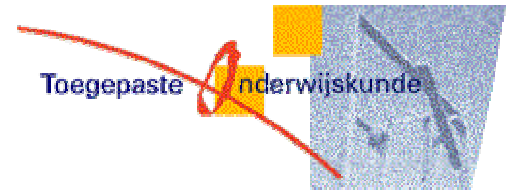


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Policy Studies



Models of Technology and Change In Higher Education

**An international comparative survey on the current and
future use of ICT in Higher Education**

Edited by

Betty Collis & Marijk van der Wende

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5 ICT in teaching and learning: Part of a blend

The second dominant theme in the responses is that ICT use, in terms of e-mail, word processing, PowerPoint, and the Web, has become standard as part of the teaching and learning process. But this has not radically affected the nature of this process; rather, ICT has become part of the blend of on-campus delivery.

The general picture seems to be that there is much ICT in use, not to replace traditional on-campus settings, rather to complement them. "Blended learning" using ICT (especially Web-based systems) combined with lectures, books, and other traditional media and ways of teaching is already the norm.

This trend is seen in terms of ICT policy and objectives relating to ICT, as well as in the way that ICT use has been implemented into practice, the ways ICT is actually being used as part of a blend, and the perceived effectiveness of its contribution.

5.1 ICT policy and objectives

The fact that ICT use is common relates to the policy of the institutions. Respondents indicate that 97% of the institutions have a formally stated ICT policy. In 54% of the cases this is a combined bottom-up and top-down type of policy: there is an institutional wide-ICT policy that serves as a framework for faculty-specific plans. In 19% of the cases the policy is bottom-up: faculty or department-levels formulate the ICT policy with no link to the institutional-level decision-making. In only 9% of cases, is the policy characterized as only top-down: an institution-wide policy to be implemented in all faculties. In the remaining cases, respondents were not aware of the nature of the policy (15%) or there was no policy (3%).

As for the objectives of the ICT policies of the institutions, quality improvement is prominent. In addition, the main objectives are related to the status, reputation and competitive position of the institution and to increasing flexibility. The previous chapter showed that ICT policies are indeed somewhat affected by the changing student demand, but not too much. This is again confirmed here (Table 12), in terms of a rather weak focus on new target groups.

Looking at which activities in the institution actually involve the use of ICT at present, it seems that ICT is especially linked to innovation in teaching and learning, which may well be related to the main objective of quality improvement. Furthermore table 13 again confirms that both at present and also in the future, the institutions are mainly focused on teaching the traditional student group. However, in the future, more focus is on teaching international students and providing lifelong learning.

Table 12: Main objectives of the ICT policies

Objectives of ICT policy (N=690)	Now	Future
	Mean	Mean
Enhancing quality	3.97 (0.93)	4.25 (0.82)
Enhancing status and reputation of the institution	3.87 (1.02)	4.27 (0.82)
Enhancing flexibility	3.76 (0.96)	4.13 (0.84)
Enhancing competitiveness	3.67 (1.09)	4.07 (0.91)
Increasing efficiency	3.63 (0.92)	4.04 (0.85)
Widening access to traditional students	3.33 (1.11)	3.67 (0.98)
Enhancing cost-effectiveness	3.19 (1.10)	3.75 (1.04)
Creating opportunities for life long learning	3.17 (1.13)	3.70 (0.98)
Creating opportunities for international students	3.07 (1.14)	3.57 (1.04)
Generating institutional income	2.45 (1.20)	3.34 (1.15)

1=none or low, 3=some, 5=High

Table 13: Extent to which current and future activities involve the use of ICT

Activities which involve use of ICT (N=690)	Now	Future
	Mean (SD)	Mean (SD)
Innovation in teaching and learning	3.41 (1.07)	4.10 (0.83)
Externally funded research	3.22 (1.25)	3.73 (1.06)
Teaching 18-24 years old	3.16 (1.02)	4.12 (0.85)
Internally funded research	3.03 (1.20)	3.45 (1.13)
Interaction with business and industry	2.81 (1.21)	3.49 (1.12)
Teaching international students	2.72 (1.14)	3.61 (1.09)
Providing lifelong learning	2.68 (1.19)	3.77 (1.09)

1=Low, 3=Moderate, 5=High

5.2 Implementation: the role of leadership and communication

Both decision makers and support staff were asked to indicate to what extent they consider their institution as being successful with regard to the overall use of ICT. The responses show that this success can be seen as average (mean = 3.38, SD=0.90), although decision-makers value the success somewhat higher than the support staff.

The fact that ICT has become part of the blend in traditional delivery is also related to the way that ICT policy has been implemented in the institution. Various actors play a role in the implementation of ICT policy in an institution. The ways in which they interact, e.g. take responsibility, show leadership, divide tasks, and communicate with each other, are important for the success of implementation processes. Decision-makers indicate that in almost half of the cases rectors have the formal responsibility for the ICT policy; in all other cases this responsibility has been decentralized. They also indicate that in the actual implementation of policies the central level is much less important. This is confirmed by data concerning the leadership taken in the implementation process (table 14). According to the total group of respondents, instructors and support staff are the most important actors in this respect (table 15).

Table 14: Formal responsibility and importance in implementation of ICT policy (as reported by decision makers; percentages of sample reporting)

Roles of actors (N=184)	Formal responsibility	Importance in implementation
Rector	47%	16%
Heads of departments	20%	20%
Deans	14%	12%
Support centre	8%	17%
Individual prof/instructor		27%
Other	11%	8%
Total	100%	100%

Table 15: Leadership of actors in the development and implementation of ICT policy (as perceived by all respondents)

Extent of leadership shown by actors (N = 690)	Mean (SD)
Professors or instructors	3.91 (1.04)
Support centre	3.49 (1.21)
Heads of departments	3.27 (1.09)
Rector	3.08 (1.26)
Deans	2.83 (1.16)

1=weak, 3=moderate, 5=strong

5.3 Technology use, teaching & learning practice

ICT as part of a blend, gradually stretching the traditional ways of teaching and learning, is clearly established. The general level of technology infrastructure in the institutions is valued as between average and high. The available technology is used more often for organisational purposes (including course preparation) and outside classroom activities than for communication and in-classroom activities (table 16). Furthermore, it seems that the use of e-mail and the use of Web resources is becoming a common phenomenon in the educational practice, whereas other ICT forms, such as wireless solutions and conferencing tools, are used little or in a much more limited extent (table 17).

Table 16: The extent to which ICT is used within the institution

Extent of ICT used (N=690)	Mean (SD)
Course preparation or organisational purposes	3.80 (0.98)
Via a Web environment used outside of classroom activities	3.63 (1.06)
For communication with and among students and instructors	3.07 (1.11)
In classroom activities	3.04 (0.95)
For a combination of classroom activities and Web activities outside classroom	2.83 (1.17)

1=rarely, 3=some, 5=extensively

Table 17: The extent to which technologies influence actual teaching practice

Influence of technologies on teaching practice (N=690)	Means (SD)
E-mail systems	3.94 (1.08)
Web resources	3.90 (0.96)
Web-based course management systems	2.53 (1.29)
Planning tools, such as network-accessible agendas	2.32 (1.15)
Externally available courses or modules, accessible via the Web	2.13 (1.09)
Conferencing tools (video, audio, chat)	2.00 (1.07)
Wireless solutions	1.77 (1.00)

1=very little, 3=some, 5=very much

Looking at the actual use of the various available tools and applications other than e-mail and Web resources (table 18) we can observe that most options are used only to a very limited extent (between "uncommon" and "somewhat"). Most popular (but only scoring just above "somewhat") are presentation tools (PowerPoint etc.), personal bookmark collections and database tools.

Table 18: The extent to which support staff estimate that the following technologies are being used within the institution

Tools used (N=132-148)	Mean (SD)
Information presentation tools	3.53 (1.19)
Personal bookmark collections	3.37 (1.37)
Database tools	3.08 (1.15)
Authoring tools	2.74 (1.15)
Course planning tools	2.63 (1.15)
Newsgroups	2.58 (1.13)
Course management systems	2.52 (1.26)
Instructional design tools	2.52 (1.21)
Testing tools	2.21 (1.01)
Tools for analysis and tracking student performance	2.20 (1.17)
Chat	2.19 (1.11)
Groupware	2.17 (1.10)
Whiteboards	2.13 (1.14)
Tools for on-line marketing	1.95 (1.01)
Desktop video conferencing	1.70 (0.86)

1=very uncommon, 3=somewhat, 5=very common

Table 19 shows that these types of rather basic use of available ICT options are usually focused on supporting the also basic processes of students writing reports, and instructors transferring knowledge (e.g. oral presentation or reading materials). All other instructional orientations are also used, but less often. It is interesting to see that the use of testing and other formal assessments still is not supported much through the use of ICT, although many software solutions are available on the market (table 19).


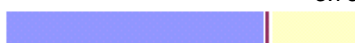
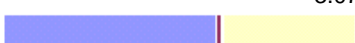




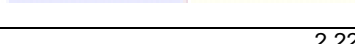
Table 19: The extent to which ICT is used to support certain orientations in a typical course

ICT used to support (N=347)	Mean (SD)
Students producing/creating reports and products using ICT tools	3.58 (1.32)
Knowledge transfer	3.57 (1.16)
Providing feedback on assignments	3.33 (1.30)
Skill development	3.23 (1.27)
Re-using materials made by someone else or found elsewhere (appropriate re-use, not plagiarism)	3.19 (1.27)
Connecting to prerequisite knowledge	3.19 (1.27)
Developing positive attitudes towards the discipline	3.05 (1.28)
Students planning their own learning processes	2.77 (1.28)
Giving guidance / Informally monitoring progress and effort	2.74 (1.30)
Motivating on-going participation	2.71 (1.30)
Offering access to course activities via the Web?	2.71 (1.30)
Giving feedback after formal assessments	2.65 (1.30)
Testing and other formal assessments	2.04 (1.15)

1=rarely, 3=some, 5=extensively

Table 20 confirms again that face-to-face interaction and direct communication between instructors and students and among students is still very important in the way in which instructors teach. ICT is used in a way that is complementary to this, but does not replace what traditionally has occurred in the teaching and learning process.

Table 20. Overview of how instructors teach their courses

Features	Mean (N=347)			SD	
	Very low amount		Very high amount		
How much interaction with the instructor occurs in the course?	Very low amount		4.08	Very high amount	.89
How much interaction among the students occurs in the course?	Very low amount		3.73	Very high amount	.89
With what type of knowledge does the course deal?	Stable knowledge		3.07	Newly emerging knowledge	.90
How are the learning materials used in the course acquired?	All predefined/ acquired by the instructor		2.80	All found or created by the students	.94
Does the course involve the appropriate re-use of materials made by someone else or found elsewhere?	Not at all		2.78	Very much	.98
How does the student participate in the course?	individually		2.65	As part of a group	.86
How much of the course is Web-based?	None		2.54	Entire course is Web-based	1.19
How does the student communicate within the course?	face to face		2.22	Only via the computer	.85

5.4 Perceived effectiveness

The perceived effectiveness of the use of ICT to support teaching and learning is between neutral and positive ($M=3.56$, $SD=0.76$). There were no significant differences found between the actors in this perception. Instructors are generally quite positive about the freedom they have to make choices in the way they use ICT. They seem to feel quite comfortable and confident about their own use, but at the same time they indicate that there still is scope for improving the ways in which they use it. Table 21 summarises some aspects of instructors' perceptions. More are discussed in the following chapter.

Table 21: Perceived impact of ICT on learning effectiveness according to instructors

Perceived effectiveness (N=347)	Mean (SD)
I feel I can make my own choices with respect to when and how I use ICT in my teaching-related work.	4.07 (0.88)
I feel comfortable and confident about my use of ICT for teaching-related work.	3.93 (0.98)
The use of ICT is becoming a normal part of the way I do my teaching-related work.	3.74 (1.08)
Using ICT is facilitating new forms of learning in my courses.	3.57 (1.07)
My students are satisfied with the learning value of the use of ICT in my courses	3.46 (0.84)
I am satisfied with the results of using ICT in my courses	3.44 (0.97)
My students are satisfied with the ease of use of ICT in my courses	3.33 (0.90)
I am satisfied with the way I use ICT in my teaching	3.28 (1.04)

1=very negative, 3=neutral, 5=very positive

In conclusion, the second main theme emerging from the study is related to the first: ICT use, in terms of email, PowerPoint, word processing and Web resources, has become commonplace, but in a way that only gradually is stretching traditional on-campus practices. The lecture remains the "core medium", the instructional form that is most highly valued. However, ICT has clearly become part of the blend, serving as a complement to already existing instructional tools. This notion of core and complementary media (Collis & Moonen, 2001) relates to the idea of blended learning, with ICT now clearly part of the blend.

Table 21 showed instructors to be generally neutral to somewhat positive about some aspects of their ICT use. In the next chapter, the instructor perspective is examined more closely.