept the idea that they are long-term members of the partnership. The

RCN has emphasised that there is no possibility of quickie divorces. The purpose of the partnership is not generating cash for the shareholders, but using the potential profits to develop new modules and courses instead.

The structures that exist in the partnership are still quite informal. In the future it will become more of a corporate entity, and all the services will be contracted. The general model is based on *ad hoc* working groups in which one of the four institutions takes the lead in the development of some of the modules or other aspects of the partnership. It then secures the funding and invites the relevant expertise from the other partners. For instance, there is a working group on information services which is responsible for preparing documentation and presenting its case to the rest of the partnership.

**Ad hoc projects at a non-institutional level**

Most of the universities are involved in co-operations with other universities on a project-based and *ad hoc* level. One example is Umeå University, which co-operates with other universities on a project basis. The Centre for Educational Technology (CUT), which is the unit responsible for the joint efforts to increase the deployment of ICT in the educational setting at Umeå University, is co-operating with universities in both Sweden and abroad, such as with the University of Stockholm and the University of Oslo.

### 6.2.2. Assessment of the partnership models – strengths, weaknesses and preconditions for success

The case studies show that numerous advantages and benefits accrue from participation in national partnerships, but they also highlight certain weaknesses and preconditions for success.

The main **strengths** of participating in the above-mentioned partnership models are:

- There is a lot of scope for initiative and innovation in partnerships. The process of developing content together consolidates the best practices of the universities involved. Joining competences from different universities and / or disciplines improves the results in terms of both the actual product and the co-operation process; the latter alone provides the partners involved with new knowledge and inspiration.

- Cost reduction, since the universities would have problems in taking on the e-learning course development costs alone. The development phase of e-learning courses is extremely costly and resource-hungry, and it is not always possible for a single university to absorb such costs on its own.
- Access to new markets and a strengthened position in the marketplace. In line with the logic of the cost reduction argument, a common effort can make it possible to address new target groups in a competitive market.

**Weaknesses:**

- The process of joint development is very time-consuming and places heavy demands on resources. The co-operation model can be somewhat rigid if all parties have to agree on their actions and have their agreements approved by all their internal systems.
- Even though the organisational structures of the partners may be quite alike, there can be differences in the educational cultures. Therefore the partners will constantly need to discuss and agree on different aspects of the individual processes.
- Partnerships and joint development involve a lot of hidden and transition costs for meetings, co-ordination etc. These have to be estimated and incorporated into the business model. However, such costs are often difficult for universities to anticipate, since not all of them are accustomed to applying market logic.
- In addition, the demand side has proven very difficult to estimate. The supplementary courses are aimed at professionals who can either pay for them themselves or whose companies will pay for them, but the size of this target market has been hard to estimate. The often substantial drop-out rates of many e-learning courses make this task even harder.

**Preconditions:**

- It is a very important precondition for success that the individuals involved should know and trust each other, and that all partners should commit themselves to the project. Everyone involved has to understand and accept that it is inherently difficult to get a consortium of autonomous universities to operate effectively.
- It is important that the university partners should have a similar internal structure and charter model. This means that they will recognise and understand the associated internal procedures and potential problems.
- A clear partnership strategy and a sound knowledge of the market is a precondition too.

- A sound business model, with clarity about who is doing what and who is responsible for what, is a precondition.
- The level of quality and ambition should be agreed on. Some institutions aspire to be world champions, while others are more pragmatic.
- Systematic analysis of the skills needed to develop and implement the various aspects is needed.
- The involvement of senior staff can indicate commitment and priority.
- The staff needs to feel that the development is necessary, and this should be backed up with incentives for them to participate.
- Business issues should not overshadow pedagogical ones. The partnership and business issues tend to absorb a lot of attention, with the risk of diminishing the importance of the educational considerations.

## 6.3. Co-operation between universities across national borders

The universities in the EU Member States are not as involved in trans-national co-operation involving ICT as they are at the national level.

Around one third of the universities in the EU member states are involved in co-operation ventures with universities in other countries for the joint supply of e-learning courses. However, international co-operation is a priority for the future. Only 24% of the universities have no plans in that direction.

As is illustrated in the table below, in a majority of universities other co-operation areas such as the joint development of ICT-based material, the joint development of new study programmes in which ICT is integrated, and the joint development or purchase of technological platforms for learning activities and/or the administration of students do not yet exist, although there are expectations of more international co-operation in the future.

**Table 6.2: Is your university involved in any strategic co-operation with other universities in other countries regarding the following initiatives?**

| | Yes | No, but we have taken concrete steps in that direction | No, but we plan to do so within 1-2 years | No, and we have no plans in that direction | Total |
|---|---|---|---|---|---|
| Joint supply of e-learning courses | 34% | 15% | 27% | 24% | 210 |
| Joint implementation of accreditation or certification systems | 16% | 17% | 22% | 45% | 210 |
| Joint development or purchase of technological platforms for learning activities and / or administration of students | 17% | 14% | 20% | 50% | 210 |
| Joint development of ICT-based study material | 25% | 18% | 24% | 32% | 210 |
| Joint development of new study programmes (e.g. MBAs) where ICT is integrated | 21% | 22% | 23% | 33% | 210 |

### 6.3.1. Examples of trans-national co-operation between universities

The study indicates two general levels of trans-national co-operation between the universities:

- EU co-operations and partnerships
- One-to-one partnerships.

It seems that the existence of consortia involving EU universities at the trans-national level is not widespread. In the global market, however, there are consortia of world-class universities that comprise prestigious universities located in different continents.

**EU co-operation and partnerships**

The EU has supported several projects for establishing trans-national co-operation. The Finnish Virtual University is involved in the MENU project (Model for a European Networked University for e-learning). The major goal for the MENU project is to create a model for a European Networked (Virtual) University, offering a variety of e-learning opportunities. 11 partners in 7 European countries are joining forces to establish the model. The model will result in an organisational structure, a quality assurance system, examples of joint courses, and study programmes across institutional and national borders.

Umeå University is co-operating with the other universities in Sweden and Finland (the Kvarken region). There is a long tradition of co-operation in this region, but it has been hard to travel and to maintain contact. The use of ICT for communication and co-operation now makes it easier. An obstacle to co-operation in the region is the insufficient comparability of courses across national borders. The UniZon Kvarken initiative is funded by the EU, the participating institutions, the municipalities of Umeå and Vasa, and the Kvarkenrådet.

### One-to-one partnerships

The Open University of Catalonia (UOC)[90] is co-operating with universities in Latin America. A joint diploma has been developed in conjunction with an Argentine university, and the UOC is also working with universities in Mexico. When it enters a Latin American market, the UOC typically seeks out local partner universities, which then provide local tutors and counsellors. The UOC emphasises that it does not enter into franchise agreements, but focuses on co-operation ventures in which all partners will be strengthened by the co-operation.

The UKeU is also involved in several partnerships with universities from outside the EU.

**Text box 6.2: A perspective from AllLearn**

> AllLearn (www.alllearn.org ) is a not-for-profit distance teaching venture involving Oxford, Stanford and Yale universities which was formed in September 2000 to provide college-level education through online courses to alumni of these three universities and others.
>
> AllLearn offers three kinds of courses: forums (2-5 days), short courses (4-6 weeks) and courses in the humanities and social sciences (8-10 weeks). They consist of online components, such as lectures in text or audio format, chat and online discussions, and offline components such as books, videos etc. The courses are produced by the relevant faculties of each of the three participating institutions, and are tutored by younger academics.
>
> The courses are not graded, and do not result in any study credits. They are purely for the enjoyment and personal enrichment of their participants.

[90] For further information, please refer to the case study profile of the Open University of Catalonia/Annex G.

**Worldwide Universities Network**

The Worldwide Universities Network (WUN) (http://www.wun.ac.uk/ ) is a group of thirteen universities, 6 from the UK, 5 from the US, and 2 from China. The main focus of the Network is on collaboration in research and graduate education. WUN's partners have agreed to collaborate in the development and delivery of distributed learning through the sharing of learning materials and the pooling of expertise concerning the development and operation of delivery platforms. Among the goals included in the mission statement are the creation of a virtual graduate school, the efficient use of information technology, and supporting the development of new paradigms in research, teaching and learning. Several of the British members are involved in developing courses for UKeU with the help of WUN.

Current examples of co-operation under the auspices of WUN include a 5-year project involving the University of Southampton, the University of Leeds, Pennsylvania State University and the University of California at Santa Barbara. Its purpose is to construct an international online resource dedicated to teaching and learning geography at undergraduate level. The project is joint-funded with 2.2 million Euro from the UK's JISC and the USA's NSF (National Science Foundation).

### 6.3.2. Assessment of the partnership models – strengths, weaknesses and preconditions

The trans-national partnership model is not as widespread among EU universities as the national one, and not all the case study institutions are involved in this kind of co-operation. The strengths, weaknesses and preconditions mentioned in relation to the national partnerships also apply to the trans-national partnerships, but there are particular additional factors that are relevant at the trans-national level:

**Strengths:**

- The internationalisation of the courses is an obvious strength of the trans-national partnerships, both in terms of the international content and the co-operation generated at the trans-national level. This can be advantageous for both teachers and students.
- Specialised research / education institutions in individual countries have an opportunity to become world-beating market players in their particular disciplines if they join forces.

**Weaknesses:**

- The variation in educational traditions, curricula and reward systems among the different countries can be a weakness both in designing, developing and implementing the courses.

- Language problems which exist among the teachers can represent a weakness when addressing a global market, especially when the institutions are competing with universities that are naturally English-speaking.

**Preconditions:**

- There needs to be mutual understanding of the norms and values of the different educational traditions
- In order to create a sense of ownership among all the universities involved, the co-operation has to involve equal partners. The franchising model creates no ownership among the parties involved.

**Text box 6.3: A perspective from Australia**

**The offshore programmes of Australia's universities**

Higher education is one of the fastest-growing exporting sectors of the Australian economy. Between 1990 and 2000, the number of fee-paying international students rose from 25,000 to 95,000. In addition to this, Australian universities have created 1,009 offshore programmes involving overseas higher education institutions, more than 70% of which are based in Singapore, Malaysia and Hong Kong (May 2001 figures).

Charles Sturt University (CSU) (http://www.csu.edu.au/ ) in New South Wales is a university with strong traditions of distance education and involvement in offshore programmes. Currently 22,000 out of 30,000 students are engaged in distance courses, and of these 5,000 are located in south-east Asia. CSU is involved in a major partnership with the School of Professional and Continuing Education in Hong Kong involving IT programmes and library science. ICT plays a major role in delivering these courses through learning support (course support systems and tools; learning-specific resources) and through facilitating management and support services (e.g. portals, registration and library access). Offshore programmes are a major factor pushing the take-up of new educational technologies, because they provide academics with a rationale for doing so.

The Australian government provides active support for institutions wanting to engage in international or offshore educational partnerships through an agency called Australian Education International.

## 6.4. Co-operation and partnerships involving private sector partners

The universities in the EU Member States are not heavily involved in ICT integration and e-learning with partners outside the university sector. Only 18% of the universities in the EU member states are involved in co-operating with other suppliers of education such as private companies for the joint supply of e-learning courses, and less than half of the universities (49%) expect to be involved in this way in future years.

As the table below shows, the majority of the universities do not prioritise other co-operation areas either. Only in relation to the joint development of ICT-based study materials do more than half of the universities expect to be co-operating with other education suppliers.

**Table 6.3: Is the university involved in any strategic co-operation with other suppliers of education (e.g. private companies) regarding the following initiatives?**

| | Yes | No, but we have taken concrete steps in that direction | No, but we plan to do so within 1-2 years | No, and we have no plans in that direction | Total |
|---|---|---|---|---|---|
| Joint supply of e-learning courses | 18% | 17% | 14% | 52% | 209 |
| Joint implementation of accreditation or certification systems | 8% | 10% | 10% | 72% | 209 |
| Joint development or purchase of technological platforms for learning activities and / or administration of students | 18% | 10% | 16% | 57% | 209 |
| Joint development of ICT-based study material | 18% | 11% | 22% | 49% | 209 |
| Joint development of new study programmes (e.g. MBAs) where ICT is integrated | 14% | 8% | 18% | 59% | 209 |

### 6.4.1. Examples of co-operation and partnerships with private sector partners

The universities are reluctant to become too involved in co-operating with private sector partners because their type of logic and motivation is very different from that of the private sector. In addition, many universities and government representatives expressed a general concern that the core ethos of the universities and their academic freedom might become corrupted through getting involved with such partners.

However, this study has identified three main models of partnership involving private sector partners:

- Consortia
- Co-operation at project level
- Outsourcing of IT services.

**Consortia**

The Open University of Catalonia[91] has set itself the objective of engaging in partnerships with both public and private sector partners. 'Collaboration with the world outside the university in order to attain objectives' is one of the ten key principles of the university. Both public and private sector partners were involved in the foundation of the UOC and are now represented on the university's Board of Trustees and Standing Committee. In addition, interested partners are invited to support the UOC or to sponsor its initiatives, or suppliers can become part of the UOC's consumers' co-operative, whereby their products and services are offered to the university community.

The UOC has entered into a strategic agreement with the Planeta publishing house. Instead of competing, the UOC and Planeta are trying to develop learning material together for initial and continuing education. The goal has been to ensure a win-win situation for both partners, and though Planeta's revenue from the venture has not been large, a return on investment is assured and is growing. The UOC management notes that it has learned a lot about marketing and commercialisation through co-operating with Planeta.

The UKeU is a government-funded public-private e-learning initiative set up as a private company, UK eUniversities Worldwide Limited. The Higher Education Funding Council for England has co-ordinated its development, and the Government is allocating £62 million for the 2001-2004 period to match contributions from the private sector.

The shareholders are UK universities and colleges, which submit proposals before becoming partners. Through their holding company, the UK colleges and universities have granted UKeU a licence to deliver their courses online. The UKeU is co-operating with some leading technology-based companies.

**Co-operation at project level**

The Politecnico di Milano[92] has several current projects which are based on co-operation involving both public and private sector partners. In the Math Online project, it has been co-operating with the regional school office in Lombardy. This project

[91] For further information, please refer to the case study profile of the Open University of Catalonia/Annex G.
[92] For further information, please refer to the case study profile of the Politecnico di Milano/ Annex G.

arose from a discussion between the Politecnico di Milano and the school office about the inadequate knowledge of mathematics among high school students, as well as their decreasing interest in the natural sciences. The purpose of the project is to teach high school students mathematics online.

The Politecnico di Milano is also currently involved with private company partners in both the Laurea OnLine and the Master NBA projects.

In the Laurea OnLine-project, the Politecnico di Milano is co-operating with Somedia (part of the Espresso-Repubblica publishing group). Somedia has invested 4 million Euro in this project.

The partnership project business models have differed slightly, but in its partnerships the Politecnico di Milano has mainly been responsible for the production of content and the teaching input. In the Laurea OnLine project, Somedia was responsible for the technology. In order to take part in Laurea OnLine, students paid the normal tuition fee to Politecnico di Milano and an equal amount to Somedia. Because of the course's substantial drop-out rate, the degree course has not proved profitable for Somedia.

The business model for the Master NBA co-operation with Sfera is based on total financing from Sfera (for both the technology and the work of the teachers). Sfera is permitted to use the learning objects within the ENEL group of companies, while the products are the joint property of the Politecnico di Milano and Sfera. Half of the students' tuition fees are paid to Sfera. In any future projects Sfera will not finance the development to the same extent as it did with the Master NBA.

**Outsourcing of ICT services**

In 1999, the University of Utrecht[93] decided to enter into a strategic outsourcing partnership with Cap Gemini/Ernst & Young. It outsourced the university computing centre (ACCU) consisting of 120 staff members for approximately 8 million Euro. The employees were all offered work at Cap Gemini.

The reasons for the outsourcing deal were that some serious problems had been experienced while the university was running the IT Centre. The Centre had been reorganised three times but was still failing to function properly. It was too costly, and was

[93] For further information, please refer to the case study profile of the University of Utrecht/ Annex G.

forfeiting income from contracts which were being lost to other actors, and yet there were no drivers inside the university capable of organising the Centre differently. In addition, the service level was not up to scratch and the customer orientation was poor. As a consequence the faculties were consolidating their own computing centres, and there was an urgent need for things to change.

An additional motivation was that the university did not want to pay the development costs that would be involved in establishing a new computing centre. Instead, it saw an opportunity to capitalise on the experience of a large IT company capable of providing industrial-strength software.

**Text box 6.4: A perspective from Australia**

> In Australia, partnerships between the tertiary education sector and industry or government are used by the universities as a source of revenue. For instance, the Charles Sturt University runs a 'police academy' under contract from the New South Wales police force, as well as an extensive programme related to the wine industry which is 50% funded by the industry itself. Deakin University has an extensive network of arrangements with private companies such as Coca Cola and CPA Australia. When delivering tailored programmes for private companies or government agencies, ICT is used for learning support (course support systems and tools, learning-specific resources).

### 6.4.2. Assessment of the partnership models – strengths, weaknesses and preconditions

The experiences gained through the partnerships involving universities and private sector partners have been mixed.

According to the private company Somedia, its co-operation with Politecnico di Milano[94] has yielded some valuable lessons. There was a clash of two different cultures, and during the co-operation the Politecnico di Milano failed to take advantage of some of Somedia's knowledge concerning how to behave in a marketplace and take care of its customers – in this case, the students. Because of current market conditions, Somedia would not initiate a similar development project for the time being. Additionally, the Politecnico di Milano has learnt a lot from its co-operation with private sector partners – most of all, about customer care.

[94] For further information, please refer to the case study profile of the Politecnico di Milano/ Annex G.

Concerning the outsourcing partnership between the University of Utrecht[95] and Cap Gemini/Ernst & Young, the overall outcome has been that costs have dropped to half their pre-outsourcing level. The lifetime value of the contract has dropped from 8 million to 7 million Euro because of the increase in operational efficiency, and also because many ICT services have been put online.

The case studies outline the general advantages and benefits which can result from engaging in partnerships with private sector partners, but they also highlight some weaknesses and preconditions.

**Strengths:**

- Financial support from private sector partners makes the development of e-learning courses possible. Without external funding, it is unlikely that similar levels of investment would have been made by the universities on their own. On the other hand, the private sector partners would not have been able to develop content with the same degree of academic value without partnering with the universities.
- The mix of competences in a partnership involving university and private companies can be fruitful. Universities have the academic know-how needed to develop content, and the private companies often have the technological solutions, product marketing knowledge and sense of customer care.
- Outsourcing IT services can improve their quality and lower their cost. Service level agreements can make the objectives clear. In addition, the outsourcing partner can contribute its experiences and innovative spirit to the university.

**Weaknesses:**

- The universities and private companies are fundamentally different as regards their co-operation drivers. The universities often focus on high content quality, the companies on their return on investment, which can lead to unbalanced co-operation goals. The cultures that exist in universities and private companies are generally different.
- A substantial drop-out rate is not rare for e-learning courses. If the business plan does not take this into consideration, the co-operation may fail.
- In outsourcing, the contractual terms can inhibit continued innovation. There is also the possibility of hidden costs. In addition, the academic staff can be deprived

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[95] For further information, please refer to the case study profile of the University of Utrecht/ Annex G.

of direct contact with the outsourced unit; the contract often means that there are more layers to go through before any changes can be implemented.

**Preconditions:**

- Expectations among both universities and private sector partners have to be adjusted and made explicit on initiating the co-operation.
- There is a need for mutual understanding concerning the *raison d'être* and business drivers of the individual organisations making up the partnerships. The university must acknowledge that the incentives of the private sector partners are centred on making a profit. Private sector partners have to accept that universities are judged on their ability to deliver quality.
- The quality of the interpersonal relationships of the people involved in the co-operation is a key issue. It is therefore very important to meet regularly. The management needs to follow the process and simply replace the individuals in charge if the interpersonal chemistry is not optimal.
- In outsourcing, the management of the venture cannot itself be outsourced. Very strict monitoring of the performance of the contract must therefore be maintained. The universities also need to consider that the outsourcing company cannot be depended on to innovate.

**Text box 6.5: A perspective from the USA**

According to Dr. Andy diPaolo, Executive Director of the Stanford Center for Professional Development (SCPD), a successful e-learning business model encompasses three aspects. The recommendations of Andy diPaolo might provide inspiration at the management level while deciding how to enter the e-learning market. The three aspects are:

*The business aspect:* E-learning in supplementary training has been most successful when it has considered the financial perspectives of e-learning. A university should find its own niche or micro market and start on a small scale, while constantly considering the scalability potential. Ownership of the process should be transferred to core teaching members, and incentives should be used for teachers to participate. An example of this could be channelling the profits from a course back into the department which developed it.

*The pedagogical aspect:* More than just content should be offered – students want to be part of a community, and they want tutors. Automatic feedback and grading should be available. Blended learning models should be favoured, and ideas should be presented to focus group critiquing during the course development process.

*The technological aspect:* The e-learning course platform should be the same as the one used on campus, and should have a common look and feel for both campus students and virtual students. Investment should be made in an Learning Management System, and the setting up of digital services should be considered in order to ease the work of the students.

**Text box 6.6: A private sector perspective**

SUN Microsystems is supporting universities in Europe which are developing creative new services like single sign-on systems and portals. It has signed several contracts with the universities of EU Member States. SUN Microsystems is investing in this area to expose the students to its own technologies, hoping that they will use them in the future.

In the opinion of the EMEA Technical Manager, Philippe Trautmann of SUN Microsystems, the universities have to focus on integrating their systems if they want to compete in the e-learning field. As in business, they have to integrate services and create knowledge enterprises. For instance, they are currently in charge of islands of knowledge which are not integrated with their administrative systems.

## 6.5. Future models of co-operation and partnerships

### 6.5.1. Future models of co-operation at national level

According to the case studies and the experts interviewed, the involvement of the EU universities in national co-operation will certainly continue, and will increase both in volume and co-operation level. The data from the survey indicate that the joint development of study programmes and content will multiply. The case study institutions underline that they will continue their involvement in strategic partnerships, and that the partnerships are likely to evolve towards the inclusion of more partners as the basic construction and partnership models get consolidated.

Additionally, there appears to be a trend towards self-sustaining initiatives.

The current business model of the Finnish Virtual University is based on securing funding from the Ministry of Education and the European Fund. The Ministry is responsible for selecting and granting funds for the university and network projects on an annual basis. The Finnish Virtual University will be evaluated in 2004. On the basis of this evaluation the Ministry of Education will consider possible future models for the Finnish Virtual University. The Finnish Virtual University is guaranteed funding till the end of 2006. Future business models could either consist of continued government funding or a more company-like structure in which the universities involved will own the Finnish Virtual University.

This is also the case in France, where the Campus Numérique national initiative has now ended after three years of operation. From now on, the partnerships established through the initiative must supply their own funding.

### 6.5.2. Future needs and models of trans-national co-operation

From the results of the study, there seems to be a trend towards increased trans-national co-operation in the EU Member States. One of the main reasons for this is the existence of an education market outside the EU. Another reason is the extended integration of the ECTS system and the increased co-operation being fostered by the Bologna process.

The education markets outside the EU seem to have attracted the interest of various parties. In the course of the case studies, the interviewees have also repeatedly pointed to the need for increased co-operation regarding the following:

1. Extending the use of e-learning in the EU candidate countries
2. Extending the use of e-learning in the Mediterranean countries
3. Extending the use of e-learning in South America and the Spanish-speaking parts of the world.

In the survey that was conducted among the all universities of the EU Member States, the universities have pointed to some of the areas in which extended EU and national co-operation is needed. Three extended EU and national co-operation areas are recommended by more than 60% of the universities. Most think that extended co-operation is necessary for the support and funding of pilot and development projects, with 69% of them stating that this is necessary to a high or very high extent. The further development of common technological standards occupies second place (63%), and the developing and sharing of learning material is in third place (62%).

**Table 6.4: To what extent is extended EU and national co-operation necessary concerning the following areas?**

| | To a very high extent | To a high extent | To some extent | To a low extent | To a very low extent | Don't know | Total |
|---|---|---|---|---|---|---|---|
| (Further) development of common technological standards | 23% | 40% | 24% | 6% | 5% | 2% | 205 |
| (Further) implementation of the common accreditation system (ECTS) | 24% | 32% | 25% | 6% | 7% | 6% | 205 |
| Development of quality assurance models | 17% | 32% | 25% | 12% | 10% | 5% | 205 |
| Support of co-operation between universities and other educational partners | 15% | 37% | 31% | 10% | 6% | 2% | 205 |
| Support and funding of pilot and development projects | 33% | 36% | 22% | 4% | 2% | 3% | 205 |
| Development and sharing of learning materials | 24% | 38% | 26% | 8% | 2% | 2% | 205 |
| Other | 9% | 0% | 0% | 0% | 6% | 85% | 35 |

At the European level, the extended development of the ECTS system and the Bologna process are generally seen as important drivers for the development of further co-operation between countries, but still-inflexible national systems are inhibiting longer-term partnerships and the development of joint degrees. The Open University of Catalonia[96] considers a key challenge for co-operation between universities to be national curriculum standards. It is easier to co-operate with the universities of countries which allow them to decide their own curricula.

It is being suggested by several countries that an association should be formed by those European universities which are experienced in e-learning and are interested in offering joint degrees.

### 6.5.3. Future needs and models of partnerships with private sector partners

The case studies point to a clear tendency for the universities to become more involved with private sector partners. However, overall interest has weakened because of the general economic situation, and in addition the general experience has been that the business ethos is not very compatible with that of the universities. The profit

[96] For further information, please refer to the case study profile of the Open University of Catalonia/Annex G.

motive is sometimes hard to assimilate into the logic of the university. Private companies could be involved in more limited roles, however.

From the results of the study, there seems to be a trend away from project-based co-operation with different public and private sector partners towards more consortium-based models.

For example, according to Rector Prof. Giulio Ballio the future business model of the Politecnico di Milano should be based on a consortium involving different types of partner (technology vendors, multimedia companies etc.). The Politecnico di Milano is considering this model for the future, which must not be project-based but should be scaled up to enable it to offer a number of courses and services.

# 7. The national approaches to ICT integration and e-learning among the EU's universities

The purpose of this chapter is to provide an overview of the different national approaches of the EU Member States concerning the development of ICT integration / e-learning in their universities. Even though the universities of the EU are mostly autonomous institutions, national strategies and initiatives play an important role. This chapter presents different models of national strategies and initiatives.

The main questions that will be answered in this chapter are:

- What are the different national approaches to ICT integration / e-learning in the EU Member States?
- Have national strategies been developed concerning ICT integration / e-learning in universities in the EU Member States?
- Have any regional initiatives been taken?
- What are the main drivers for extended ICT integration / e-learning in the EU Member States from the national perspective?
- Have any national actions been taken concerning the quality assurance and accreditation of e-learning courses?
- Have any national initiatives been taken concerning the interoperability of systems and metadata standards?
- What are the experiences of content brokerage at the European and national levels?

The chapter is based on interviews with government representatives in the EU Member States, interviews with other experts in the field, selected data from the survey of universities, and a desk study of published material. The EU experiences and approaches are put into perspective via the inclusion of examples of initiatives and experiences taken from the accession countries, as well as from countries outside Europe containing universities which are well advanced in ICT integration and e-learning.

## 7.1. Main drivers for the development of ICT integration / e-learning from the national perspective

The study demonstrates great concordance among the government representatives in their assessments of the main drivers that are pushing the development of ICT integration and the use of e-learning in the EU universities. According to the individuals interviewed at national or regional level in the Member States, the information society is regarded as a driver for change across the whole of Europe, and ICT is seen as a means for the universities to modify their roles in a changed society. The government representatives are in significant agreement concerning the nature of the key drivers among the European universities:

- **The internationalisation and globalisation of education** is part of the new environment that the universities are inhabiting. On the one hand this trend is leading to openness towards the EU and a clear focus on the Bologna process, while on the other hand the universities are becoming increasingly competitive and business-oriented.
- **Students demand ICT**. Students following initial courses are accustomed to using ICT in their daily lives, and they also expect the institutions to be using it in their teaching and administration. At the same time, the demand for lifelong learning is increasing, together with demands for the social inclusion of new groups of students. Here new markets are opening up to universities, but these new students are demanding extended accessibility and flexibility. Universities must integrate ICT in order to meet their students' demands.
- **Universities need to improve the effectiveness and quality of both their teaching and administration**. Across Europe, there is an interest in improving the quality of teaching via the development of new ICT-based methods. In addition, there is a general emphasis on reducing costs and freeing up resources for the very costly development of ICT.

**Text box 7.1: A perspective from Australia**

In Australia, the main driver behind the use of ICT in higher education is a change in the federal government's funding policy. Due to a fall in per capita funding, universities must attract more students, and this has encouraged them to adopt new patterns of curriculum design and more flexible ways of learning and teaching such as home or workplace study, because the student population has become more diverse. Students also contribute more to the cost of education than before, and therefore universities have become more customer-oriented, especially towards the overseas fee-paying students who contribute 79% of their fee revenues. For further information, please refer to the study of ICT development in Australian universities from a European perspective which was conducted by the Dutch SURF foundation. See http://www.surf.nl/en/download/Australian_book.pdf.

## 7.2. The development of ICT integration and e-learning is being prioritised at a national level

The European universities are autonomous institutions and are generally in charge of their own development, including the use of ICT. However, the study shows that the national or regional levels play an important role in driving and supporting the progression towards the extended use of ICT and e-learning. Several of the key issues in this process, such as the accreditation and certification of courses and metadata standards for information exchange, are challenges that need to be confronted at a national or even international level. In addition, co-operative ventures and joint development involving universities and other actors require initiatives at the national or regional level to support them.

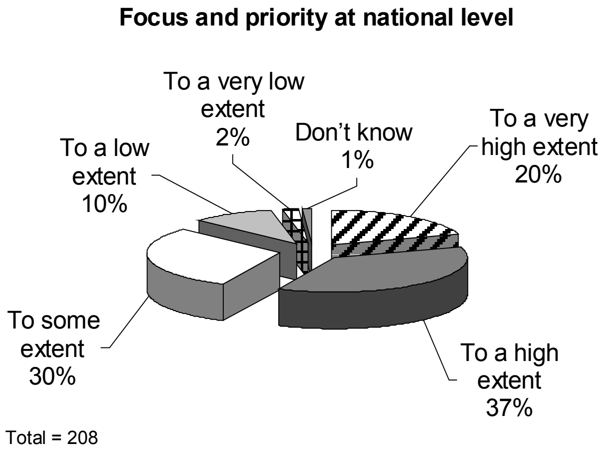
Almost all Member States place substantial emphasis on the importance of the development of ICT and e-learning in the universities, and indicate that ICT in universities is being prioritised at the regional or national levels. The regional level is important in countries like Germany and Spain, where the higher education system is decentralised; meanwhile, the universities are under the influence of, and receive funding from, both the national and the regional levels. In these countries the regional level can also develop strategies and support projects that encourage the integration of ICT.

However, the study indicates the existence of substantial differences among the national approaches in relation to the development of ICT strategies, the central coordination of initiatives, the existence of national initiatives and the level of government funding. In the following section, the main trends in the national approaches and their impact are described, together with key examples of initiatives and experiences.

## 7.3. The use and role of national ICT strategies

The study clearly shows that a national priority and focus on ICT integration and e-learning is a key driver for ICT integration and e-learning. Accordingly, the survey that was conducted among all the universities in the EU Member States shows 57% of the universities responding that "focus and priority at national level" is a key driver for ICT integration / e-learning to a high or very high extent.

**Figure 7.1: To what extent do you consider the following factors are key driving forces for ICT integration in your university?**




Especially in Finland, France, Italy and Sweden, the universities regard the focus and priority at national level as being a key driver.

About half of the EU Member States have developed specific strategies concerning ICT development and/or e-learning in the universities. These countries are Austria, Finland, France, Germany, Greece, Luxembourg and Portugal. The national strategies and action plans in these countries focus primarily on the following key elements:

- **Infrastructure:** the creation of "laptop universities" (Germany) and laptops for all students at favourable prices (Portugal), broadband connections (France), the largest wireless network in the world (Portugal), linking universities with the Ministry of Education (Greece).
- **Content:** Development of innovative multimedia and web-based learning modules (Germany, Austria, Portugal).
- **Co-operation:** expanded co-operation between universities (Austria, Germany, France).
- **Virtual universities:** A national virtual university (Finland); multiple virtual campuses developed by university consortia (France).

Other member states, such as Denmark, Italy, Ireland, Spain, the Netherlands, Belgium and Sweden, have no national strategy, while the UK is in the process of developing one. National ICT strategies and action plans are often seen as a tool for (or an indicator of) a prioritised national effort. However, the lack of a national strategy in about half of the Member States does not imply a lack of national initiatives or that these countries are not focusing on integrating ICT in higher education.

According to several of the national representatives interviewed, a strategy that focused solely on ICT integration / e-learning in the universities would be too narrow to be effective. Instead, ICT development in universities is seen as closely connected with broader issues such as the development of the information society, the lifelong learning paradigm, or the development of higher education. Therefore some countries, such as Ireland, UK and the Netherlands, have incorporated the issue of ICT in universities into more generalised national strategies.

In Sweden, a national strategy for ICT integration / e-learning is considered to be irrelevant, with ICT regarded as already being a mainstream strand in its universities' activities. In the Swedish universities, the development of ICT is regarded as an issue which they have to prioritise alongside all the other considerations that are involved in running a modern university.

**Text box 7.2: Perspectives from the accession countries**

ICT integration and e-learning are being prioritised in the accession countries studied. In Slovenia, Hungary and Lithuania, national ministries or committees devoted to the information society, plus action plans devoted to technological development, have been brought into being. Among the priority areas mentioned is ICT in higher education.

One example is that of Hungary, which responded to a late 1990s UNESCO study which concluded that there was a strong need for strategic and institutional development at governmental level and a readjustment of economic priorities. In April 2002, a ministry of information technology was created, and a national strategy for the information society was formulated in 2001 (revised in December 2002). Part of the national education strategy lays emphasis on research and development in educational methodologies for the efficient use of new technologies, especially in open and distance education, course management and content development in the field of ICT-supported education, and also for improving digital literacy and supplying the education sector with more IT equipment.

The strategies of most of the accession countries studied still seem to be focused on the provision of basic infrastructure, especially the construction and management of networks. In the Czech Republic, however, the primary CESNET initiative (run by the Academy of Science and all the country's universities) is gradually switching its emphasis towards funding development programmes in other areas. Many of these are of a technical nature, but others focus on the application and use of ICT in higher and distance education.

## 7.4. National initiatives

To support the integration of ICT into universities, between them the Member States have created a variety of national initiatives. In order to provide an overview we have separated the national or regional initiatives into three themes which will be presented below:

- National institutions or commissions working with ICT development in the universities by co-ordinating large-scale projects and the mutual sharing of experiences between universities
- National virtual university initiatives
- Other programmes and initiatives.

### 7.4.1. National institutions or commissions working with ICT development in universities

Several countries are operating national institutions that have been established to advise and support universities on the use of ICT and initiate and co-ordinate large-scale projects which the universities cannot undertake on their own. The national institutions collect experiences and best practice cases from across the country and feed them back to the universities as concrete examples and suggestions concerning how the teachers can go about integrating ICT at a practical level.

The objectives of the national institutions and commissions are similar across the Member States, but two different models for their establishment and operation stand out.

- Established by government decision or by the universities
- Funded primarily by government or by the universities

The two models can best be exemplified by JISC in the UK and the SURF Foundation in the Netherlands.

**Text box 7.3: The JISC (Joint Information Systems Committee), UK**

The JISC (http://www.jisc.ac.uk/ ) is an independent advisory body which is concerned with further and higher education and provides strategic guidance, advice and opportunities regarding the use of ICT to support learning, teaching, research and administration. With funding from the UK Further and Higher Education funding councils, JISC provides a centralised and co-ordinated locus for the development of ICT infrastructure and activities in line with its 5-year strategy.

JISC is working to achieve the following objectives over the next five years:

- Build an online information environment providing secure and convenient access to a comprehensive collection of scholarly and educational material
- Help institutions create and maintain Managed Learning Environments (MLEs) to support students
- Ensure the continued provision of, and broad-based access to, a world-beating network to support education and research in the UK
- Provide a range of advisory and consultancy services concerning the use of ICT
- Promote innovation in the use of ICT to benefit learning and teaching, research and the management of institutions
- Improve staff and student skills in the exploitation of ICT, particularly in their use of the Internet
- Support the regional and community agendas of institutions through Metropolitan Area Networks (MANs) and Regional Support Centres (RSCs)
- Provide a focus for collaboration among UK educational IT initiatives to help create a more broad-based information-literate society
- Promote and facilitate international collaboration in the exploitation of ICT

**Text box 7.4: The SURF Foundation, Netherlands**

The SURF Foundation (http://www.surf.nl/home/) is the key player in the progression towards the extended use of ICT in Dutch universities. The SURF Foundation was set up in 1985 by a group of universities, and is the higher education and research partnership organisation for network services and ICT. All 13 universities plus the open university and 35-45 institutions active in non-university tertiary education are participants.

The mission of SURF is to exploit and improve an advanced common ICT infrastructure which will enable the higher education institutions to realise their own ambitions more easily, and to improve the quality of learning, teaching and research.

SURF is working to the 4-year strategic plans set out by the Executive Committee of the General Board. The current strategic plan dates from April 2002 and covers the 2003-2006 period.

SURF's activities are funded both by the participating institutions and by the Dutch government. The institutions pay the operating costs of the SURF office. In addition to this, SURF receives grants from the Ministry of Education, Culture and Science and from the Ministry of Economic Affairs, though these grants may only be used for strategic innovation. The limited-liability companies SURFnet and SURFservices finance themselves out of the fees they charge for their services and products.

The key strength of the model that SURF represents, in which the universities participate as partners and the activities are funded mainly with money from the university budgets, is that it ensures strong commitment from its constituent universities. The solid involvement of the universities ensures a close connection with their needs, which reinforces the commitment from the universities towards the initiatives being undertaken. The chief weakness is that it makes heavy demands on the universities, and its initiatives may be limited in their scope by the immediate needs of the universities.

The key strength of the model that JISC represents is its broad and independent perspective regarding the challenges being faced by the universities; however, there is a concomitant risk of the universities not being committed by its advice or the projects that it undertakes.

In addition to the national institutions, some Member States have appointed commissions or special working groups to assist with the development of ICT in their universities. One example of this is Greece, where the Ministry of Education has appointed a 25-person strategic committee for the introduction of ICT in education. The committee is made up of people from the universities, the ministry and other institutions of higher education, and supplies the ministry with reports and policy recommendations regarding the most effective way of integrating ICT in education. Occasionally, representatives from the business sector also participate in working groups on specific topics.

### 7.4.2. National virtual universities

Virtual universities currently have a prominent profile, and are being developed right across Europe. However, the term 'virtual university' is used to describe several different types of universities. On the basis of an expert analysis of the field, there are four distinct models for the organisation of virtual universities[97]:

A. *Nationally co-ordinated virtual universities:* A national initiative to co-ordinate existing e-learning courses offered by the national universities.
B. *National virtual university via a consortium:* Support of partnerships between universities. Focus on co-operation and joint e-learning offerings.
C. *Institution-based virtual university – combination model:* A university offering its virtual courses independently. The university may offer e-learning in parallel with its campus-based offerings.
D. *Institution-based virtual university – fully virtual model:* A university offering its virtual courses independently, either separately from the campus-based university or via transformation into a purely virtual university.

Models A and B include universities that focus on co-ordinating or supporting co-operation among a country's universities. Models C and D focus on individual universities which offer all or some of their courses in e-learning format. In this section, the emphasis is on the national virtual universities represented by models A and B.

#### Nationally co-ordinated virtual universities (model A)

A nationally co-ordinated virtual university is a virtual umbrella organisation in the form of a portal that co-ordinates and distributes existing e-learning courses at university level, as in the case of Sweden.

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[97] The four models have been developed by Morten Flate Paulsen, Doctor of Education and Director of Development at the NKI Internet College.

**Text box 7.5: The Swedish Net University**

The Swedish Net University (http://www.netuniversity.se/ ) is a national initiative established in 2002 and funded by the Swedish Ministry of Education and Science. The primary task of the Swedish Net University is to co-ordinate the different e-learning courses being offered by the various Swedish universities.

The Swedish Net University was established to give more people the opportunity of studying, and to make it easier to study from home via the Internet. The Net University is seen as supporting lifelong learning in Sweden.

Sweden has neither a national strategy for ICT in higher education nor any programmes supporting the integration of ICT. However, the Net University is an exception to this governmental absence of involvement. The Net University is a government initiative, but approval from the Swedish universities was obtained in the preliminary phase. Participation in the Net University is voluntary for universities and university colleges. The government will provide an extra disbursement (160 million SEK in 2003) as an initial incentive for the courses being offered by the Swedish Net University.

In Sweden, the universities have been offering courses in e-learning format for many years. For them, the development of the Net University represents a new route for reaching new students, as well as adding value by creating a brand name for the distance education being offered by the country's universities. One of the objectives of the Net University agency is to improve the co-ordination of the different courses and education being provided by the various universities. In addition, the agency has the task of encouraging the improvement of skills and competences among distance education teachers and other personnel, as well as identifying topics and areas that would benefit from the provision of additional distance education.

By co-ordinating and bringing together the courses that would otherwise be dispersed among many different universities, this type of national virtual university makes the e-learning courses more visible and more easily accessible to its students. This is expected to attract additional students and thereby make it more appealing for universities to offer e-learning. This kind of national virtual university is anticipated to develop a virtuous circle in relation to e-learning supply and demand.

In most countries, the government takes the responsibility for setting such a virtuous circle in motion, with this type of national virtual university generally being established and financed through public funding. The great challenge for such a national virtual university is to develop a business model that is sustainable without requiring special public funding, otherwise there is a significant risk that it will cease to exist as soon as the project-based funding runs out.

### Virtual university via a consortium (model B)

The establishment of virtual universities based on consortia is the most widespread model. In many countries there are national programmes whose purpose is to establish partnerships between universities. In these consortia, the universities co-operate and develop joint e-learning offerings.

This study includes three very different virtual university consortia:

- Finnish Virtual University
- Campus Numérique, France
- UKeU, UK.

**Text box 7.6: The Finnish Virtual University**[98]

> The Finnish Virtual University (http://www.fvu.fi/) is a project-based organisation founded by Finland's 20 universities plus the National Defence College for the purpose of conducting their virtual university activities. These encompass the use of ICT in education, administration, student counselling and the organizing of research support services. The Finnish Virtual University does not provide academic education independently, and does not have the authority to award degrees.
>
> Together with its member universities, the Finnish Virtual University:
> - Provides high-quality network-based education and study services
> - Co-ordinates online education provision, student counselling and research network activities
> - Creates records and databases of curricula, student information and study registers
> - Produces publications
> - Drafts the agreements needed to facilitate its activities
> - Establishes the necessary operational bodies
> - Collects fees in order to finance its activities

[98] For further information, please refer to the case study profile of the Finnish Virtual University/ Annex G.

**Text box 7.7: Campus Numérique, France**[99]

In 2000, the French Ministry of Education launched a national initiative named Le Campus Numérique (http://www.educnet.education.fr/superieur/campus.htm). Based on three calls for proposals in 2000, 2001 and 2002, the initiative was designed to support the development of virtual campuses. Specifically, its purpose has been:

- to strengthen and support the use of ICT in teaching in order to improve French higher education.
- to introduce distance learning and open learning to new target groups at higher education level, in accordance with the concept of lifelong learning.
- to make French higher education more competitive in response to increased international competition.

Le Campus Numérique focuses on offering virtual and online teaching programmes by encouraging the French universities to group themselves together into consortia. At the moment, Campus Numérique is supporting 64 consortia.

The consortium structures vary, some being highly formalised while others are more informal and are still evolving.

In 2002, the Campus Numérique budget was 9,376,000 Euro. The projects under the initiatives are funded through a variety of sources in addition to the programme funding, for instance through the universities themselves, via student fees or via the CNED.

[99] For further information, please refer to the case study profile of the Canage Consortium/ Annex G.

**Text box 7.8: UKeU, United Kingdom**[100]

UK eUniversities Worldwide (UKeU) (http://www.ukeu.com/) is a private company set up as part of the eUniversities project. The Higher Education Funding Council for England (HEFCE) has co-ordinated the establishment of UKeU, whose aims are:

- to establish a globally competitive provider of internet-based higher education to help equip UK universities compete against the virtual and corporate universities around the world exploiting this medium;
- to embrace a socially inclusive agenda;
- to be an exemplar of e-learning, feeding back good practice to enhance e-learning in UK HEIs; and
- to be a collaborative venture between UK HEIs and private sector partners.

UKeU was incorporated on 19 October 2001, and its first courses began in Spring 2003. Public funds are invested through a holding company (the eLearning Holding Company Ltd) owned by the HEIs of the UK. The holding company oversees the attainment of value for money represented in the services provided by UKeU, and also oversees the quality and standards of a venture which carries a brand backed by UK higher education under a licence arrangement. The Government has allocated £62 million to the eUniversities project over the 2001-2004 period, up to £55 million of which HEFCE will allocate to UKeU through the holding company. Matching funding is being sought from private sector partners.

In general, the role of the UKeU is to create and maintain the learning environment, and to build the infrastructure. The UKeU does not itself develop content, but has a team of experts which supports the universities in doing so.

The consortia are based on the concept that together, the universities will grow stronger and will be better able to confront the challenge of integrating e-learning. The study shows that the establishment of consortia is a fruitful approach to starting up online education and extending the use of ICT in universities. However, the optimal format and commitment best suited to the consortium model still needs to be developed further, and finding effective routes to co-operation is still a challenge.

One of the main experiences with this type of virtual university is that the assurance of commitment from the universities at the outset is of key importance. This was a prime issue in Finland, where all the universities were active in the founding of the Finnish Virtual University in January 2001. The main experience of the FVU has been that the construction of a virtual network such as itself which links all the universities together takes many years. In the opinion of the stakeholders, the strategy of focusing heavily on the sustainability of the network has proven to be correct. Denmark has also had experience of developing a national virtual university of this kind, but due to a lack of

[100] For further information, please refer to the case study profile of UKHEP/Annex G.

support from the national universities the initiative was terminated before it came on-stream.

The uncertainty concerning the future model of the Finnish Virtual University (FVU) might be a possible obstacle for the further development of the FVU over the next few years. The FVU will be evaluated in 2004, and the Ministry of Education will consider possible future models for the FVU on the basis of this evaluation. The FVU is guaranteed funding till the end of 2006. Future business models could either involve continued government funding or a more company-like structure in which the universities involved will own the FVU.

According to the individuals interviewed, one of the weaknesses in the French Campus Numérique is the lack of co-ordination and facilitation at the programme level. During the project years, no relationship was established with the overall programme framework, and there has been no co-ordination between the various projects supported by the initiative. The interviews indicate that several problems are generic and are also relevant to other consortia, such as legal issues and payment models. This points to the need for more co-ordination and central support in such areas.

National programmes often support the national virtual university consortia. However, the concepts relating to the e-learning programmes and initiatives of several of the universities studied were developed independently of any national initiative. For instance, the idea for the UK Healthcare Education Partnership, one of the partnerships under the UKeU, was developed independently of, and prior to, the establishment of the UKeU. Instead, the UKeU was an investment opportunity which was able to provide part of the funding for the very costly activity of developing the e-learning modules. Following the concluding of the contract with the UKeU and the agreement on the conditions and the business model, there have been no significant connections between the UKeU and the UKHEP in the running and implementation of the partnership. The main basis of the relationship is that the UKeU will be the website host, and that the partnership will be using the UKeU platform to serve its modules to the students. The UKHEP operates its pedagogical and academic settings independently, and has decided not to purchase the marketing or expert services which the UKeU offers. The UKHEP is using its own experts instead. The same pattern is true for the Canege Consortium in France, which is funded by the Campus Numérique.

Public funding is supporting the virtual university consortia in promoting ICT integration in universities and extending the use of e-learning to achieve other goals such as social inclusion and lifelong learning, as described in Chapter 5. This is not the direct objective of the UkeU. Its primary objective is the commercial one of developing a mechanism for exporting UK university education. However, the extended use of ICT in other areas of the universities may very well turn out to be a side benefit of the latters' involvement in the UKeU. The fact that they have enjoyed support in creating the e-learning programmes through their involvement in the UKeU could bring about an enhanced outcome.

**Comparison of different types of national virtual universities**

In comparing the different types of national virtual universities, it is noticeable that none of the national virtual universities are independent providers of academic training, and that they do not have the authority to award degrees. That is the task of the participating universities instead. This makes the universities that offer their own courses via virtual universities very dependent on each others' reputations and quality assurance systems. This is especially important for those institutions which participate in consortia, but also affects those virtual universities which simply co-ordinate the national offerings.

The degree of commitment differentiates the two types of national virtual university. The Finish Virtual University (FVU) offers a portal that consolidates the courses offered by its constituent universities. This is also the case with the Swedish Network University. In the latter, however, the universities are not mutually dependent, they do not develop courses together, and they do not co-operate to confront common challenges. In the consortium model, the participating universities have entered into a partnership and assist one another in co-ordinating and developing their e-learning courses.

Many of the virtual university initiatives are still very new, and the extent of their ultimate impact and results remains to be seen. There are high expectations because of the substantial government funding involved; however, in some cases, such as that of the UkeU, critics have asked whether the extent of national funding spent could have been applied better elsewhere. Experts have pointed to the risk of the Swedish Network University ceasing to exist when its project funding expires.

**Text box 7.9: A perspective from Canada**

> The Canadian Virtual University (http://www.cvu-uvc.ca/) is an umbrella-type structure under which degrees are granted by the participating institutions. The CVU offers about 250 programmes and 2000 courses, some of which are fully on-line. However, the number of universities participating is limited, since nationwide collaborations are experiencing competition from provincial consortia. In British Columbia, a consortium in which all the universities of the province participate is currently operating which is constructed according to a model that is quite similar to that of the Finnish Virtual University.

### 7.4.3. Other national initiatives or programmes

In addition to the above-mentioned national programmes and national virtual universities, the national or regional levels have developed and implemented other types of initiative, mainly in order to develop infrastructure for specific programmes.

The main purpose of such programmes is either to steer ICT development in a particular direction by directing resources to kick-start the development of ICT, or to give extra assistance to initiatives that are already underway in the universities. Such initiatives and programmes are principally launched via calls for proposals.

Several Member States have initiated programmes to develop technological infrastructure. In Greece, for instance, there are two main examples:

1. GUNet (Greek University Network)[101]. GUNet is a consortium created in order to design and implement a Greek university network.
2. GRNet (Greek Research and Technology Network)[102]. GRNet is a company owned by the Greek state and co-funded by the Ministry of Development and the European Union. It currently provides advanced networking services to more than 60 institutions (all of them Greek universities, research centres and technological institutes) encompassing 150,000 Internet users (i.e. approximately 50% of the Greek Internet user community).

In Sweden, the universities themselves set up *ad-hoc* consortia to work on different issues of importance to them, such as the development and operation of a computer-based student admissions and documentation system. Here there is no support or involvement from the national government, which makes it more costly and time-consuming for the universities to administer but ensures relevance and commitment.

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[101] GUNet: http://www.gunet.gr/
[102] GRNet: http://www.grnet.gr/

In Finland, a number of networks to develop joint initiatives supporting online education have been set up as part of the Finnish Virtual University and are being funded by the Ministry of Education. Examples of such networks are:

- *IQ Form*[103] – developing a supporting learning environment for the Finnish Virtual University (co-ordinated by the University of Helsinki).
- *IT-Peda*[104] – Network for Enhancing Knowledge of On-Line Teaching and Learning in Finnish Universities (co-ordinated by the University of Tampere).

The Ministry of Education funds these networks.

In Italy, there has been substantial emphasis on improving and developing the technological infrastructure and broadband networks. The Ministry of Education, University and Research has prioritised these areas.

**Text box 7.10: A perspective from Canada**

> In Canada, the provincial governments have been active supporters of ICT development in universities. For instance, the province of British Columbia has recently invested 3-4 million Canadian dollars in a variety of projects, including content development.

The study has shown that the national initiatives and programmes are crucially important. However, the study also demonstrates that obtaining good results from the programmes and the widespread dissemination of ICT among the universities is still a challenge, as the issue of ICT integration is often not considered in a strategic perspective or given adequate attention by their managements. Based on these findings and expert opinions, it is recommended that future national initiatives and programmes must mandate the involvement of senior management, and that emphasis must be placed on incorporating ICT integration into the universities' strategies.

## 7.5. Key challenges at national level

The national level is of great importance if the universities are to meet some of the principal challenges they face in integrating ICT. All the sources in the study point to the importance of co-ordinating and dealing with certain key challenges at the national

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[103] IQ Form: http://iqform.edu.helsinki.fi/iqform2/start.php?locale=en_EN

[104] IT-Peda: http://www.uta.fi/itpeda/

or even trans-national level. Three of the main challenges that this study has focused on are:

- Quality assurance and accreditation
- Interoperability of ICT systems
- Use of metadata standards.

### 7.5.1. Quality assurance and accreditation – a precondition for future high-quality e-learning among national universities

A key challenge is to ensure confidence in courses that are being offered in e-learning format. Several government representatives interviewed have stated their fear of poor-quality uncertified courses gaining ground and competing with national degrees. To meet this challenge, there is a need for a system that firstly guarantees the quality of courses, and secondly ensures that the courses being offered by other countries are acknowledged nationally. For this to be possible, a system of quality assurance and assessment procedures needs to be developed, together with an internationally recognised accreditation system.

The issue of quality assurance systems is currently under debate in several countries. However, in the majority of countries, the issue is not being tackled at a national level. The reason for this is that it is a responsibility that has traditionally lain in the hands of the universities, since it touches on the domains of academic freedom and university autonomy. Germany is one of very few countries in which quality assurance has been integrated into the national programme.

In most universities, no special initiatives are being taken regarding the quality assurance of their e-learning courses. It is often the responsibility of the teachers to assure the quality of their own courses, whether they are campus-based or are offered in e-learning format. In the UK, the Quality Assurance Centre has developed guidelines for the quality assurance of e-learning courses, but their implementation is still being left to the universities themselves to tackle. In Greece, an agency is currently being set up under the National Accreditation System to deal with the quality assurance of both traditional-style and e-learning courses.

Even though the issue of quality assurance systems is of great importance for both campus-based teaching and e-learning courses in Europe, it is mainly the virtual universities or partnerships involved with e-learning courses that are tackling the quality

assurance issue. National virtual universities such as the UKeU and the Finnish Virtual University provide useful examples of quality assurance procedures.
Due to the importance of the issue and the hitherto limited outcomes, PLS RAMBOLL encourages the national level to support initiatives which will result in common standards and agreements concerning the issues of quality assurance systems and assessment procedures.

**Text box 7.11: The UKeU quality assurance procedure**

> The UkeU (www.ukeu.com/) has developed a five-stage development process consisting of well-defined procedures and quality checkpoints at each stage of the cycle:
> - An external Committee for Academic Quality (CAQ) first approves the proposal
> - The specification document is used to shape the course materials
> - Scripts are passed to technical teams for production
> - Delivery of the course takes place after thorough checking of the courseware
> - Monitoring, programme evaluations and reviews are conducted on a regular basis

The issue of the accreditation and certification of e-learning courses is generally regarded as being an aspect of the implementation of the ECTS system. In most countries, e-learning is subject to the same certification systems that are in general use by the universities, and all over Europe the ECTS system is being implemented as the new accreditation system.

The issue of accreditation and certification seems to be one that requires extended EU and international co-operation. Luxembourg, for example, was attempting to develop a certification system that was intended to combine the French and British systems, but being a small country it was unable to overcome the challenges involved. Much has already been achieved with the ECTS system, but the importance of developing the system further needs to be given additional emphasis.

### 7.5.2. Interoperability of ICT systems – a continuous task

The second key challenge that universities are facing is ensuring the interoperability of their ICT systems. The universities of Europe have been developing their ICT systems for many years. They have systems for student, personnel and payroll administration, as well as for communicating and exchanging information with government. There are also websites that belong to the university and its departments, and possibly an intranet or a learning management system.

The interoperability of the different ICT systems is of great importance for the effective functioning of modern universities. All the different systems need to share some of their information, and it is vital that these systems should be interoperable. The universities in Europe have been facing the challenge of systems interoperability for many years, but as their systems increase in complexity the issue will continue to challenge them in the future.

Even though the issue of interoperability of ICT systems is seemingly a university matter, research shows that national co-operation and the support of standards can help universities to meet this challenge. Research has been done on the interoperability of systems and the integration of Learning Management Systems into higher education in Europe. The investigations of the expert Morten Flate Paulsen have shown that Scandinavian universities are in the vanguard in this area, due to the standardised format of the Scandinavian student administration systems and their widespread national-level implementation. This promotes co-ordination and facilitates the interchange of students among universities.

PLS RAMBOLL encourages the national level to support co-operation and common standards between universities in order to assure the existence of efficient and professionally-run national universities in the future.

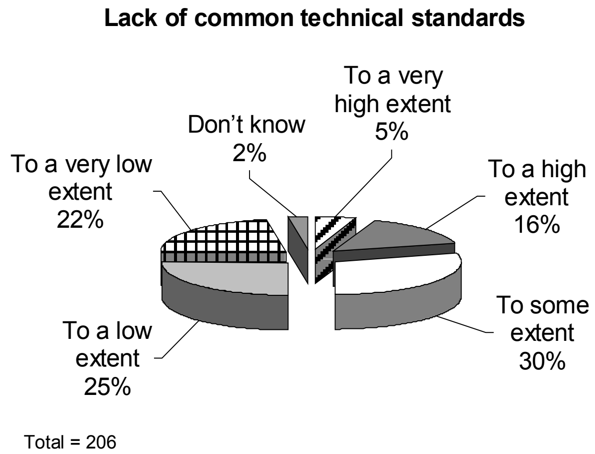
#### 7.5.3. Lack of initiatives concerning metadata standards

A third key challenge is the issue of metadata standards. Metadata is a definition or description of data formats. Applying metadata to data makes it easier to locate and share the data in question. For example, XML is a programming language which is used to describe and transmit structured data between applications. The advantage of the existence of standards is that they facilitate the location and exchange of information between systems. On the other hand, the disadvantage is that it is regarded as time-consuming and limiting of the development process to follow the standards. In addition, their value may not be apparent until later on when a system has expanded, or the benefits of conforming to the standards may not be conferred on those who have developed the resources in question, but only on those requesting information from outside the system.

Judging from the responses to the questionnaire presented to the universities, the lack of common technical standards is not regarded as being an important obstacle.

Only 21% think that the lack of standards is an obstacle for the expansion of ICT use to a high or very high extent.

**Figure 7.2: To what extent do you consider the following factors are obstacles for the expanded use of ICT in your university?**




The general lack of interest in metadata standards is noteworthy, since for some of the universities which are most experienced in the integration of ICT, the lack of common technical standards is still a very important obstacle. For the Finnish Virtual University this will be one of the most important focal points in future years, and according to SUN Microsystems much progress has been made in this field using the SCORM standard, but there is still a lot to be done in terms of standardization. The experience of the experts in the field suggests that the universities are generally underestimating the problems which this issue represents.

Though metadata standards are not seen as a key issue or as an obstacle at the moment, the absence of metadata standards is expected to become one in the near future. With the extended development of digital learning resources, the issue of metadata standards will become an issue in the future if resources – and therefore their high development costs – are to be shared. To make it easy for potential students to find the right courses, international standards are also needed to describe courses and study programmes.

Today, the course material of most universities is produced locally, and it is only slowly being recognized that problems will arise when this material is exchanged between institutions. Metadata standards and metadata are important issues in relation to the re-use, scalability and sharing of digital learning resources and e-learning courses. At both the European and global levels, the SCORM, AICC and LOM standards are becoming prevalent. However, in some countries the lack of common technological standards is already regarded as being an obstacle in the developmental process.

Nor is there much concentration on this issue at national level, with only a few national strategies and programmes focusing on metadata standards and the promotion of metadata development and deployment. In the majority of countries, discussion has just begun concerning metadata and the launching of pilot projects, and the issue of metadata standards is considered to be at an early stage. For example, an argument originating from Ireland that opposes the concentration on metadata standards is that the number of courses being offered in e-learning format is still limited.

At the national level, the German 'New Media in Education' programme is exceptional in tackling the issue of metadata standards. Workshops are being held for the staff working in the projects being funded by it, with the aim being to standardize the e-learning which is in production. Standards committees have been set up which function as platforms for co-operation with individual representatives, and funding is being provided for in-service training in the field. The metadata issue has become more prominent through these initiatives, but the head of the 'New Media in Education' agency notes that it still needs to be developed even more in Germany.

Interoperability and metadata standards are core elements of the Portuguese national strategy and action plan. A working group is developing standards and software to deal with these issues. The national higher education portal – the e-U – will be supported by standards governing content, as well as an obligation to follow metadata standards. The content standards will be made public during 2003.

The national ministries interviewed differ in regard to who should be developing and defining metadata standards. Some argue that they should be set at EU level, while others favour the adoption of existing industry standards such as SCORM and AICC. The SCORM standard is sponsored by the US Office of the Secretary of Defense (OSD), and the AICC standard has been developed for the aviation industry. Several of the experts expressed scepticism concerning the provenance of the standards being developed by such parties, in addition to their demand for standards that support the European university model and pedagogical approach. In relation to this it can be noted that JISC in the UK is currently working with the US National Science Foundation, as they find the NSF easier to co-operate with than the EU.

The unclarified status of standards is seen by leading experts as a challenge that will soon become a major barrier for the extended use of ICT and e-learning in European universities. PLS RAMBOLL recommends that the EU should take the initiative to involve representatives from universities, member states and the business sector in a debate to clarify the issue and arrive at a decision. It is important that a choice should be made soon, and that all the relevant parties should be involved in the debate.

**Text box 7.12: A perspective from Canada**

In Canada, a national standard has been developed that is based on a selected subset of IMS. Key actors in the development have been Canarie (http://www.canarie.ca/), a non-profit organisation devoted to "accelerating Canada's advanced Internet development and use" (members include universities, private companies and ministries), and EduSpecs (http://eduspecs.ic.gc.ca/index.htm), an agency under the federal government working on specifications and standards and developments related to e-learning. The purpose of creating a common standard has been twofold: 1) To provide Canadians with universal access to online education and training resources in order to support their individual and collective learning needs and interests; 2) To give Canada an opportunity to influence the creation of common specifications and standards, and thereby to facilitate sales of Canadian online learning materials around the world. The universities are currently being encouraged to use this standard, but implementing it is difficult.

# 8. *Main conclusions, trends and scenarios*

This chapter presents the study's main conclusions and trends regarding ICT integration and e-learning among the EU universities. In addition, we present four scenarios for EU universities based on the cluster analysis described in chapter four.

We start by summarising the overall results and conclusions and then move on to our conclusions regarding the main trends and future challenges affecting the universities of the EU. After this we present our recommendations.

## 8.1. Main results and conclusions

### 8.1.1. Four clusters of EU Universities

In the analysis, the replies given by the 200 European universities which responded to the survey produced a division into four university clusters:

- Cluster 1: The front-runners (16% of the universities)
- Cluster 2: The co-operating universities (33% of the universities)
- Cluster 3: The self-sufficient universities (36% of the universities)
- Cluster 4: The sceptical universities (16% of the universities).

The clusters' characteristics are as follows:

**Cluster one:
"The front-runners"**

- 75% have a formal ICT strategy
- Substantial use of online registration for courses
- ICT is to a very large extent integrated in the teaching on campus
- Substantial numbers of e-learning courses are incorporated in basic academic training and in supplementary training
- Very positive attitudes towards ICT among both management, teachers and students
- Substantial funding for ICT from the universities themselves
- Huge involvement in strategic co-operation with domestic and foreign universities, as well as with other suppliers of education

**Cluster two:
"The co-operating universities"**

- 63% have a formal ICT strategy
- Digital services such as online course registration are not as widespread
- ICT is integrated in the teaching on campus to a very large extent
- E-learning courses are offered to a minor degree in basic academic training and supplementary training
- Positive attitudes towards ICT, especially among management and students. Some sceptical teachers.
- Funding consists of a mixture of government funding and funding from the universities themselves
- Huge involvement in strategic co-operation with domestic and foreign universities, as well as with other suppliers of education

**Cluster three:
"The self -sufficient universities"**

- 60% have a formal ICT strategy
- Digital services such as online course registration are not as widespread
- ICT is integrated in the teaching on campus to a very large extent
- A considerable number of e-learning courses are incorporated in basic academic training and supplementary training
- Positive attitudes towards ICT, especially among management and students. Some sceptical teachers.
- Substantial funding for ICT from the universities themselves
- Very low extent of strategic co-operation with domestic and foreign universities or with other suppliers of education

**Cluster four:
"The sceptical universities"**

- 13% have a formal ICT strategy
- Digital services such as online course registration are not as widespread
- Limited ICT integration in the teaching on campus
- Very limited numbers of e-learning courses are incorporated in basic academic training and supplementary training
- Attitudes mixed towards ICT – a substantial numbers of teachers in particular are sceptical
- Funding of ICT is a mix of government funding and funding from the universities themselves. EU funding is also relatively important
- Low extent of strategic co-operation with domestic and foreign universities or with other suppliers of education

### 8.1.2. ICT integration in the organisational setting

The use of intranets is widespread in the European universities, and they are heavily used for processing and presenting administrative and course information. However, the use of intranets for interactive digital services such as online course and examination registration is not very common.

Even though national programmes have been set up, the implementation of ICT is primarily being funded from the general university budgets. Private sponsorships or public/private partnerships play no significant part in funding in most of the universities that participated in the survey.

The study clearly shows that those universities which have an ICT strategy are further ahead in their integration of ICT in administration and organisation as well as in the educational setting. An ICT strategy is also an indicator of greater ICT networking co-operation.

The universities themselves see the focus and the priority of the university management as being the key driver for ICT integration.

- According to the survey data, limited financial resources are seen as the primary obstacle for the integration of ICT in the universities. However, several government representatives, experts and case study interviewees have noted that insufficiency of funding is often the result of the university managements' failure to set ICT integration as a high enough priority.
- The lack of incentives is seen as a general obstacle for the integration of ICT, according to both the experts and the government representatives interviewed.
- Development and pilot projects are useful tools for beginning the processes of ICT integration and innovation. But an opinion which was universally expressed was that the ultimate challenge is to incorporate the results and experiences gained from the development projects into a university's overall strategy.
- An effective and efficient ICT organisation and support structure can be a driver for the integration of ICT and e-learning, and is a precondition for the successful use of ICT in all aspects of the university's activities. In general, the organisational structure is regarded as being an obstacle to ICT integration and e-learning in many of the EU's universities.
- ICT can be used as a way of overcoming geographical distance in both internal and external communication.

- The questionnaire results appear to indicate that in the organisational setting, the main focus of the universities over the next two years will be to upgrade their technological infrastructure.

### 8.1.3. ICT integration in the educational setting

Integrating ICT into the educational setting affords great potential for improving the quality of education, but it places new demands on the universities. The main conclusions concerning the status of ICT integration in the educational setting are:

- The EU universities are at very different stages in the level of their integration of ICT into teaching. However, an increased use of ICT in teaching over the next couple of years is anticipated.
- ICT is mostly being used to support traditional campus teaching in the universities. However, the use of ICT to open up the traditional lecture format in the direction of study landscapes is being tried out in different universities.
- E-learning is not suitable for all groups of students and universities in Europe. The approaches to e-learning vary considerably in the different Member States, depending on the strength of focus at both national and university levels, market orientation, target group and competition.
- The majority of universities do offer some e-learning at the level of basic academic training and supplementary training. However, e-learning does not seem to be the preferred mode of delivering teaching in either basic academic training or in supplementary education.
- Most e-learning courses at university level are accredited using ECTS, or will be in the near future.
- The majority of universities have developed quality assurance models for e-learning.
- Most universities have taken upon themselves the new task of developing ICT competencies and technical support for students and academic staff.
- The main drivers for the development of ICT in the educational setting are pioneering individual teachers, positive attitudes towards ICT, student demand and technological advances.
- The main challenges and obstacles for ICT in the educational setting are the absence of a joint and comprehensive management approach to ICT integration, a change-resistant university culture, insufficient knowledge of ICT among teachers, and the lack of high-quality ICT-based teaching material.

### 8.1.4. Virtual, physical and social mobility

ICT is a strong tool for supporting various kinds of mobility. Our main conclusions concerning the status of the use of ICT to support virtual, physical and social mobility are as follows:

- The issue of virtual mobility is one of the key aspects of most of the e-learning models identified in this study and is stated by several representatives from university management to be a key objective. However, our analysis indicates that virtual mobility is still mostly supported on a project basis and is limited in scope. Only a minority of the universities' ICT strategies cover student mobility.
- Overall, campus culture does not seem to be either strengthened or weakened by ICT integration and e-learning. ICT integration has been perceived as strengthening the campus culture to a high or very high extent by 16% of the universities participating in the survey.
- Social inclusion is a key priority in most of the national strategies. At the national level, there is a heavy emphasis on broadening the catchment population for university education to include people who would otherwise be unlikely to undertake it.
- Regional development and social inclusion go hand in hand in many national ministries' strategies and plans. Ensuring access to universities and education for the rural population through the development of rural universities, local mini-campuses or the availability of e-learning is considered vital for the promotion of regional development.
- The demand for lifelong learning is one of the main drivers for the integration of ICT. The majority of universities participating in the survey consider the demand for lifelong learning to be a key driver for their ICT integration process.

### 8.1.5. Co-operation, partnerships and new business models

Across the EU universities, there is an emergent trend towards a higher level of co-operation with a variety of entities. Accordingly, partnerships among universities, partnerships between universities and other actors, and new business models, are all being developed. The main conclusions concerning co-operation, partnerships and business models are:

- Approximately half of the universities in the EU member states are involved in co-operation with other universities in their own country regarding the joint supply of e-learning courses. The study indicates three overall levels of co-operation between the universities at national level:

    - National networks or consortia supported or initiated at national or regional level
    - Bilateral or multilateral partnerships or consortia among universities
    - *Ad hoc* project-based co-operations.
- Around one third of the universities in the EU Member States are involved in co-operation with universities in other countries regarding the joint supply of e-learning courses. The existence of trans-national consortia involving EU universities is evidently not widespread. The study indicates two main levels of trans-national inter-university co-operation:
    - EU co-operations and partnerships
    - One-to-one partnerships.
- The universities in the EU Member States are not heavily involved with partners outside the university sector in relation to ICT integration and e-learning. Only 18% of the universities in the EU member states are co-operating with other suppliers of education, such as private companies, in the joint supply of e-learning courses. However, this study has identified three main models of partnerships with private sector partners:
    - Consortia
    - Co-operation at project level
    - Outsourcing of IT services.

#### 8.1.6. National approaches towards ICT integration and e-learning

The main conclusions of the study are:

- The integration of ICT / e-learning in the universities has a high priority on the political agendas of the EU Member States. However, the universities enjoy great autonomy, which limits the direct influence that can be brought to bear at the national level.
- There are great variations in the level of influence which the national governments exercise on the universities each country, and in how active the national ministries are in directly supporting ICT integration among their countries' universities. Austria, Finland, France, Germany, Greece, Luxembourg and Portugal have developed national strategies and action plans focusing on the use of ICT and e-learning in their universities. Other Member States, such as Denmark, Italy, Ireland and Sweden, have no national strategies, although in several of them the ICT issue has been integrated into more generalised strategies.

- The existence of a national strategy focused on ICT integration / e-learning is not a determining factor for the national priority regarding this issue, nor does it necessarily reflect the actual level of ICT integration / e-learning among the universities of the country in question. However, the universities regard the national priority and focus on ICT integration and e-learning as an important driver for ICT integration.
- The main drivers for ICT integration / e-learning at a national level are the internationalisation and globalisation of education, student demand for ICT, and the universities' need to improve the quality and effectiveness of both their teaching and administration.
- The national strategies and action plans are focused primarily on infrastructure, the development of digital content, co-operation and the establishment of virtual universities.
- National institutions play a very important role in co-ordinating and initiating large-scale projects which the universities cannot undertake on their own.
- National virtual universities are being established in several countries, using a variety of different models. There are virtual umbrella institutions that have created portals for the distribution and/or development of e-learning courses, as well as national programmes designed to establish partnerships among those universities that are capable of developing e-learning courses.
- The quality assurance and accreditation of e-learning courses is recognised by the virtual universities as being an issue, but in most Member States and universities no particular initiatives are being taken.
- The interoperability of systems is an issue that ministries and universities are working on continuously.
- There is only limited action being taken on metadata standards, even though the evidence of experts suggests that it is vitally important for the future development of ICT in universities. The lack of attention being paid to this area limits the potential for extending the use of ICT in universities.

## 8.2. Future trends and challenges regarding the use of ICT and e-learning in EU universities

### 8.2.1. Organisational setting

The study indicates that the EU universities face major challenges if they are to promote ICT integration and e-learning from the project level to a more strategic one.

The analysis indicates that the involvement of management is of key importance in this development. In the years to come, ICT integration and e-learning will tend to shift from being project-based and experimental to becoming integrated into the normal functioning of all the universities' activities. Ensuring the further development and sustainability of ICT integration and e-learning is the future major challenge for management. These are manifold: setting up digital services, developing technological infrastructure, making ICT systems interoperable, developing ICT competences among teachers, entering or expanding into the market of e-learning, and considering the possible formation of networks with other universities in the areas of ICT integration and e-learning.

The study shows that having an ICT strategy is a key driver for ICT integration and e-learning, and with all the challenges ahead, it seems almost a prerequisite that the universities of the EU should have formulated an ICT strategy.

The development of common standards and compatibility between administrative and learning systems will become ever more important as ICT is further integrated into the universities. The demand for common metadata standards will grow as more universities expand their use of e-learning and more learning resources are developed.

Our study indicates that the existence of an effective and efficient ICT unit and support structure is a precondition for the successful use of ICT. Central units offering professional support and guidance concerning ICT are of key importance. In the future, ICT will not be limited to particular projects and organisational structures. It will be an element in all aspects of the organisation, and the ICT unit will therefore have even greater strategic importance.

On the other hand, there is still a need for bottom-up initiatives in order to ensure local grounding, involvement and innovation. Personal experience and enthusiasm is a key driver today, and will also be so in the future. To summarise: in order to integrate ICT successfully, both a top-down and a bottom-up approach are needed.

In the field of ICT, supporting the staff is essential, and this is considered to be a major task for the universities in the future. The staff need both technical and pedagogical support. Both teachers and students are already being offered courses and support in many universities, but the incentives for facing the challenge of integrating ICT into teaching do not match up to the commitment and interest that are required to implement it. In the years to come, incentives for the individual faculties, institutes and teachers to push the development of ICT further must be developed. The incentive to do so might be based on an awareness of the benefits obtainable from the integration of ICT, and making extra time available to the teachers for developing course material.

### 8.2.2. Educational setting

The integration of ICT into campus teaching and e-learning courses will not represent the future for all EU universities. Still, across the EU Member States the emphasis is very much on increasing the use of ICT on campus and offering courses in e-learning format – indeed, on the basis of the study findings, it seems likely that one of the universities' main focus activities over the next two years will be to increase the number of such courses.

The challenge will be to move from using ICT in individual initiatives to transforming it into a component of mainstream education. The development of didactic models based on good practice will be an issue, and creating sustainability – including in the financial sense – is of key importance.

The issues of quality assurance and accreditation systems will be sharpened further in relation to both campus-based teaching and e-learning courses in Europe. There are also other important issues, such as the development of ICT-based teaching material, the development of teachers' competences and, on a smaller scale, the development of students' competences.

To integrate ICT into their teaching effectively, teachers must completely rethink their subjects and start doing things in new ways. A key challenge in future years lies in showing teachers the potential of ICT and then supporting them in achieving their ICT-related objectives. The emphasis will be on developing their knowledge about the new pedagogical models that are facilitated by ICT, and on sharing best practice experience.

Digital content will be increasingly prevalent. ICT will be better integrated into higher education curricula, which in turn will increase the demand for ICT-based teaching material. However, the quality of e-learning content needs to be improved and assured. Clearing-houses capable of supplying advice on standardisation, pedagogical issues and course development may be developed. The pressure for the development of common standards will increase. It appears probable that US trends will reach Europe, with teaching materials being mass-produced, and the process becoming industrialised. Teams of specialists will be developing course material. It will be important to resolve the issues concerning i) the legal framework governing intellectual property rights and ii) payment systems to improve the sharing and re-use of learning resources. Meanwhile, such developments will begin to challenge the values of academic freedom and the importance of teaching based on the teachers' own research.

### 8.2.3. Virtual, physical and social mobility

In the future, virtual, physical and social mobility will also be a key priority at both European, national and university levels. Virtual mobility will shift from the project level to more institutionalised settings involving national agreements on mobility among universities.

Enhancing accessibility through various means is a key issue for the future, and ICT integration and e-learning are seen as important tools for bringing it about.

Lifelong learning is a key political priority, and the universities are increasingly focusing on supplementary training.

### 8.2.4. Co-operation, partnerships and new business models

One of the main experiences to emerge from the co-operation that has taken place so far among the universities, as well as with other suppliers of education such as private sector partners, is that the establishment of successful co-operation takes time. It needs to be founded on a 'win-win' strategy for all the partners involved, and all the parties must be willing participants. The current tendency in the EU Member States seems to be to move away from intentions to construct nationwide virtual universities to the support of existing networks instead, or the establishment of new sub-national scale virtual universities.

## Future models and the need for co-operation at national level

The involvement of EU universities in national co-operation will continue, and will increase in terms of both the volume and level of co-operation. The study indicates that the joint development of study programmes and joint content production will multiply. The institutions will continue their involvement in strategic partnerships, and new partnerships are likely to evolve.

In addition, there seems to be a trend among the big national networks to move away from education ministry funding towards self-sustaining initiatives.

## Future models of, and the need for, trans-national co-operation

From the results of the study, there seems to be a trend towards increased trans-national co-operation among the EU Member States. One of the main reasons for this is the existence of an educational market that lies outside the EU. Another reason is the extended integration of the ECTS system, plus the support for increased co-operation arising from the Bologna process.

In the course of the study the universities have pointed to some of the areas where extended EU and national co-operation are needed, such as the support and funding of pilot and development projects, the further development of common technological standards, and the development and sharing of learning material. All of these are regarded as being key priorities.

The extended development of the ECTS system and the progression of the Bologna process at European level are generally regarded as being important drivers for the further development of co-operation among the Member State countries, but still-inflexible national systems are hindering longer-term partnerships and the development of joint degrees.

## Future models of, and the need for, partnerships with private sector partners

The study points to a clear tendency for the universities to become more involved with private sector partners. However, overall interest has weakened because of the general economic situation, and in addition the general experience has been that the business ethos is not readily compatible with that of the universities. The profit motive is sometimes hard to assimilate into the logic of the university. Private companies could, however, be involved in more limited roles.

From the results of the study, there seems to be a trend away from project-based co-operation with different public and private sector partners towards consortium-based models. One future business model appears to be a consortium that includes several different types of partner (technology vendors, multimedia companies etc.).

## 8.3. Four scenarios for EU universities

The cluster analysis of the EU universities shows that the future use of ICT and e-learning will grow rapidly among the universities of all four clusters. The common denominators of the development will be:

- The use of ICT in the organisational setting will grow.
- The vast majority of universities will have digital services within 1-2 years.
- Courses for students and teachers on the technological and pedagogical issues affecting ICT integration are expected to increase.
- The supply and usage of e-learning courses for basic academic training and supplementary training will increase significantly.

This is the scenario for all four clusters, but it is evident that their pace of development will vary, and that the gap between the highly advanced universities and those that are still struggling with their initial ICT development is likely to increase in future years. This is also true of their involvement in strategic co-operation and partnerships. Almost all the front-runner and co-operating universities expect to develop their co-operation with other universities in a variety of ways, while the self-sufficient and sceptical universities have very limited plans to do so.

The cluster analysis points to the following four developments and scenarios for the four clusters.

### 8.3.1. A scenario for the front-runner universities

The front-runner universities have already implemented a high level of technological infrastructure, and they are well ahead in integrating ICT and e-learning in both their organisational and educational settings. The continued development of ICT, an increase in e-learning courses, and an incremental upgrading of technological infrastructure, teachers' competences and the support being given to teachers and students are top priorities, implying that the front-runner universities will increase their pace and their lead among the universities of Europe.

The future scenario for the front-runner universities seems to revolve around partnerships, and we expect them to be increasingly involved in partnerships with both national and foreign universities and other public and private sector partners. The front-runner universities are either in the process of developing, or have plans for jointly developing, study material and study programmes, as well as supplying e-learning courses in conjunction with both national and foreign universities and private actors. In this regard they will truly be setting themselves apart from the remainder of the universities.

This implies that the front-runner universities will play an ever more active role in their societies in relation to regional development and the reinforcement of the lifelong learning paradigm. These universities have a potentially important role to play as a link between the public and private sectors, as well as between research, academia and the outside world.

### 8.3.2. A scenario for the co-operating universities

The co-operating universities are not as enthusiastic as the front-runners in their plans and priorities for the development of ICT, and their lower level of priority in this area suggests that they will generally fail to catch up with them.

Their focus will be on strengthening their teachers' competences and technological support, and on increasing the proportion of their e-learning courses and the number of students taking them. They will continue their co-operation with national and international universities, and will support their extended e-learning focus by increasing their co-operation with other universities in the joint provision of e-learning. International co-operation will be an objective, but they are more hesitant towards co-operating with private sector partners.

### 8.3.3. A scenario for the self-sufficient universities

The future for the self-sufficient universities appears to consist of the internal consolidation and development of ICT-based study material and e-learning courses within their own institutions.

There is a slight tendency towards opening up to the outside world, since some parts of them will engage in extended national co-operation on the joint development of ICT-based study material. The joint development of programmes or e-learning courses and international co-operation will be incorporated into their actions and strategies only slowly. Co-operation and partnership with other actors, e.g. private companies, is not on the agenda.

#### 8.3.4. A scenario for the sceptical universities

In general, fewer universities in the fourth cluster have indicated that any of the initiatives presented in the questionnaire will comprise key priorities than is the case for the universities in the other clusters. This indicates that the cluster four universities do not plan to strengthen their ICT development in order to catch up with the other universities. Some of them recognise the importance of the ICT development and have a certain level of interest in it, but the level of scepticism and the low scale of key priorities indicate that such development will be relatively slow-paced. The focus will mainly be on the upgrading the technological infrastructure, and to some extent on supporting teachers and students.

# 9. Recommendations for future action

On the basis of its analysis and the conclusions arrived at in the study, PLS RAMBOLL Management has produced the following recommendations. These recommendations are targeted at the respective levels involved in higher education:

- EU level
- National level
- University level
- Areas in need of research within the field.

## 9.1. EU level

In general, the EU-level recommendations revolve around the facilitation and dissemination of experiences and good practice. Many universities lack inspiration from other universities that are undergoing similar processes or which have experienced some of the same challenges, and the EU has an opportune potential role in facilitating these interactions.

- Several countries have suggested that an association should be formed out of those European universities which are experienced in e-learning and are interested in offering joint degrees, as well as in generally publicising of good practice and experience relating to ICT pedagogy and content development. We recommend the EU either to directly support such an initiative or to assign this task to an existing organisation. The association could take up the task of disseminating experiences and good practice on the Web.
- Quality assurance and assessment procedures for e-learning are potentially a key issue in future, when the development of e-learning courses and joint ICT-based material begins to take shape. These issues are generally handled at university level, but the study showed that there is still a very long way to go before quality assurance models are developed. We therefore suggest that the EU should initiate support for the development of quality assurance systems by universities. Additionally, extended international co-operation will call for systems focusing on quality assurance standards. The EU initiative could first and foremost pay attention to the development of common standards for quality assurance. In addition, the EU could take it upon itself to disseminate good practice from pre-existing models, and to compile and disseminate checklists of issues that must be taken into account in developing the quality assurance standards.

- The lack of high-quality ICT-based learning material is a key barrier. The process is very resource-hungry, and requires competences that extend beyond disciplinary boundaries. Therefore the EU should encourage and support the development of learning resources in its future eLearning Programme. Additionally, we recommend that the EU should take an active role in supplying advice on pedagogical issues and course development.
- The development and application of common metadata standards is considered to be of key importance for the future development and sharing of digital learning resources. However, there is a need for clarification concerning the issue of whether the metadata used in European higher education should conform to industry standards, or whether separate standards should be developed in accordance with the pedagogical models that exist in Europe. PLS RAMBOLL Management recommends that the EU should take the initiative to involve representatives from universities, Member States and the business sector in a debate to clarify the issue and reach a decision. The EU is encouraged to investigate the options and to support initiatives for setting common European metadata standards. Additionally, the EU could consider whether a criterion or requirement should be included in the new eLearning Programme for the universities to demonstrate how they are intending to implement the metadata standards.
- Intellectual property rights and payment systems must be regulated in order to increase the sharing and re-use of learning resources. The EU is encouraged to investigate the options and to support initiatives to resolve this issue.
- There is a general trend in the direction of extended partnerships both within and across national borders. However, the study points to a need for EU-level facilitation and support in order to bring together relevant partners sharing common interests and a similar approach and organisational culture. The universities need information concerning what other universities are at a similar stage and facing similar challenges, or which other universities they could learn from. The EU could consider developing a website that includes good practice examples and a 'bank' of potential university partners. Additionally, PLS RAMBOLL Management recommends that the eLearning Programme should involve a strong emphasis on the development of partnerships.
- In this connection, the EU is encouraged to stimulate the establishment of centres of excellence that can assist the universities in jointly targeting new university education markets both inside and outside the EU.
- There is a trend towards the extended involvement in partnerships and co-operation with both other universities and private sector partners. The study

has demonstrated that the development of a workable business model is an important prerequisite for this process to succeed, and that the universities are relatively inexperienced in this area. The EU is encouraged to develop and disseminate guidelines for the development of business models for various forms of partnership, and to highlight relevant good practice examples.

## 9.2. National level

- It is crucially important that ICT integration in universities should be labelled as a key priority at the national level, and that strategic goals and objectives should be defined. Whether these are set out in a strategy targeting ICT in universities or are integrated into broader strategies that for instance cover the entire field of higher education or the knowledge society is of subordinate importance.
- The existence of national or regional institutions committed to ICT is of key importance. Such institutions can either kick-start ICT development or give it extra impetus and steer it in a certain direction by supplying means, support and guidance. The development or support of such national institutions is recommended.
- The development of networks which will ensure the general dissemination of good practice and experience in using ICT pedagogy and content development is highly desirable. The national level is encouraged to support such networks.
- The extended development of the ECTS system and the Bologna process is supporting increased co-operation between countries, but still-inflexible national systems are inhibiting more long-term partnerships and the development of joint degrees. The national level is encouraged to start initiatives to increase the flexibility of the national systems, and to participate in the development of common standards or agreements in this area.
- Quality assurance and assessment procedures for e-learning must be developed in order to support e-learning and virtual mobility. This equally applies to accreditation, certification and student authentication. These issues are generally handled at the university level, but the national level is encouraged to support initiatives leading to common standards or agreements.
- The development and use of common standards for metadata is considered to be of key importance for the future development of ICT integration and the sharing of digital learning resources. The national level is encouraged to participate in trans-national initiatives concerning the setting of common European

standards, as well as to prioritise metadata standards and support their use and development by integrating this issue into national strategies and action plans.

## 9.3. University level

- Our analysis indicates that the possession of an ICT strategy is a key driver for ICT integration. Universities are recommended either to develop a specific ICT strategy or to integrate ICT into their general university strategy.
- There is no ideal 'one size fits all' e-learning and ICT integration model. The integration of ICT and e-learning must correspond to the goals of the university and support them accordingly. A holistic view of the university's goals and challenges is recommended, combined with the consideration of which of their aspects ICT is capable of supporting. ICT should be seen as a tool for meeting challenges, not as a problem area.
- Pilot projects are important, but it is recommended that universities should start focusing on integrating ICT into their normal operation and find sustainable models for doing so.
- The involvement of management is crucial to ensuring that the integration of ICT is implemented across the university's operations in their entirety, and does not simply remain stuck at the project level.
- The dissemination of good practice and experience with ICT pedagogy and content development is recommended at university level, as is participation in national and trans-national networks.
- An effective and efficient ICT organisation and support structure can be a driver for ICT integration and e-learning, and is a precondition for the successful application of ICT in all aspects of a university's activities. An organisational structure encompassing professional support for the integration of ICT alongside room for local initiative is recommended for ensuring both professional development and grounding.
- For many years, dedicated enthusiasts have been of key value in integrating ICT. In order to support the integration of ICT into the overall operation and activities of the university, the stimulation of the intermediate group of faculties and teachers is recommended, as they are the principal entities which will be crucial for expanding and anchoring the development of ICT integration.
- The chief barriers to the integration of ICT are negative attitudes towards ICT, coupled with inadequate ICT knowledge and ICT skills. It is recommended to:

1) Provide incentives to involve the university as a whole, and the university staff in particular, in the development of ICT integration. Teachers need to be rewarded for good teaching. The career development structure for teachers should be developed further, and ICT competences should be an element in this. This should also be linked to the payment structure; 2) Ensure training in the technical, and even more importantly, also the pedagogical use of ICT; 3) Provide both technical and administrative support to the teachers; and 4) Resolve the issue of how professors and teachers should be paid for the development of content.

- Quality assurance and assessment procedures for e-learning must be developed in order to support e-learning and virtual mobility. The same applies to accreditation, certification and student authentication. These issues are generally handled at university level, but participation in trans-national initiatives is encouraged in order to facilitate trans-national mobility.
- The lack of high-quality learning material is a key barrier. The universities are encouraged to develop learning resources and share them with other universities.
- The use of common standards for metadata is considered to be of key importance for the future development and sharing of digital learning resources. The universities are encouraged to apply metadata standards, as well as to participate in trans-national initiatives concerning the setting of common European standards.

## 9.4. Areas in need of further research

Interviews with experts and government representatives, as well as the case studies, have pointed to the desirability of further research in the following areas:

- Pedagogical and didactic issues: There is a need for research into e-learning pedagogies and the pedagogical interactions between the students and their teachers/tutors. Other areas are: How to develop a ‘social infrastructure’ for e-learning which ensures that students do not too easily drop out; How to increase the user-friendliness of tools; How to use virtual learning environments to create more effective learning settings; The lack of knowledge about the risks and consequences of taking particular approaches to e-learning.
- Organisational issues of ICT and e-learning in higher education: The management of innovation, the sustainability of solutions, and how to increase the receptiveness of university managements towards innovation.

- Cost/benefit studies of ICT and virtual learning: Where is ICT effective? Where do we need ICT (indeed, *do* we need ICT)?
- Best practice in terms of content development. Development of common standards.
- Have ICT and e-learning changed the evaluation and examination procedures? Is there a need for the development of new evaluation procedures?
- Are the physical surroundings a barrier for the extended use of ICT on university campuses? What comprises best practice for the improved support and facilitation of the use of ICT in terms of the layout of the physical environment?
- Has the extended use of ICT and e-learning changed the picture among Europe's universities concerning student fees? What are the future models of student fees?
- The development of ways to evaluate and assess the quality of e-learning. How to quality assure and accredit e-learning courses.
- Changing the attitudes and culture of teachers: How can incentives for the improvement of teaching and the use of Web-based learning environments be created?
- Gender aspects: Why are the majority of students taking online courses in Sweden female? Is this an international trend, and if so, why? How can online courses be made more attractive to men?
- Problems of scalability: How can ICT pilot projects undertaken in one or two departments be successfully scaled up to encompass entire universities?

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