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Core Connections

by Jef Moonen and Betty Collis

□ In the introduction to her book, *Tele-Learning* (Collis, 1996), Betty used a simple dedication: "To Jef: My core connection." In his speech upon assuming his professorial chair (Moonen, 1990), Jef said that "computers may not have changed the educational world but they have changed my life," a comment understood by us as referring not only to his work but to our own coming together. This feeling of being at each other's core works both ways for us despite the fact that we grew up on different continents and did not know each other until each of us was well established professionally. This is perhaps one of our strengths: By the time we met, we were each clear within ourselves about our own identities and professional rhythms. And remarkably, these rhythms matched, and still do. Our own separate identities continue even when we work closely as a team and even though we are married. We do not always agree, but we always respect the integrity of each other's opinions and decisions.

But this paragraph has started as a summary of ourselves as a professional partnership. We should step back and introduce ourselves in order that the summary has a context. We will present ourselves, first, separately and factually. The texts that follow are adapted from the authors' biographies in our current book, *Flexible Learning in a Digital World: Experiences and Expectations* (Collis & Moonen, 2001).

Jef Moonen

Jef Moonen holds Belgian citizenship. He studied mathematics and was a mathematics teacher and teacher trainer for many years in Belgium. He coauthored a mathematics textbook series for the elementary grades with accompanying teacher's guides that has been remarkably successful, remaining in press and use for nearly three decades. Jef moved from secondary school teaching into the teaching of statistics at the university level at the University of Leiden in The Netherlands in the early 1970s. In response to problems in his own teaching situation—many students, coupled with the need of the students for individual support and feedback—and because of his own strengths as a teacher and skills with computers, Jef became a pioneer in the design and development of computer-based teaching materials for use in his own statistics course. He designed, programmed, and used a suite of programs to support his statistics teaching. These programs were first built using APL and later implemented with the PLATO authoring system and microcomputers such as the IM/BM 5100. This work formed the basis of his dissertation in 1978. The programs, in various revisions, continued in use for almost two decades. Since then he has served as founder and director of the National Center for Computers in Education in The Netherlands (1981–89) as well as Professor of Educational Instrumentation (Educational Technology) at the University of Twente (1987-present). From 1991 to 1994 he was dean of this same faculty, from 1987 to 1999, he was also chairman of its Department of Educational Instrumentation, and resumed the chairmanship in 2002. His expertise is in the areas of design methodology for electronic learning resources, implementation of electronic learning environments in education and training, and cost-effectiveness of educational technology, in particular in higher education (see http://users.edte.utwente.nl/moonen/). He has managed many large projects relating to technology design, development, and implementation, and regularly participates in national and international projects, panels, review boards, and steering groups relating to technology in education. At the same time, he remains a pioneer in the use of technology in his own teaching (see, e.g., Collis, Winnips, & Moonen, 2000), continually innovating, researching, and reflecting on the lessons that have been learned from all this experience.

Betty Collis

Betty Collis was born in the United States and holds both American and Canadian citizenship. She, too, was a mathematics major who also regularly took computer programming classes; a mathematics teacher; and coauthor of a mathematics text (written for internal use in a school district). She began her professional exposure to the field of educational technology in the 1960s while a graduate student at Stanford University and has been a pioneer in two waves of technology applications—those relating to computers in education in the 1970s and 1980s and those relating to networked applications in education in the 1980s and 1990s. Like Jef, she began her own work with computers in education based on problems in her own teaching—working with large classes, trying to help her students visualize dynamic mathematical relationships and, in particular, concepts relating to probability. The first day she saw an Apple™ microcomputer in 1979 she bought it, and began writing little programs that she could use the next day in her classes. This meant programming for a real context—one small computer, large classes, examination-driven curriculum, classes that met in different buildings. It quickly cemented the base for all her work relating to computer-related applications for learning:

- Will they (the target group of teachers and learners) use it?
- If not, why not?
- If it is worth using, how can we help increase the likelihood of that use in practice?

Over the years, this has meant a long list of projects from software development to national-level evaluations see (http://users.edte.utwente.nl/collis/). A major recent example is the *TeleTOP* initiative in the Faculty of Educational Science and Technology at the University of Twente. (Like Jef, she is also a senior professor in this faculty). This initiative involves institutional

change toward more-flexible learning supported by the TeleTOP Web-based course-management system developed under her leadership. Also, like Jef, Betty remains a pioneer in her own teaching. She has been professor of telelearning at the University of Twente since 1997 and, because of her recent focus on technology use in the corporate sector and in particular the Shell Learning Centre, she has been named Shell Professor of Networked Learning and leads another large project there.

Jef and Betty: The Start

In 1987, Jef and Betty met each other in a way that has turned out to be typical of their professional styles and relationship. Betty was the cochair of a seminar in February 1987 in Israel, sponsored by the group that is now called International Society for Technology in Education (ISTE) whose focus was on national initiatives in educational software development and use in practice. The attendees at the seminar were a selective group, limited to persons in leadership positions in their own countries with regard to national initiatives in educational software. In canvassing colleagues in European countries for the appropriate people to invite, the name of Jef Moonen came up again and again. So, Betty invited him to the seminar. Jef came, and appreciated Betty's contribution so much that he later in that year nominated her as an external evaluator for the national educational software project that he was directing. In working together on this evaluation, they found they could quickly and sharply focus on key issues and strategies for their resolution, a process that primarily occurred via e-mail (using a protocol then called BITNET).

Jef and Betty: In Action

Other projects, jointly authored papers, consultations, and joint presentations, followed. Jef's European identity and position brought Betty further into the European professional world; Betty's North American identity brought Jef further into American and Canadian professional circles. Betty and Jef married in 1990. In what is unique in The Netherlands, both are full professors in the same department.

Although we had both been pioneers with the use of technology in our own teaching for many years, we will only review a sampling of our pioneering experiences at the University of Twente since 1990 (the material in this section is adapted from Collis & Moonen, 2001, pp. 133–142). These experiences, among others, led us to the formulation of 18 "Lessons Learnt." We see our work in terms of four interrelated areas, as shown in Figure 1.

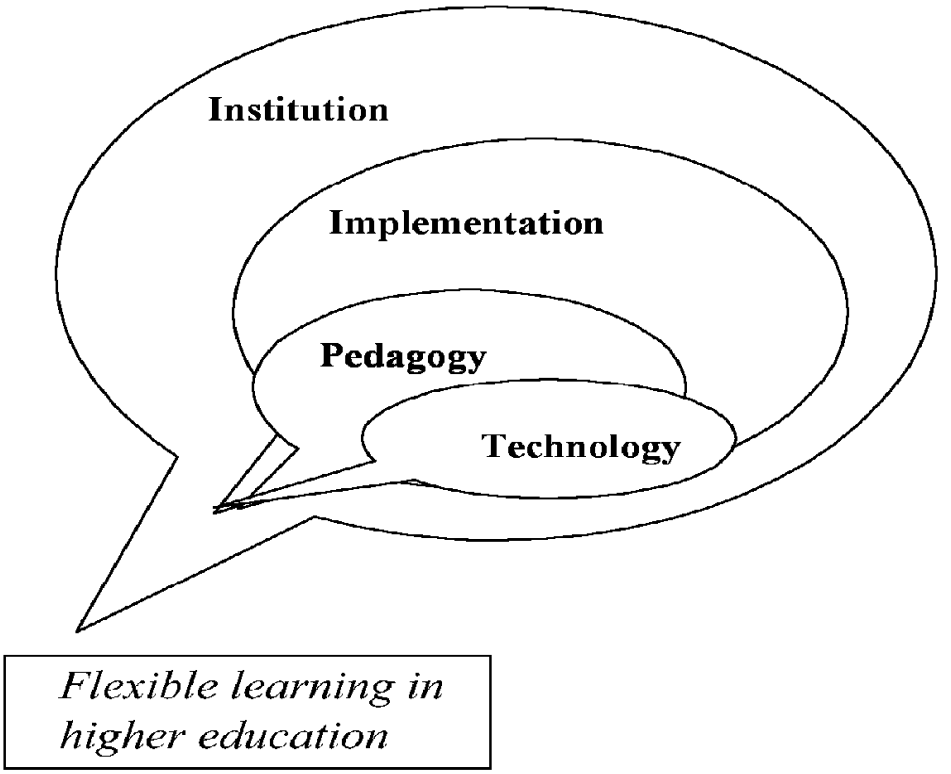
Pre-Web

In our faculty in the early 1990s our work evolved from the application of data-communication tools and systems for educational purposes into our own teaching, with our regular on-campus students. What we and some of our colleagues were doing was revolutionary, in The Netherlands at least, because we were using tools such as e-mail, computer-conferencing systems, and then in 1994, World Wide Web sites, not for distance education but to extend and redesign our teaching with students whom we saw face-to-face and who saw each other regularly.

Our pioneer work during this period was partly with our own courses, but also via a number of special projects in which we were involved. From our courses and projects, we became convinced that we needed one integrated electronic environment in which communication, student projects, archival material, course information, course resources, and also our own internal team communication could all be conveniently managed. And we needed strategies to cut down on the amount of communication and material we needed to manage even while retaining the richness of what was going on.

We worked together on a number of research projects. For example, we carried out a project for the Ministry of Education on the state-of-the art, internationally, of educational uses of multimedia. It was in an associated computer-communications project that Betty and other colleagues first developed the *4-E Model* for predicting the likelihood of an individual's

Figure 1 □ We are technology people, but never technology in isolation (Collis & Moonen, 2001).



making use of a new form of technology for learning. Also, at the same time, in national and international projects focused on cost-effectiveness of technology in education relating to technology, the roots of the simplified return on investment (ROI) approach (which remains central to Jef's work) were established. We also continued to be involved in national projects relating to the development and stimulation of educational-software use. From these experiences, the observation that most educational-software products developed in such special projects were rarely used beyond the project was reenforced.

Web

We began pioneering with the use of Web sites and environments in our own classes, with ideas and experiences flying between us by the day. For us as instructors, we learned that we could use Web-tools to help enormously with a number of instructional burdens associated with our courses but, at the same time, these ways of using Web functionalities added new management burdens. This led to our awareness of the value of a Web-based course-management system.

At the start of the academic year 1997 the faculty leadership decided to commit itself to a "telelearning" initiative for the faculty. Betty was named as the leader of the project. By the end of the academic year 1997–1998, this initiative, named *TeleTOP,* had moved rapidly, with all the first-year courses in the curriculum redesigned for more flexibility and ready to begin in September 1998. A new Web-based system had been designed, built, and used for an initial set of courses, and also formed the core

technology for all of the courses ready to begin in September 1998. The initiative has been remarkably successful, with 100% use of the system throughout, first, our faculty and, now, the university, and, over the years, in many other settings from schools to corporate-training centers. We have had a new wave of projects and presentations and experiences based on our TeleTOP-related experiences, a wave that continues unabated in 2002.

Lessons Learnt

What lessons emerged or had the major impact on us during this period? We have summarized them in our 2001 book (Collis & Moonen) and give them here in Table 1.

Being Partners, Professionally and Personally: What are Some Main Points for Us?

Professionally we both have come to realize, confirmed by many experiences, that at the core of teaching and research activities in relation to technology, the end user has to be satisfied. Expectations have to be fulfilled. Yes, there can and should be a theoretical, factual, and normative element in what to do, but eventually what will be presented and made available has to fit with what the end user, as a customer, needs and wants. From that perspective, we have always been very sensitive to include, from the early beginning of each of our activities, the opinion and wishes of the projected end user. And, as each end user brings some particular peculiarities, it is, almost by definition, impossible to translate those particularities into predefined specifications for the (software) product under consideration. This is the basis for our constant emphasis on user-centered design, which has culminated in the publication of a "Three Space Design Strategy" by Jef (Moonen, 2002), in which the role of the user is emphasized, even to the point that this end user is meant to be the "final" designer of technology-based products.

This perspective often brought both of us in serious conflict with traditional research paradigms. We want to emphasize the importance of iterative cycles of rapid prototyping and the processes related to it in order to find the best match with the needs and wishes of the end users. This approach contrasts with carefully worked out "experimental design" approaches, that often cannot take into account the diversities and dynamics of a real-world situation. And this difference of opinion has brought us occasionally in conflict with subsidizing bodies, resulting in not getting some of our research funded. More seriously, our position was often not really appreciated by official evaluation committees and we had to defend our position many times to colleagues and scientific boards.

Of course we are not against an experimental-design approach when doing research about technology. However, the experimental-design approach should follow two other phases. In a first phase, data should be collected (for instance through surveys) to get a first insight in the problem at stake. Then an elaborate second phase should follow where, using prototyping approaches, a potential solution for the problem earlier identified is being sought. In that second phase different solutions have to be tried out, striving for an optimum, and permanently assessed, using formative-evaluation approaches. Only after an optimal and stable solution is available, given the particular circumstances, does an experimental-design approach become relevant. Generalizing, we prefer to act in our teaching and research based on the concept of relationality, more than on the concept of rationality. We want to focus more on the optimization of the process, rather than believing that there is a perfect solution that can be designed in advance.

From a more personal perspective, it is obvious that we could fear becoming too (professionally) involved in issues, having different opinions, and creating tensions between ourselves. In our case, although we do not always agree on issues and topics, serious tensions based on professional differences have not occurred. Probably because we think very much alike—this was the basis, besides personal attraction, for our initial appreciation for each other. But also we do not have personal tensions because we understand each other so well, and

Table 1 ☐ "Lessons Learnt" (Collis & Moonen, 2001, pp. 2–3)

	Lesson	*Comment*
1	Be specific.	We need to define our terms and express our goals in a measurable form or else progress will be difficult to steer or success difficult to claim.
2	Move from student to professional.	Learning in higher education is not only a knowledge-acquisition process but also a process of initiation into a professional community. Pedagogy should reflect both acquisition and contribution-oriented models.
3	You can't not do it.	The idea whose time has come is irresistible, and conversely.
4	Don't forget the road map.	Change takes a long time and is an iterative process, evolving in ways that are often not anticipated.
5	Watch the 4-Es.	An individual's likelihood of voluntarily making use of a particular type of technology for a learning-related purpose is a function of four "E"s: the environmental context, the individual's perception of educational effectiveness and of ease of use, and the individual's sense of personal engagement with the technology. The environmental context and the level of personal engagement are most important
6	Follow the leader.	Key persons are critical.
7	Be just-in-time.	Staff-engagement activities to stimulate instructors to make use of technology are generally not very effective: Focus on just-in-time support for necessary tasks.
8	Get out of the niche.	Most technology products are not used in practice beyond their developers. Keep implementation and the 4-Es central in choosing any technology product.
9	After the core, choose more.	Technology selection involves a core and complementary technologies. The core is usually determined by history and circumstances; changing it usually requires pervasive contextual pressure. The individual instructor can make choices about complementary technologies and should choose them with flexibility in mind.
10	Don't overload.	More is not necessarily better.
11	Offer something for everyone.	A well-designed WWW-based system should offer users a large variety of possibilities to support flexible and contribution-oriented learning not dominated by any one background orientation. If so, it is currently the most appropriate (core or complementary) technology for flexible learning.
12	Watch the speed limit.	Don't try to change too much at the same time. Start where the instructor is, and introduce flexibility via extending contact sessions to include before-, during- and after aspects, with each of these made more flexible. Move gradually into contribution-oriented activities.
13	Process yields product.	Through the process of contributive learning activities, learners themselves help produce the learning materials for the course.
14	Aim for activity.	The key roles of the instructor are becoming those of activity planning, monitoring, and quality control.
15	Design for activity.	Instructional design should concentrate more on activities and processes, and less on content transmission and a pre-determined product.
16	Get a new measuring stick.	What we are most interested in regarding learning as a consequence of using technology often can't be measured in the short term or without different approach to measurement. Measure what can be measured, such as short-term gains in efficiency or increases in flexibility.
17	Be aware of the price tag.	It is not going to save time or money to use technology, at least not in the short term.
18	Play the odds	.A simplified approach to predicting return on investment (ROI) that looks at the perceived amount of relative change in the factors that matter most to different actors is a useful approach to support decision making or evaluation.

know why each of us thinks in a certain way about a given issue. Our (small) differences based on different nationalities, backgrounds, and cultures have never been of any importance in this respect. Although the faculty we work in had some, unspoken, reservations about a couple working together in the same department, after 14 years no problem, conflict, or difference in interests has occurred. And all the staff and students of the faculty see us as their individual colleagues, not as a married couple.

The fact that we both work at the same department certainly has brought us, the staff of the department, and our students many advantages. The main advantage for us is that we share, on a daily basis, interesting readings, contacts, and issues. We discuss whether a certain meeting is valuable to go to and which of us can best contribute to it. We decide whether certain contacts should be maintained and, if necessary, by whom. We can shift obligations about who should represent the department. But also our colleagues and students profit from our cooperation. We often discuss such matters when driving home, continuing over dinner and breakfast the next morning. We both love to talk to each other and explain what happened that day, not only to inform the other, but also to seek advice or comfort when a conflict situation has occurred at work (which happens of course now and then). We are to each other our best advisors. And as two know more than one, such advisory activities create better results for both of us. Also in the national and international arena, we help each other with the contacts we have. Betty, having the better international reputation, creates opportunities for Jef also to be involved. And Jef, being a manager for more then 20 years, advises Betty in dealing with the kinds of issues that involve leading people and managing projects and budgets.

Now as we grow older (Jef is 60, Betty is 57), the speed and intensity of our work is starting to show a difference. Jef is slowly preparing for his retirement, avoiding many new activities and concentrating on a smaller number of interesting tasks (such as being the mentor of Ph.D. candidates). Betty is still full of fire, just starting the new challenge of becoming the Shell Professor of Networked Learning working within our faculty and in the multinational training center. But eventually, we will settle down, relax, and enjoy life even more. One of our hobbies is to make scrapbooks of our travel. Our basement is filled with those treasures. Looking through them now and then reminds us of the wonderful times we have had, and will continue to have—good times where work and private pleasures are always intermingled. Assuming our health stays stable, those good times will remain after we both retire. □

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