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# Linking Information Technology and Pedagogical Innovation to Enhance Management Education

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## Abstract

*There is a growing consensus in management education that there is a gap between theory taught and daily professional practice. New educational perspectives such as constructivism, constructionism, action learning, and reflective practice, offer us opportunities to bridge this gap. On the other hand information technologies, and especially the Internet, are being increasingly used as a tool to add value to management education. In this paper I state that it is only within the above new educational perspectives that the use of information technologies can fulfill their learning promises. Two action research cases and their lessons are reported. They show that, while enhancing clearly management education, some points need careful design and implementation.*

## 1. Introduction

The development of educational technologies, and in particular communication technologies, is reshaping the landscape of university education and corporate training. In addition to distance learning institutions, traditional universities and companies are increasingly launching distance education programmes and using educational technologies in order to add value to their educational and training activities (Alavi, 1994; Alavi, Wheler, & Valacich, 1995; Alavi, Yoo, & Vogel, 1997; Angehrn & Nabeth, 1997; Ives & Jarvenpaa, 1996; Knoll & Jarvenpaa, 1995; Leidner & Jarvenpaa, 1993).

Management education has long been suffering from a gap between theory taught and daily professional practice (Schön, 1983; Schön, 1987; Spinosa, Flores, and Dreyfus, 1997). As a business school professor I am committed in research and practice to bridge this gap. I think that our professional activity is an opportunity for innovation and hence I design and implement educational experiences to add value to management education by using educational technologies and applying innovative pedagogical

methods (Hacker et al., 1996; Vasquez Bronfman, 1998).

In order to bridge the gap between theory and practice in management education, I have designed and implemented some educational innovations using information technologies. This paper reports my action research on these experiences and address my main research question: *how can we link information technology and pedagogical innovation in order to add value to management education?*

## 2. Effective learning and the role of IT

The use of information technology in higher education has been reported by many scholars in recent years (Alavi, 1994; Alavi, Wheler, & Valacich, 1995; Alavi, Yoo, & Vogel, 1997; Angehrn & Nabeth, 1997; Ives & Jarvenpaa, 1996; Knoll & Jarvenpaa, 1995; Leidner & Jarvenpaa, 1993). Most of these studies report the automation of information flows between teachers and students or among students themselves and address questions of software and hardware architecture, IT infrastructures, or logistics issues (EDEN, 1998; NTICF, 1998). These automation efforts may have led to efficiency gains but they have not led to warrantable improvements in learning. In Seymour Papert words, instructors and decision-makers in the field of education seem to be immersed in a technocentric perspective. *Technocentrism* is the fallacy of referring all questions to the technology. In our case, technocentrism leads to questions like: Will the Internet have this or that effect on management learning, by comparison with a traditional classroom? Or will a CD-ROM lead to a mechanical method of thinking on accounting? These questions reflect technocentric thinking and so do all questions about whether this use or that use of IT is the right one (Papert, 1987; Papert, 1990). Concerning education, what is missed in technocentric thinking is *learning*. Instead of focusing on IT questions, we have to focus on learning. And, from business school professors' perspective, we have to focus in particular in management learning. That leads to address the

questions: what is effective learning (in general), and what is effective management learning (in particular)?

Concerning learning in general, I build on pedagogical perspectives such as constructivism (Piaget, 1985; Piaget, 1992), constructionism (Papert, 1990; Harel & Papert, 1991), and in the work of well known educational thinkers such as Bruner (Bruner, 1987; Bruner, 1996) and Vygotsky (Vygotsky, 1985). Constructivism is based on the assumption that knowledge is created by learners rather than transmitted by teachers like information in a pipeline, that learners discover and *construct* meaning from their environments. In addition to this view, constructionism suggest that learners are particularly likely to create knowledge when they are actively engaged in *making* something that is also personally meaningful and that they can *share with others*, such as video games, robots, computer animations, written stories or, more close to management learning, e-commerce Web pages and export plans.

Constructionism is also close to the work of Lev Vygotsky and Jerome Bruner, in the sense that both state that learning is a *social* process and stem from cooperative activities, from making something collectively. Moreover, Bruner and Vygotsky state that effective learning occurs when this process happens within transactions between learners and members of their culture more experienced than them, hence leading to the concept of *coaching, mentoring*, etc.

In addressing the question of effective *management* learning, we need first to have an interpretation of what management is. I agree with Peter Drucker who says that "Management is a practice rather than a science. It is not knowledge but performance" (Drucker, 1974), and with Henry Mintzberg who has stated that management is not a technical profession, certainly not a science, not even applied science, but a practice, a job (Mintzberg, 1966). Following his ideas on the nature of management, Mintzberg says that effective management learning must be turned to practice, to the cultivation of skills (Mintzberg, 1988). This interpretation of management lead us to a new question: what is effective learning when one needs to learn a practice?

To answer this question I were inspired by the action learning school of thought (Revens, 1980; Pedler, 1991), and especially by Donald Schön's ideas on reflective practice and on education of reflective practitioners (Schön 1983; Schön, 1987). Action learning is a concept of learning that goes through a cyclical process where students work on a *real* problem. This is done in a learning set of usually 5-8 people whose main goal is to learn from the experience through questioning and reflecting while

solving a real problem in real time. In this school of thought, learning involves programmed knowledge (knowledge you get from outside the set through lectures, seminars, books, etc.), but the majority of the learning occurs through fresh questions that help the persons addressing the problem to look at it in different ways so that better solutions can be found. Action learning has been used mainly in corporate settings but had come recently to management education in business schools (Thorpe and Taylor, 1991; O'Hara, Webber and Reeve, 1996; Dilworth, 1996).

Donald Schön is well known for his remarkable work on practitioners' education. He observes that there is an artistry which is inherent to competent professional practice, an art of problem statement, an art of implementation, an art of improvisation, and that this artistry contains but goes beyond the rationality of applied science and of research based techniques. Therefore, the question of how to learn this artistry is posed. Schön then states that when we observe how competent practitioners learn their artistry we find different educational traditions that stand outside or alongside the normative curricula of universities and business schools. There is athletics coaching, apprenticeship in industry, conservatoires of music and dance, studios of visual and plastic arts. In medical schools there are interns and residents learning under the guidance of senior clinicians by working with real patients on the wards. In this kind of learning, students cannot be *taught* but they can be *coached* by experienced practitioners while involved in a real project.

In order to train students in the artistry of competent practitioners, Schön suggests that they must enter a practicum. A practicum is a setting designed for the task of learning a practice. A *reflective practicum* is a practicum aimed at helping students acquire the kinds of artistry essential to competence in the indeterminate zones of practice. The main goal of the practicum is to learn the *know how* of practitioners, as opposed to the knowledge accumulated in the field (which is the goal of traditional university education). In a practicum (or studio for learning) students run a project and gain knowledge on the project's field by being involved in solving the problems posed by the project itself. In other words, students are immersed in a learning by doing environment under the guidance of senior practitioners.

We have now a robust framework of ideas concerning management learning. Summarizing this framework we can say that effective management learning needs a learning by doing environment where students make things collectively tackling real problems under the guidance of experienced

practitioners, where they can share ideas with others hence working in teams, where coaching help students to reflect on their projects and assumptions, where lecturing felicitously complete learning by doing opening students to new and powerful interpretations of the reality they are facing.

Within this framework of ideas I have designed and implemented practicums. For instance, to learn the artistry of electronic commerce projects design, I have implemented at ESCP (Ecole Supérieure de Commerce de Paris) a six months' e-commerce studio where students - working in teams of 2 or 3 - must find a small company and then design and implement an e-commerce solution for this company. I met students every 2-3 weeks in an e-commerce course at a Master level and we discussed the e-commerce projects with them. Also, at an undergraduate level in a Major in IT and Organization, I implemented a Strategic Information Systems' Studio where students - working in teams of 3 or 4 - designed a strategic application of IT for real companies.<sup>1</sup> We met every two weeks during the Fall term starting by discussing one or two teams' presentations, then lecturing for one hour followed by teamwork on the projects. I played then the role of a senior consultant helping juniors to tackle the different issues and problems of the projects.

It is within these new educational perspectives where questions about the role of IT in enhancing management education must be addressed. I think that information technologies are not educational tools, they are just tools. As every technology in history, information technologies are *possibilities-openers*: they make new things possible hence stimulating our creativity in *how we use* the technology. Therefore, a good question in our case is: *what new possibilities can we invent with IT in order to add value to management education?* Information technologies, and especially the Internet, offer us:

- to access information wherever the information source is and wherever people seeking for information are;
- to transfer information to distant people wherever these people are and regardless if they are connected at the moment the information is transferred;
- to ask distant people to make something;
- to share ideas with people regardless time and distance constraints.

With these technical and organizational possibilities in mind I have created practicums within virtual environments. Two of these these practicums

will be reported and discussed here. They are: i) an import/export project between ESCP students and Mexican students at ITESM, and ii) a virtual campus where trainees must design IT-based pedagogical innovations. These activities, which are constructionist in nature, are the fieldwork of my research programme which is *to apply these educational views to virtual environments and to observe how they have to adapt*.

### 3. Research method

Because I am interested in transformation and not only in knowledge, I choose the action research approach to study these IT-based pedagogical innovations. Action research may be defined as action *and* research (Dick, 1998; Gill and Johnson, 1991; Gummesson, 1991). Action in order to run a change process (here, pedagogical innovations using information technologies), and research in order to gain knowledge of the field. Instead of hypothesis to test I have outcomes to achieve, e.g. to train students in the import/export business, to make them enter new work practices using the Internet, etc. In order to do this, I need to gain knowledge of the field: the main benefits of the project for students, the problems they encountered, the perceived transformations of the professors' role and, in particular, if they perceive they have learned the *know how* of *practitioners* (as opposed to the knowledge accumulated in the field).

In order to enhance rigour in our research, we need a declared-in-advance epistemological framework. Following Checkland and Holwell (Checkland and Holwell, 1997) we have to declare a Framework of ideas F, a Methodology M, and an Area of Concern A. In my research program I deal with a real-world problem situation, which is how to use information technologies to add value to management education. I enter the study of this question with the framework of ideas I have summarized above and action research methodologies is my chosen M. I therefore take action research projects as case studies and access data through participant observation (messages sent by students and professors, students' final presentations, etc.), interviews with students, and evaluation questionnaires.

### 4. Cases and findings

#### 4.1 Doing business between Mexico and France

Following an initiative of Prof. Carlos Ruy Martinez, from ITESM (Monterrey, Mexico), I

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<sup>1</sup> The ESCP programme ensures that at least one of the teams' members worked for one year in a company, the year before taking their Major.

designed (with the collaboration of other ESCP colleagues) a studio for learning International Business called *Doing business between Mexico and France*. This studio is aimed at training students on Import/Export Consulting. In accordance with my educational perspective, the way we do this is by involving them in a learning-by-doing experience. More precisely, students have to find a company and to make an Export Plan for this company. Hence, at the end of this three months course students will be able to say to the market: "We know something on import/export consulting, not mainly because we have been taught on that, but because we have already done it!".

In Paris, students are ESCP full-time students from a Major in International Business (having more than 10 nationalities), or students from a Master in International Project Management. ESCP students meet their professor once a week in an International Marketing course and spend 30'-60' in discussing the developments of the project. In Mexico there is a very different scenario. Students are Executive MBA students spread throughout the Mexican Republic. They attend courses in the different ITESM locations and attend especially a once a week International Marketing course taught at a distance through videoconference where *Doing business between Mexico and France* is the main project for credit.

Students work in teams, usually 3-6 students in each team. The objectives of the project are to make an Export Plan for a company wanting to export to Mexico or to France (students work as *export* consultants), and to help a foreign company (french or mexican) to export to Mexico or to France (students work then as *import* consultants). Students use the Internet and other sources of information in order to find relevant information on the mexican and french markets. They also find, in the Web page of the course, a template of the Export Plan.

Concerning all the information that is impossible to find on the Web, e.g. retailers, price policy, etc., students develop a collaborative work via the Internet (e-mail, forums, etc.) with their "other-side-of-the-ocean" partners. For instance, french students ask their mexican colleagues about good retailers for the product they are trying to export to Mexico, and suggest advertising policies. Students must also send a sample of the product to their counterparts in order to test its cultural acceptance via focus groups.

To help the students in dealing with delays, there is a detailed schedule on the Web page of the course. Students must then send advancement reports to their professors every 2-3 weeks. These reports, and the

weekly meeting, help professors to coordinate the whole project, between themselves and with students.

We have been running this project since Fall 1997, twice a year. There are every time 30-35 students in Paris and around 20 students in Mexico.

**4.1.1 Finding information about the mexican market.** French students have found their companies through personal relationships. For mexican students it is very easy to find a company wanting to export to France: usually it is the company where they work (at least one of the team members).

Concerning sources of information about the mexican market, french students make use of data bases from the Centre Français du Commerce Extérieur (the french agency for foreign trade) and from the french consulate of Mexico. They also look at the Web page of the course and its links to other Web pages, but they find the majority of the information which is on the Internet by surfing the Net themselves.

The Web page of the course is mainly used to get the template of the Export Plan and a focus groups guide. Students complained about the Web page of the course saying that there was too much information and not always. Therefore they had to surf the Internet by themselves, hence wasting time.

**4.1.2 Internet-based teamwork across the Atlantic.** The majority of students - both at ESCP and at ITESM - gave a poor rate to this fundamental activity. Questions were not answered or answered out of delays. Reports were not send on time. Three main reasons can explain this fact:

- lack of commitment. Shared commitments and shared goals are always hard to obtain in team work, depending as they are on good faith, trust based on recognized skills, time and motivation for collaboration. Asynchronous communication, as by e-mail, usually enhance those problems (Mason, R. and Kaye, A., 1989).

- questions were not understood. Here students point an important communication problem. When someone request information or action from a performer, the content of the request may not be well understood by the performer. Modern communication theory has established that it is the one who listen to a statement that makes sense of the words. (Austin, 1962; Searle, 1969; Searle, 1979; Winkin, 1981; Winograd and Flores, 1986). E-mail communication enhances these problems because feedback is limited to written words and is slow in time to obtain.

- even if a team is active and committed, its members can be requested for information they are not qualified to obtain. For instance, if a french team is

exporting a sailing ships rent service, a priori the mexican team is not supposed to have knowledge of the field, hence sending poor information to Paris while being active and "good folks". This is one of the limits of this kind of learning experience.

Students also complained about the slow pace of asynchronous communication. Mexican students frequently asked for chats, but ESCP students refused to chat. They said that chat is not a solution, because people is not always available at the same time (when in Mexico is 1 P.M. is 7 P.M in Paris) and because when chatting you usually don't have the information requested at hand. In this sense e-mail is better precisely because it is asynchronous. Chat may be useful for social contact. Nevertheless, in case of negotiation of a project oriented difficulty, where misunderstandings may take place, sophisticated synchronous communication tools (e.g. videoconference, NetMeeting, Sametime, etc.) could be very useful.

**4.1.3 Main benefits.** As expected, students reported that the main benefit of this project is the fact of learning through practice. "It's a project in touch with reality", "It's not just an academic exercise but something real", etc. Concerning the specific benefits of working with the Internet, students said they *learnt to develop intercultural relations on the Net*.

I am especially interested in knowing if students perceived that they learnt the know-how of import/export practitioners (as opposed to learn only the knowledge accumulated in the field). The majority of the students reported that they learnt the know-how of practitioners and value this as one of the main achievements of this learning experience, because by doing hands-on work rather than read about it they can gain much more knowledge and skills and *retain it*. However, some of them stated that time was too short for being real practitioners, while others limited their learning to "know how to make un Export Plan". Nevertheless, students faced some problems that practitioners encounter as lack of information, decisions based on feelings, and difficulty in understanding their counterparts. This is consistent with research literature: in managers daily practice information is not provided in advance in a well-structured report, it must be collected, and then interpreted against its social context (Mintzberg, 1988; Anghern and Nabeth, 1997).

**4.1.4 Changes in the role of professors.** As expected also, professors' role changed substantially. Instead of giving lectures and supervise case study discussions, professors moved from one who teaches

to one who facilitates, from one who transfer information to one who coach teams through presentations and partial reports, from one who is an academic from one who is a senior consultant helping juniors to cultivate skills. This change of role may be difficult for many academics because they have to show their knowing-in-action every time they meet their students (Schön, 1987), they have to show the knowledge of the academic *and* the know-how of the practitioner. Also, professors must always be kind to answer students questions, either face-to-face or by e-mail, hence spending probably much more time with them than in a traditional lecture.

Finally, *time constraint* was a recurrent complaint. Three months are probably too short when students are also involved in many other academic activities. Therefore, time extension is the main improvement they request.

## 4.2 The Virtual Campus of Educational Technology

In France, the Chambers of Commerce and Industry (CCIs) play an important role in education and training. The CCIs own almost all of the french business schools and are responsible for many corporate training activities. The Chamber of Commerce and Industry of Paris (CCIP) is the second french budget for education and training, after the Ministry of Education. The CCIP owns three of the leading french business schools (HEC, ESCP, EAP), an engineering school (ESIEE), a centre for top managers' training (CPA), and many professionals schools in different domains (fashion, cuisine, textiles, business, etc.).

In the last years many educational technology projects have being designed at the CCIPs schools, mainly by teachers and trainers: multimedia based business cases, instructional systems, pedagogical innovations within the Internet, etc. The CCIP has supported these projects but their evaluation showed that their implementation was unsatisfactory, with some remarkable exceptions. The former CCIP's director in charge of educational technologies decided then to launch a teachers training programme as an aid to the design of good educational technology projects. The result was the Virtual Campus of Educational Technologies (VC-ET).

**4.2.1 The VC-ET system.** I wanted to design a system that could *guarantee* the success of the educational technology projects. By "success" I mean that an educational technology system must work above all with students in a classroom (virtual or not)

instead that only in computers and networks. I then designed and implemented an *Internet-based practicum of educational technologies*: trainees design and implement their own project and learn how to do it by doing it while being coached by experts in the field. This kind of learning system is based mainly in the interactions between coaches and trainees, and also between the trainees themselves. Traditionnally, these interactions take place only in a face-to-face context. We used the Internet to allow the participants of the VC-ET to interact also at a distance. In short, the VC-ET is a learning-by-doing system, based on coaching methods, that combines face-to-face interactions with interactions at a distance via the Internet.

**4.2.2 Results of the experience.** We have run two sessions of the VC-ET, 6-8 months every session. In the first session we had 11 trainees and 13 in the second. They were trained by 3 coaches in both sessions. Trainees were college and university teachers, trainers, and people responsible for education and training programmes, in different CCIP's schools. They were involved in the VC-ET in addition of their current professional activities. In the VC-ET they had first to invent a good project<sup>2</sup> and then to design their projects (the design must include five dimensions: pedagogy, organization, technology, financial questions, and eventually law problems). Finally, trainees have to implement their projects with their students (they are also coached in this phase but this is out of the 6-8 months period).

The main lessons learned in this experience were:

1) *Coaching is a very powerful pedagogical method.* Almost every participant said that the interactions with their coaches were the main aid to design their systems.

2) *We had problems with the technology.* In the beginning, Lotus France committed with the CCIP to take responsibility for technological questions: free copies of Learning Space software, training in the use of the software, a Lotus Domino server for the VC-ET, the administration of the server, etc. Because our partner was unable to fulfill his promises, we decided then to implement a listserv facility as a tool for interaction between the trainees and as an aid to build our community of learners. This system did not work because a listserv (a mailing list) does not allow for the structuring of the different conversations that take place in the VC-ET. We then tried to move to a Web

Outlook based system but this solution did not allow people who had low versions of Internet navigators to access the system. In the second session we implemented a Web-based system with information share facilities like a media documents space, a trainees design productions space, and a forum system for electronic discussions. Even if this new Internet system made substantial improvement, again it was not easy for trainees to have electronic discussions (see below for other explanation). Despite the assumptions made by engineers and technology designers, and the propaganda of the IT industry, it can be established that, from the point of vue of users, technology is still immature. (Belisle, 1997)

We also encountered organizational problems related to the technology: for some trainees it was not easy to have a computer connected to the Internet at hand, despite the promises of their management.

3) The e-mail was the first communication channel between coaches and students, but the telephone has also been used while not planned at the begining. Moreover, the number of face-to-face sessions is important: one day every 5-6 weeks. Our hypothesis is that the "written world" allows just for a limited interactivity *between people*, especially in an asynchronous mode. Now, the VC-ET is based mainly in learner-coach interactions (or in learner-learner interactions) instead than in learner-content interactions (Moore, 1989).

4) We also faced some problems in the building of a *virtual* community of learners. While in the physical space cooperative work was well performed, in the virtual space this did not happen. Messages sent to the community were essentially general information messages or instructions to the group. Learner-learner interactions via the Internet focused strongly on socialisation. Little interaction between the trainees has taken place about the content of their projects, ideas, tips and solutions for the problems they were facing, etc. They did not share their designs and those who started a discussion on their designs via the Internet shifted quickly to one-to-one coaching. Reasons for this could be the strong project's diversity and the competitive environment in which these projects take place, incompetences in our coaching techniques, the inadequacy of our technological system for computer-supported cooperative work (for instance, non-existence of synchronous interactions facilities), and the limited interaction allowed by the "written world".

5) *Design is a process against a moving target.* We observed important changes in the designs between the trainees initial ideas and their final products. They adjusted their designs to the constraints

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<sup>2</sup> By "good project" we mean a project that is technically and economically feasible, pedagogically interesting, and has been accepted by its future users: students, trainees,...

they faced in the journey and were listening to the feedbacks they received from coaches, partners, their management, and their "customers" (i.e. their students). This finding is consistent with research in the field (Schön, 1987).

6) Nevertheless we have reached a good level of customer satisfaction: 90% of the VC-ET trainees declared that the VC-ET is a system that allowed them to design a good educational technology project and allowed them to do it in a flexible way (at home, at their offices, etc.).

## 5. Main lessons learned and conclusions

When implemented within innovative educational views, information technologies can really add value to management education. The educational experiences described in this paper show that it is possible to implement virtual learning-by-doing environments where students can work in distant teams to make things collaboratively, under the guidance of experienced practitioners that can coach them either face-to-face and at a distance. Students find information on the Internet and use it to interact with their peers and with professors sharing ideas and requesting for action.

As expected, the most immediate impact observed was on professors' role, moving from an information transmitter to a coach. Also, students reports and their final products show that the virtual practicums made them learn the know-how of practitioners. Nevertheless there are some points where the educational framework described here needs careful consideration in order to adapt to virtual environments.

Concerning information technology it is very important to see that we have to be distrustful concerning distance education software, because this kind of software follows the patterns of traditional distance education which is based on learner-content interactions rather than on learner-learner interactions and on learner-professor interactions. Distance education software (e.g. Learning Space) is consistent with this assumption and is therefore adapted to learner-content interactions. Students can access content, follow a schedule, answer questions, etc., but they have little facilities for interaction with other people. Hence, rather than a distance education software, we need a software that can support interactions at a distance between people by structuring their conversations, in addition to allow them to access *relevant* information for their projects. If we are consistent with the assumption that learning is to make something cooperatively, a computer-

supported cooperative work software (e.g. Lotus Notes) is needed rather than a distance education software.

Learning in practicums (or in action learning sets) is based mainly in the interactions between coaches and trainees and between the trainees themselves. Traditionally these interactions take place only in a face-to-face context. Certainly, without the Internet the learning experiences reported in this paper would not have been possible, because only the Internet offers a cheap way to send and receive information and to access information worldwide. However, as we have seen before, the "written world" does not allow for the same level of interactivity than face-to-face contexts. Finding the good blend between face-to-face interactions and distant interactions is a big issue for virtual practicum design in order to ensure its effectiveness.

In addition to that there are communication problems. To send and to receive information does not mean that you communicate well (i.e. that you share a context, a common background), furthermore that you take common action. Effectiveness in communication via the Internet is much more difficult than expected. Schön reports that communication problems between coaches and students are one of the most important difficulties in a practicum (Schön, 1987). IT-based communication enhance these problems because interactivity is always lesser than in face-to-face contexts.

Over the coming years management education will face many challenges to the traditional ways of learning. The use of information technologies is seen as a panacea to handle these challenges. I strongly believe that there is a risk for the quality of education because when implemented within traditional educational views, information technologies enhance the worst of traditional education. This paper has shown that there is an alternative view to this question, shared (at least partially) by other scholars (Alavi, Yoo, and Vogel, 1997; Knoll and Jarvenpaa, 1995). In order to make progress in this way, it is necessary to put pedagogy first while making good use of information technology possibilities. In this sense, further research is needed on collaborative learning at a distance via the Internet and on distant coaching techniques. Finally, research is also needed to explore to what extent I have designed and implemented *reflective* practicums (Veen, Lockhorst, and Korthagen, 1995).

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