Models of Technology and Change
In Higher Education

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

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2. Conceptual Framework

The conceptual framework of this study consists of a model predicting the variables that will have an impact on an institution's ICT and educational delivery approach. Section 2.1 gives an overview of the clusters of variables in the model. Section 2.2 shows the model, and Section 2.3 indicates how the model was used to generate items for the survey questionnaire.

2.1 Predicting ICT and educational delivery scenarios

There are many variables involved in an institution's decision to offer its educational program in a certain way to its students. These variables form a complex system, where each variable has an influence on the others, and where new impulses are continually challenging the system to make new responses. Such a dynamic system is difficult to capture and study. For this research, variables will be looked at individually that in reality never appear in isolation but in combinations with other variables. A model to study variables that influence an institution's dominant approach to educational delivery and the use of technology in this delivery will be by definition incomplete and overly simplistic. However, key variables can be identified that repeatedly have been shown to have a major impact on policy, implementation, practice, effectiveness, and eventually on an institution's general approach. In this section, we begin with what we want to predict with such a model (the outcome variables), followed by five sets of variables that can be hypothesized to have some linear relationship with each other and with the general-approach outcome variables. Although this conceptual framework is based on literature, it will not be presented as a literature study. Except where a direct reference is specifically called for, individual references will not be cited in the text. Instead, a selected bibliography concludes the report, which can be used as a basis for exploring the rationale for the different sets of variables in the conceptual framework.

The outcome variables: ICT and educational delivery

Two main lines of change in educational delivery can be identified (Collis & Gommer, 2001; Collis & Moonen, 2001). One relates to the local vs. global issue. Should the university move toward strengthening itself as a home base for its learners, or move toward a future in which its students little or never come to the home campus, via strategies such as multinational partnerships, satellite campuses or distance education? What if the individual university decides to go alone? Can it compete? Will the big partnerships dominate client attention? Or will a swing back to the basics occur, as a backlash against failed attempts at globalisation if these should occur? A second line of development relates to the program and content to be offered. How should this be obtained, and offered to clients? As total programs? As individual courses? As portions of courses (modules, or learning events of different types) which can be combined in different ways? What if the choose-your-own-combination idea takes root, stimulated by competition for fee-paying professional clients? Can the local institution handle this sort of individualisation itself? Many different ways could be found to zoom in on key aspects of these developments and emerging contexts. Figure 1 gives one analysis (Collis & Gommer, 2001; Collis & Moonen, 2001).
Figure 1. Four scenarios for educational delivery (Collis & Moonen, 2001, p. 199)

Scenarios of the future in which flexible learning will be part of a setting …

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 (current situation)
*Back to the basics*

Scenario B
Quality control of a cohesive local curriculum, available globally:
The Global Campus

Where global and network-mediated transactions are the norm

In which the learner chooses what he wants and thus takes more responsibility for quality assurance

Scenario C
Individualisation in the local institution:
*Stretching the mould*

Scenario D
Individualization and globalisation
The New Economy

Scenarios A *Back to Basics* is the current dominant situation for many traditional post-secondary institutions. It is also the case that many universities are starting to experiment with distance participation in their established programs. This can lead to Scenario B *The Global Campus*. Scenario C *Stretching the Mould* relates to increased flexibility with or without changing the underlying pedagogical model within the institution. Many traditional universities are now moving toward some forms of *Stretching the Mould*, by offering more flexibility for participation within their pre-set programs. Scenario D *The New Economy* is the most radical; a systematic example of it does not yet seem to be available in most traditional universities and yet it is increasingly being seen as the way of the future.

These four scenarios have been studied in a variety of different contexts, including those of specific universities and also at the national and conceptual levels (see Collis & Van der Wende, 2002). It is useful to also apply them as dependent variables in the current research. They can be used as dependent variables for the current situation of the institution but also as predictions of where the institution is headed several years in the future, such as 2005. Although no institution will explicitly choose only one of the scenarios but rather will offer combinations of all of them in various degrees, it can still be useful to try to identify which scenario is most representative of the educational delivery in an institution, currently and in the future.

If the scenarios are taken as the product of many different pressures and decisions within the institution, what are main categories of such predictors?

**Environmental conditions and settings**

Every university operates in a particular environment. Features of this background can be taken as the baseline upon which any eventual decision about scenarios and educational delivery will take place. In terms of the institution, its history, its culture, and
its particular demographics have led it to adopt (perhaps implicitly) a particular mission for itself and a profile that distinguishes it from other institutions as well as markets it to its potential clients. The "mission and profile" of the institution will certainly be a key factor in its evolution toward one of the scenarios.

The profile of an institution is not only influenced by its history and demographics but also by its current leaders. Universities differ in the degree of centralized or decentralized leadership typical for decisions about ICT and educational delivery. Also, the unique characteristics of those in leadership positions in an institution have a clear impact on the operational scenarios. Thus "Leadership, internal power structure" is also an important background dimension in a university's change process with regard to educational delivery and ICT.

Students are the main clients of the university and directly or indirectly the main source of income. Their characteristics and needs steer the university in its programs and approaches. As more and more non-traditional students, such as working people, require new services from the university, their influence will be a substantial component on the change process. Parallel to them, the faculty in the institution are another critical variable affecting change. Instructors bring with them their own histories with respect to change and technology in teaching and learning which in turn influence their willingness or capacity to adopt new forms of educational delivery. Thus student and instructor characteristics both are critical baseline conditions for the choice of a dominant scenario for the institution, currently and in the future.

While the institution is shaped and constrained by its own characteristics, it is also directly influenced by the outside world. This can occur in many ways. The society in which the university is based will have its own standards and ideas relating to a "good education" which must be respected. The policy of the national government or of other agencies that accredit and fund the university form critical constraints on its operating decisions. Two main sets of external pressures are those (a) related to new competitors for the university in terms of its target market, its status, and its funding; and (b) also with respect to ICT, the general and unavoidable movement toward technology provision, such as via e-mail, Internet, and Web access, that is now becoming standard to society itself. All of these aspects: "Social aspects of good education", "Increasing competition", "Technology push", and "External policy" need to be taken as environmental conditions influencing the eventual choice of a dominant scenario for a particular university.

**Policy/response**

All of the aspects mentioned under "Environmental Conditions and Settings" come together in various ways to steer the current policy of the institution relating to educational delivery and ICT. Most institutions do not make an explicit policy decision relating to one of the four scenarios shown in Figure 1, but instead establish a number of intermediate policies relating to ICT. These intermediate policies relating to ICT can be based on increasing the efficiency of operations, increasing the quality or teaching and learning, enhancing the flexibility to various educational services and options for the students, enhancing cost-related payoffs, and increasing access opportunities to both traditional and non-traditional students. Together, this cluster of variables could be seen as "Type of Policy". We see it as a result of the environmental conditions in the institution.
Implementation
Given the environmental conditions of the institution, and the policies that reflect those conditions, the next step in moving toward a scenario can be called "implementation" aspects. These aspects relate to the provisions made available in the institution to support instructors and students in their use of technology. They also relate to incentives for instructors to embark on a technology-related change process. Policy dictates the sorts of technical infrastructure available, ranging from hardware access, software licensing, and network access to types of software applications available. The policy of the institution also dictates the types of flexibility in participation that can be offered to students. On another scale, the policy and environmental characteristics of the institution determine the sorts of new and external partnerships that the institution may commit to in order to carry out its mission and associated policy. Together these implementation aspects, taken as a consequence of environmental conditions and policy, suggest at least six "Implementation" clusters that will influence any eventual scenario for the institution. These clusters can be called "Instructor support", "Student support", "Staff-related policies", "New partnerships", "Software, hardware, and network infrastructure", and "Types of flexibility in terms of participation offered by the institution".

Practice
Even though an institution establishes various support structures or partnerships, it does not mean that they are all taken up into daily practice. Technologies may be available but little or never used. Instructional practice may or may not make use of technologies even if the institution supports these. Clearly, the combination of environmental characteristics, policies, and implementation support form an important precondition for use in practice, but use in practice is not an immediate consequence. Two clusters of variables related to use in practice, relating to technology practice and instructional practice, should also be included in a model predicting delivery scenarios.

Experiences and effects
The combination of environmental characteristics, policy, implementation support, and actual use in practice of technologies for educational purposes will lead to a perceived or verified set of results in the institution. These experiences and (perceived) effects will have an impact on the eventual commitment to a delivery scenario. A variety of different types of effects can be involved, such as the perceived importance of technology use on the strategic goals of the institution, the perceived effect on efficiency, the level of satisfaction, the perceived effect on institutional effectiveness, and the perceived effect on working practices. All of these should be taken into account.

2.2 The research model

Figure 2 combines the aspects discussed in Section 2.1 into a model that predicts clusters of variables that will have an influence on the current and future scenarios for ICT and educational delivery in an institution. The model should be seen as cumulative, from left to right. This means that the clusters in Column A are expected to predict those in Column B; the clusters in Columns A and B predict those in Column C; the clusters in Columns A, B, and C are expected to predict those in Column D; the clusters in Columns A, B, C, and D are expected to predict Column E; and finally all of the clusters in Columns A-E are expected to predict each of the variables in the Scenarios column.
Data from a survey questionnaire will be gathered (Chapter 3) and used to test this model (Chapter 8). The data will also address the research sub-questions (Questions 1-4, primarily in Chapter 4; Question 5, primarily in Chapters 5 and 6) and to consider international comparisons based on the model (Chapter 7).