LEARNING TECHNOLOGY IN TRANSITION

FROM INDIVIDUAL ENTHUSIASM TO INSTITUTIONAL IMPLEMENTATION

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Institutional Implementation of ICT in Higher Education: A Dutch Perspective

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The environment in which higher education institutions have to operate has changed significantly in the last decade and is still changing. New student populations, governmental policy, new conceptions of learning and many other changes related to technological developments are causing higher education institutions to rethink their way of teaching and doing research. In the Netherlands these changes can also be seen. This chapter will discuss the changing context in Dutch higher education and describe the current experiences of teaching and learning with Information and Communications Technologies (ICT). Learning models and how these relate to the use of ICT in higher education will be discussed and conclusions about the current and future use of ICT in Dutch higher education institutions will be drawn.

Factors That Influence Changes in Higher Education

In research about changes in higher education it can be seen that the changes most important to higher education institutions are initiated externally (e.g. Levine, 2000; Bates, 2001; Fisser, 2001; Middlehurst, 2003). Examples of these external influences are governmental and policy developments, demographic changes, market forces, the knowledge economy, internationalisation of higher education and lifelong learning. Furthermore, it is well known that higher education institutions have to react to these external changes in order to survive. The use of ICT is seen as one

of the responses to these external changes. ICT has enlarged the opportunities available for higher education organisations and is having an effect on the traditional modes of production, ways of communicating with students, organizational structures, budgeting and accountability mechanisms and quality assurance procedures. However, as Fisser (2001) shows in her overview framework of factors that could have an impact on the use of ICT in education, alongside the external influences, institutional conditions could have an influence on the use of ICT. Fisser (2001) categorised factors that effect using new forms of ICT in education into six groups, listed in Table 1.

An important issue to consider is how individual Dutch higher education institutions adapt to the external and internal developments. Do they use ICT for reducing geographical distances in order to make these distances less of a barrier for both students and higher education institutions? Or do they change the roles of instructors or make use of more flexible curricula and new teaching and learning paradigms? In relation to this, one can wonder whether Dutch higher education institutions are in the process of providing quality education for rapidly diversifying student cohorts (Middlehurst, 2003), for which the ideal mode of delivery is a mix of on-campus and flexible learning (Bates, 2001). These are some of the questions we will address in this chapter. We will not only look into the current situation of the use of ICT in Dutch higher education, but will also focus on some of the future perspectives.

Table 1. Summary of factors that effect using new forms of ICT in education.

Category	Factors	
Environmental pressures	New market	Competition
	Education as business	Response to threats and opportunities
	Part-time students	Flexibility
	Lifelong learning	Knowledge management
	On-demand training	Changing student demographics
	Funding	Demands from employers
	Partnerships	Demands from learners
	Tailor-made products	
	Dynamic environment	
Technology developments	Emerging technology	New technology (push, hype)
	Dependence on IT	
Institutional conditions	New organisational structure	Concrete plans
	Broad participation	Improved access to education Leadership
	Shared vision	
Educational developments	New conceptions of learning	Individual differences
	New teaching models	Active learning
		Focus on learner/learning
Cost reduction / Cost-effectiveness	Reducing costs	Benefits
	Cost-effectiveness	
Support facilities	Administrative support	Availability of technology
	Educational and technical support (including staff development)	Availability of facilities

Drivers for Change for Dutch Higher Education Institutions

The Dutch higher education system is a binary or dual system, consisting of both universities and universities of professional education. Alongside these two major sectors, higher education is also provided through the Dutch Open University. The Dutch higher education system typically combines a centralised governmental policy with a decentralised policy (institutional autonomy) for the administration and management of the higher education institutions. With respect to the use of ICT this means that, contrary to the existence of some central governmental ICT policy for the primary and secondary education sector, governmental ICT policy for the higher education sector hardly exists. However, there are some semi-governmental funded initiatives that can be seen as the main drivers for change with respect to the use of ICT within Dutch higher education. These two initiatives are the SURF Foundation and the Dutch Digital University, two organisations that promote the use of ICT in higher education.

The SURF Foundation

The mission of the SURF Foundation is to exploit and improve a common advanced ICT infrastructure that will enable higher education institutes to better realise their own ambitions and improve the quality of learning, teaching and research (Stichting SURF, 2003). The SURF activities are funded by the higher education institutes in the Netherlands as well as by the Dutch government. One of the programmes within the SURF Foundation is the SURF ICT and Education Platform. This platform has generated a wealth of experience and products and paved the way for further cultural changes. Building on four years of successful tenders for innovation projects, the SURF ICT and Education Platform will support innovative projects during the next few years. Each year one or more themes will be adopted, in which modernisation projects that complement and strengthen each other will be subsidised and implemented via a tender. Institutions in collaboration with each other write the project plans within this tender. The platform itself initiates various projects, which promote, for example, systems integration or putting in place the use of standards.

The Digital University

The Dutch Digital University is a consortium of ten higher education institutions in the Netherlands. It focuses on the development and application of digital educational products and knowledge for higher education (Digitale Universiteit, 2002). Important issues for the Dutch Digital University are a changing demand for education, combining working and learning, permanent education, the role of e-learning and the need for cooperation. The Dutch Digital University aims to set up a relevant knowledge network, share expertise and, last but not least, share the financial burden of innovation. The projects of the Dutch Digital University can be divided into five programs:

- Digital testing, assessments and digital portfolio;
- Digital educational tools: tasks and resources;
- Learning and coaching from a distance: dual, virtual and international;
- Building up and disseminating expertise;

- Electronic Learning environments (standardization and interoperability).

In addition to the activities of the SURF Foundation and the Dutch Digital University, many projects have been set up within the individual higher education institutions. How these and other initiatives have influenced the use of ICT in higher education will be discussed in the next section.

Current Experiences of Teaching and Learning With ICT

In describing the Dutch situation, with respect to the use of ICT, we will rely heavily on the work of Collis and Van der Wende (2002) who conducted an international comparative study of 'Models of Technology and Change in Higher Education' in the Netherlands, United Kingdom (UK) and Australia. An overview will be given of the results for Dutch higher education (more detailed information can be found in De Boer and Boezerooy 2003).

In the last decade, at all levels in Dutch higher education institutions, innovative ICT experiments have been conducted. Many of these institutions have expanded the pioneering stage through the so-called '1,000 flowers blooming' phase, to faculty and even institution wide managed change or the so-called 'bottom-up to top-down approach' (Fisser, 2001). An important condition for innovative use is a high level of technical infrastructure. The technical infrastructure of the Dutch higher education institutions (supplied via SURFnet, part of the SURF Foundation) is one of the world's fastest and most advanced networks. Speed, reliability and security of the network are the key issues. De Boer and Boezerooy (2003) note that an estimated 400.000 staff and students of over 200 organisations (including the Dutch universities, universities of professional education, academic hospitals, research centres and (scientific) libraries) are connected to SURFnet. Students and staff of higher education institutions can have access to SURFnet from both the office and at home.

Another important factor for fostering innovation is institutional policy. There are many external or environmental pressures and institutional conditions that can have an effect on the institutional policy with respect to the use of ICT. These pressures and conditions are highlighted in the definitions and descriptions given by Collis and Gommer (2000) and Collis and Moonen (2001) of four main scenarios for educational delivery that can have an influence on the institutional policy (see Figure 1). The scenarios are situated within two dimensions (or lines of change). The first dimension relates to the extent to which institutions focus on local or global issues. The second dimension relates to the extent to which the institution or the lecturer controls the quality of the program.

In Scenario A (Back to Basics), the higher education institution offers on-campus activities, in which the institution controls the program. Furthermore, there is hardly any flexibility for the 18-24 years old on-campus students. However, in this scenario it is also the case that many higher education institutions are starting to experiment with distance participation in their established programs. This can lead to Scenario B (The Global Campus). In this scenario the institution also controls the program, but there is a focus on more diversified off-campus student groups. Scenario C (Stretching the Mould) relates to increased flexibility with or without

Scenarios	*Where local and face-to-face transactions are highly valued*	*Where local and face-to-face transactions are highly valued*
In which the institution offers a program and ensures its quality	**SCENARIO A** Quality Control of a cohesive curriculum, experienced in the local setting. **Back to Basics**	**Scenario B** Quality Control of a cohesive local curriculum, available globally. **The Global Campus**
In which the institution offers a program and ensures its quality	Scenario C Individualisation in the local institution. **Stretching the Mould**	Scenario D Individualisation and globalisation. **The New Economy**

Figure 1. Four scenarios for educational delivery (Collis & Gommer: 2000: 32).

changing the underlying pedagogical model within the institution. Furthermore, institutions offer more flexibility for participation within their pre-set on-campus programs. Scenario D, The New Economy, is the most radical; a student can make his own decisions about what, when, how, where, and with whom he learns.

De Boer and Boezerooy (2003) used these four scenarios as a framework for describing the current use of ICT in Dutch higher education institutions. They found that Dutch higher education institutions mainly focus on the traditional on-campus activities, in which face-to-face contact and contact between the instructor and students are two of the most important aspects. At the same time there is less emphasis on offering time and place independent learning for a diversified target group. In Dutch higher education, teaching and learning with ICT is mainly aimed at the 18-24 years old students and there is far less emphasis on international students and lifelong learners. In addition to the emphasis on offering time and place independent learning, Dutch higher education institutions only offer a moderate choice in the programs they offer. The institutions decide upon the programs they offer and these programs are in principle fully planned, with some individual choices for students. Institutions offering highly flexible programs in which students can choose more or less their own combinations are rare inside the Netherlands.

With respect to the use of ICT in teaching and learning De Boer and Boezerooy (2003) found that technology, in terms of e-mail, word processing, PowerPoint and Internet has become standard as part of the teaching and learning process. This trend can also be seen for the implementation and use of the electronic or virtual learning environments (VLE) in Dutch higher education. Almost all of the Dutch higher education institutions have implemented or are implementing an electronic learning environment. The most popular systems are Blackboard, WebCT and Lotus Learning Space, as well as home made systems such as TeleTOP, Polaris and N@Tschool.

One of these electronic learning environments, TeleTOP, has been developed at the University of Twente. An analysis of the use of TeleTOP was undertaken by De Boer (2003) and from this analysis it appears that most faculties at the university have implemented TeleTOP. The implementation of course environments in TeleTOP started most commonly with first year courses, followed in the next year by second year courses and so on. In the academic years 2000/2001 – 2002/2003, 2766 TeleTOP course environments were set-up at the university of Twente. Of these TeleTOP environments, 83% (2268) were produced for courses, the other environments were used as project environments. The average number of TeleTOP course environments that are being produced has been about a 1000 per year. Furthermore, the analysis showed that 73% of the 2268 course environments were actually used for course support, in which the instructor was responsible for the content (teaching and learning materials) and the students had access to the environments. A minimal requirement for the use of TeleTOP is that for each course environment at least five documents had to be placed in the environment. The average number of the TeleTOP documents that an instructor placed to the environment is around 105 documents. It is interesting to note that the larger the student groups, the more documents an instructor placed in TeleTOP.

Although standard applications and electronic learning environments such as TeleTOP have become a more common phenomenon in the teaching and learning process they have not radically affected the nature of this process. The instructor is and will remain the "core medium". This indicates that the classroom orientation model is the most common model used within Dutch higher education; a model in which instructors and other actors highly value the face-to-face interaction and direct communication between instructors and students and among students (see Table 2 for results of a survey of decision-makers, support staff and lecturers). However,

Table 2. Use of technology in Dutch higher education: Part of a blend.

Features	**Scale (1-5)**	**Mean (N=57)**	**SD**
How much interaction with the instructor occurs in the course?	Very low amount-Very high amount	3.30	.71
How much interaction among the students occurs in the course?	Very low amount- Very high amount	3.32	.66
How are the learning materials used in the course acquired??	All predefined/ acquired by the instructor- All found or created by the students	2.91	.58
How does the student participate in the course?	Individually- As part of a group	2.91	.61
How much of the course is web-based?	None- Entire course is web-based	2.89	.72
How does the student communicate within the course?	Face to face- Only via computer	2.88	.38

the more flexible ways of learning, such as communication via the Web or more flexibility for students in choosing their teaching and learning materials, are gaining interest in Dutch higher education. They do not replace the traditional on-campus settings, but complement them and become part of the blend of on-campus delivery.

Future Expectations for Learning Models and Related ICT: From Back-to-the Basics to Stretching The Mould?

In the precious section, four different scenarios for educational delivery were outlined. De Boer and Boezerooy (2003) report on results of a survey where decision makers, support staff and lecturers in Dutch higher education institutions were asked to indicate the extent to which these four scenarios exist now and the extent to which they would exist in the future (2005). The results, as outlined in Table 3, reveal that on-campus activities for the 18-24 years old students dominate both current and future descriptions of practice.

Whilst face-to-face contact with the traditional (18-24 year old) student groups will remain important in the future, ICT will become increasingly part of the blend of technology and traditional ways of teaching and learning. Furthermore, no real dramatic changes in mission, profile or market position are expected, especially not with respect to new target groups like international students and lifelong learners. Nevertheless, Dutch institutions are gradually "stretching the mould"; offering more flexibility in changing their procedures, models and programs as a process of change from within. It seems that within courses more flexibility is going to be offered. These changes, however, are gradual and usually slow and may comply with the slight changes in needs and demands as perceived by the institutions.

Table 3. Extent to which typical learning settings occur now and in the future (DeBoer and Boezerooy, 2003).

Scenario	**Typical learning setting (N=57)**	**Now**	**Future**
		Mean (SD)	***Mean (SD)***
A	Back to the basics	4.55 (0.75)	4.23 (0.82)
B	The global campus	1.70 (0.78)	2.76 (1.03)
C	Stretching the mould	3.50 (1.07)	4.14 (0.79)
D	The new economy	1.52 (0.78)	2.70 (1.12)

1=little or none, 3=some, 5=very much the case

It is interesting to compare these results with those of some of the other countries involved in the international survey (Collis & Van de Wende, 2002). Results from this comparison indicate that for UK and Australian higher education institutions the most common scenario for describing their current situation is the "Back to Basics" scenario. Predictions for the future however, reveal a move towards widening the opportunities for distance learning. This opening and stretching of the traditional course model (De Boer & Collis, 2003) seems a way for actors within the higher education to meet demands such as lifelong learning and providing programs for international students. However, Dutch higher education institutions are far less concerned with meeting the demands of international students than their UK and Australian counterparts (See Chapters 8 & 9).

Conclusion

As in many other countries, the impact of ICT in Dutch higher education has been considerable, but also very diverse. In the 80s and the 90s many experiments were started within the individual higher education institutions and many of these experiments have become institutionalised. However, this does not (yet) mean that the introduction and development of ICT has had the wide-ranging effect on the teaching and learning processes in Dutch higher education institutions that was expected or predicted by many people.

With respect to the near future, De Boer & Boezerooy (2003) report that Dutch higher education institutions do not expect any revolutionary change as a result from or related to the use of ICT. There is not really a concern about being forced to change by either external forces or institutional developments. But these factors are having an influence. With a strong institutional policy and important key actors that promote the use of ICT in education, more ICT initiatives are becoming institutionalised. Even though ICT in education has promising possibilities in relation to distance learning and online learning, campus-based variations, which offer more flexibility, will be a primary focus both now and in the future. Nevertheless, modest changes will occur in relation to distance learning, but only parallel to the on-campus mode, not replacing it.

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