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USING E-COLLABORATION TO IMPROVE MANAGEMENT EDUCATION: THREE SCENARIOS.

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Abstract

This paper explores the potential impact of collaborative technologies in improving management education. The first goal is to expose students to tools and practices that not only assist them with their current studies, but also serve to reinforce individual and team competencies that can facilitate their entry into the workforce. In their positions as future managers they will be expected to not only be familiar with common business practices but also to understand the implications of information technology for business; in this case with emphasis on tools and techniques that can help businesses flourish in the networked economy. With an ever-increasing recognition that e-learning tools are important for (re-)training employees, these three scenarios offer examples of how business schools might expand the boundaries of e-collaboration to help their students. These experiments have been conducted in management programs. In the first two scenarios, students use collaborative platforms in some of their daily work. The third experiment is based on a student-centred design of a learning portal. Our experience reinforces a certain number of hypotheses influencing the impact of collaborative technologies in management education. To begin with, information systems are often flawed mirrors of the managerial system that they are designed to represent. Secondly, the potential value of collaborative technologies is strongly influenced by organizational contexts, both in and between the university and the business community. Thirdly, the effectiveness of collaborative technologies depends to a large degree upon the depth and coherence of learning objectives fixed for learning and work places. Finally, improving the effectiveness of collaborative technologies requires aligning the design of learning environments with the corporate cultures and visions we are trying to reproduce.

Keywords: E-collaboration, Management, Collaborative Learning, Design, Information Technology.

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1 INTRODUCTION

Computing and networking technologies have the potential to advance communication and collaboration, and, in doing so, improving personal, organizational, and inter-personal/organizational effectiveness and efficiency. Today, the application of collaborative information technologies is important to facilitate operational efficiency and support business objectives.

"Most organizations have accumulated numerous software applications without integration for communication and collaboration. Most organizations also face severe challenges both in integrating collaborative applications and in addressing new requirements such as mobile/wireless devices, increasingly stringent government requirements for privacy and security, the need for business continuity when outbreaks,..." (OZZIE, R. et O'KELLY, P)

These characteristics are similar in both public and private sectors.

The development of the Internet has changed how we acquire, store and transfer knowledge. Virtual processes have made it possible to redesign the learning environment; introducing new participants, norms, modes and types of interaction.

Today's collaboration challenges are primarily the result of the globalisation of local and national markets, the resulting business requirements, and the evolution of information technology rapidly changing technologies, business requirements, and global economic realities. E-collaboration effectively eliminates the barriers of time, distance, and resources (i.e. incompatible computer systems), permitting people in different locations to behave as if they were in the same room, working in close proximity. As noted in previous studies e-collaboration supports group work through improved communication and is task oriented. (ABRAMOWICZ, W. et all, 2003), (KOCK et all, 2001) E-collaboration has various e-usages including: e-mail, e-business, e-trade, e-market, videoconference, chat, e-community...In addition to technology, we need to consider the human aspect: the social dimension has to be integrated within computer-based environments.

"Virtual teams are a complex phenomenon with numerous technological and social perspectives that encompass a broad range of group and ICT issues" (RUTKOWSKI, 2002, p. 220).

However, with virtual teams little face-to-face discussion is made possible.

The university, like most organisations, has begun a process of reengineering itself: learning practices, teaching practices, and administrative practices are all being scrutinized. Similar to most businesses, this challenge is due to Information and Communication Technology (ICT) integration in daily work. Information and communication technologies, and more precisely e-collaboration tools, have been used as support for nurturing change within this environment.

For several years, we have developed educational programs in management studies. When teaching management, it is important to integrate technologies into the design and the objectives of what we would like our students to learn about management. It's a challenge to reduce the gap between academia and the private sector. "Learning by doing" is a key component both for students and for employees.

In the following sections we discuss the expected competencies (skills) needed by students from both individual and collaborative points of view (Section 2). We then demonstrate how those competencies have been incorporated into our experience with computer-based activities by highlighting current challenges and constraints (Section 3). We conclude by summarizing our major results and exploring the overall implications of our research (Section 4).

2 INDIVIDUAL AND COLLABORATIVE SKILLS WITHIN THE UNIVERSITY

2.1 Knowledge

Students should acquire three types of knowledge: contextual, meta, and applied knowledge. Studies have demonstrated three key dimensions of training, namely knowledge (knowledge acquisition), practice (problem solving abilities) and attitudes (conceptual frameworks). The pedagogical value of ICT in general (and the Internet in particular) is drawn from how it supports individual and collective learning of those types of knowledge.

P. Mendelsohn (1995) has said that teaching is essentially the transmission of two or more of the following categories of knowledge:

- Contextual knowledge: (methodologically or conceptually restricted to a specific context);
- Know-how: practical knowledge (the implementation or knowledge in a given situation);
- Knowledge transfer: the ability to communicate the knowledge or processes to be engaged;
- Applied knowledge: acquisition of "professional" attitudes and relational intelligence.

Each type of knowledge corresponds to an educational process involving activities, tasks and methods (for example: course readings, projects, case studies; exercises of written or oral communication; group work, etc.)

Thomas Durand [6] has suggested that these processes are at the very heart of management practice. « ...we continually rediscover that the firm is composed of men and women whose work is based upon the deployment and the development of a set of individual and team competencies. ... ». It is precisely such men and women who seek to learn the foundations of management practice in our universities.

These four knowledge categories (as shown in Figure 1) form the cornerstones of the individual and collective competencies we wish our students to develop.

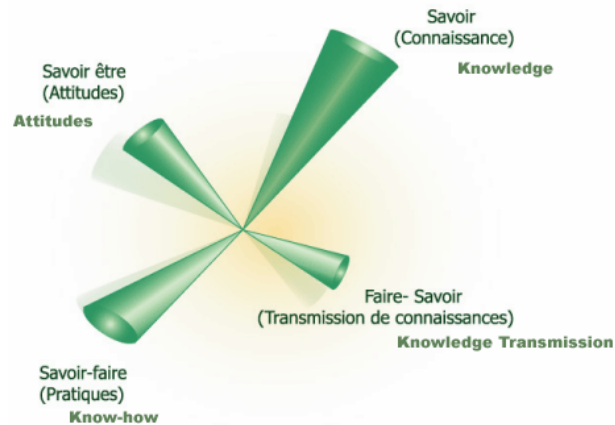


Figure 1: The competency framework (adapted from Durand)

2.2 Individual and collective competencies: an organizational perspective

In a previous article, we have explored how individual and collective competencies are affected by the introduction of information and communication technologies. We define the target as business problems, rather than simply the acquisition of technical “skills”[7]. Table 1 synthesizes our view.

Individual competencies	Team competencies
Assimilation of ICT in individual work spaces	Working “collaboratively” to play upon the strengths of team as a whole
Appropriation of ICT to learn about management practice	The communication of associated knowledge and processes
Knowledge enrichment to propose new skills and/or processes	The implementation of new processes that favour skill or knowledge creation
Developing evaluation criteria that integrate learning into the work place	Designing and deploying benchmarks that bridge the gap between individual and organisational learning

Table 1: Individual and collective competencies

One practical result of this view is that ICT cannot be deployed simply as a support for management training. The basic introduction of ICT concepts influences how we teach management and how we evaluate its objectives. One consequence of the introduction of learning technologies is the required scrutiny of what we need to teach and to learn about the practice of management. Information systems are a mirror of management system. Historically, the introduction of technology in business has changed not only production means, but also management practice (steam engine, telephone, aviation, computers...). If we limit our use of ICT to teaching for the purpose of a presentation and/or storage device, we fail to convey its impact on the processes of management and the long-term effects on planning and change.

The appropriateness of information technology in learning depends on how the organisation views learning. Four levels of learning objectives can be identified. At a fundamental level, we suggest that learning involves the transfer of information from

one individual to another. A second step would extend this simple information transfer to an institution's attempts to develop an individual's specific knowledge or skill set. A third stage builds on the first two to create new skills or knowledge at the individual or organisational level. Finally, a fourth level learning objective is the ability of an individual or an organisation to continually develop its competencies in response to market demands and objectives. The ability of information technology to facilitate learning depends on which objectives an organisation sets. The impact of IT on learning varies as the institution structures learning opportunities. In organisations characterized by hierarchical control, information flows in one direction from the instructor to the students. In student-centred structures, the learning agenda is determined by the student's needs and objectives. In team-centred institutions, the agenda is determined by interactions of participants attempting to deal with challenges from their pedagogical environments. Finally, in market-centred institutions, the learning agenda is not determined by the organisation, but rather by client demands and objectives. Corollaries to each of these institutional forms can be found in business communities. The impact of information technology on learning also depends on how the organisation wishes to define the learning agenda.

A major consideration in accessing NET (New Educational Technologies)[TICE in French] ¹ is how we are asking our current and future information workers to learn to be productive. Productivity itself is a relic of the industrial economy we focused our attention on while producing physical products more quickly and less expensively. In the information economy, information workers should be focusing on the information and services that have been integrated in the very core of product offering. "Production" itself is no longer an internal function of the organisation, but a result of a complex network of relationships between clients, organisations and business partners. Future managers will not be rewarded for focusing on speed and cost, but on client satisfaction, customer relationships, and service quality as measures of how effectively they and their teams have learnt. If learning requires asking the right questions, one such question is surely: "To what extent can New Educational Technologies reflect and support the changing focus of what we need to learn to compete in today's economy?"

2.3 Different tools to support collaborative computer-supported activity

Tools such as simple word processing, e-mail, groupware, CSCW (Computer Supported Collaborative Working), CSCL (Computer Supported Collaborative Learning), and Enterprise Resource Planning are widely used for many purposes. The evaluation of the introduction of ICT in both the academic and professional areas shows technical skills are often a key component. E-mail is the tool most used by students and employees for collaboration. But e-mail is a communication, not a collaboration tool. Nevertheless, most people use e-mail to share documents like Word or Excel files. But to work collaboratively, it is neither sufficient, nor effective. Students or employees need a collaborative tool to complement the use of word processing, spreadsheets, e-mail, etc.

We can distinguish three levels of activity: production, communication and collaboration (Figure 2). Each level of activity includes specific tools.

¹ TICE : Technologies de l'Information et de la Communication pour l'Education is the concept commonly used to describe the pedagogical use of information technologies. We translate it here as New Educational Technologies (NET)

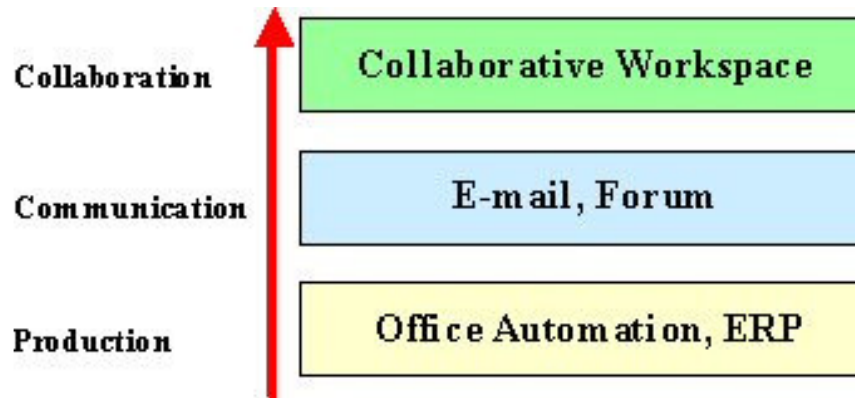


Figure 2: Levels of activity (Adapted from <http://www.mayeticvillage.fr/home.nsf/Pages/CollaborativeWork>)

These levels are generic because we cannot distinguish the basic capabilities of one word processing program from another. It is the same for e-mail or a chat forum. The embedded functionalities are the same; differences are between Human Computer Interface, price, interconnection within individual information system, and interoperability between tools used every day by people. At the collaborative workspace level, different tools offer the same functionalities.

3 CASE STUDIES (SCENARIOS) FOCUSING ON BUILDING COLLABORATIVE SKILLS

Improving the effectiveness of ICT in teaching a given discipline - management in our case - is a long and difficult task. The effective use of ICT requires both a transformation of the pedagogical goals and the processes we associate with teaching management. Our goals are not to set up a virtual campus but to establish a technological framework in which the students will learn about business, and are able to produce reusable modules that can be shared and improved by our colleagues. Innovation in ICT requires rethinking the relationship between the skills we would like to develop, the technologies we deploy, and the methodologies we use to evaluate their success or failure.

This concern is the foundation for our experiments in teaching business information systems in Western Europe. Additional information can be found in [8]. We summarize some of the results here.

In order to motivate our students to use these systems we design scenarios that are integrated into the curriculum. In their paper, Brassard and Daele, examined within the context of the European project *Recre@sup*, the effort required by teachers, students and institutions in higher education in order to introduce ICT into the curriculum. Based on case studies, they argue that we need to consider 17 dimensions in order to design, implement and evaluate such scenarios.

In the following table, we use 15 dimensions to describe our scenario based on the use of different collaborative platforms (Mayetic Village², Microsoft Sharepoint Portal Server³, and intranet). The goal of the scenario is the use of a collaborative

² <http://www.mayeticvillage.fr/>

³ <http://www.microsoft.com/office/sharepoint/prodinfo/default.aspx>

platform within projects. Each environment can be accessed via the Internet. Each group of students can share resources, exchange information, ideas and documents.

	Dimensions and questions	Impact on the scenario
ADVISORING AND PEDAGOGICAL CHOICES	1 – Design of the learning situation:	
	Learning is the building of knowledge Teaching is to guide the learning process	Scenario has to emphasize: learners' roles, the working environment facilitates exploration, information search, synthesis
	2 – Goals of the learning situation:	
	Objectives are not linked to a specific topic	Activities are based on the use of a collaborative tool
	Knowledge is linked to the use of a collaborative tool	
	3 – How to take into account students' mistakes:	
	Mistakes are part of learning	Appropriate feedback used to correct mistake The students must have help if they don't understand how to use the system
	4 – Flexibility of the learning environment:	
	Individual involvement supports team Not the same time, same place, same moment	Asynchronous environments. System remembers where student exited the lesson.
	ACTORS AND ROLES	5 – Teacher's Role:
To guide the learning process To motivate students		The monitoring consists in providing technical help and expertise about course content.
6 –Motivation source		
Students are to be motivated by the learning environment itself		Choice of user-friendly environment Choice of innovative and original learning activities
Students are to be motivated by the learning situation and their own objectives		Student-based project (for example use of problem-based learning situation)
7 – Communities of practice :		
Institution needs to be aware of this concept. We form business managers.		Our scenario includes exchanges and participation in the professional community.
ACTIVITIES	8 – Task Advisoring	
	Tasks require the mastery of some technical competencies linked to information technology	Learning activities are similar to professional situations.
	9 – Students' Activities	

	Students have to consult a number of different sources	Due to the intranet, students access and easily navigate course contents
	Students have to create, discuss and organise content.	Design activities where students need to use appropriate tools (word processing, spreadsheet, data base access)
	10 – Collaborative learning	
	Promote interactions among students. Some learning goals are reached only in a collaborative manner.	The goal of our scenario is to emphasize collaborative tasks.
	11 – Learning Evaluation	
	Students are actively involved in their own learning process.	Our scenario provides time for discussion
TOOLS AND PROCESSUS	12 – Learner Control	
	Learners have control of the scenario and the learning process.	Our scenario has to be flexible
	13 – Metacognitive support	
	Provide reflective activities that promote discussion among team members	Face to face meeting.
	14 – Knowledge management:	
	Learners form groups like a "learning community". They produce, share and reuse knowledge.	In our scenario, the main goal is that students can reproduce the same "thinking and doing" in real-world activities
	15 – Regulation and evaluation of the scenario	
	Check whether there are some elements that change during the course of the scenario; and whether the students' view can help the author to improve the scenario.	A paper-based evaluation (using a questionnaire) is conducted in order to obtain feedback from students

Table 2: Fifteen dimensions in our scenario

3.1 Scenario 1: Using a platform to build individual and collaborative team skills

Within the framework of our MSG GSI⁴, we have deployed the Microsoft SharePoint Portal Server. This technological platform (similar in many aspects to more dedicated environments such as BCSW or Quickplace) facilitated the creation of "Business" Portals equipped with research and document management, and collaborative functions. It is closely integrated with personal productivity tools widely used in the student community: Internet Explorer, Word, Excel and other Office applications, to create, manage and share information.

We have used this platform to provide our students with course targeting team competencies. We followed a Problem-Based Learning strategy, i.e. we presented a problem to be solved rather than content to be mastered. (BIGELOW).

⁴ MSG GSI : Maîtrise de Sciences de Gestion – Gestion des Systèmes d'Information – Masters Degree in Management with specialization in Information System Management

The problem was constructed around the theme « How can we integrate Internet technologies and process centric applications to support the creation of business value in today's economy? » We targeted the development of the following individual and team competencies:

- Assimilation of ICT in individual work spaces;
- Appropriation of ICT to learn about management practice;
- Working “collaboratively” to draw upon the strengths of team as a whole;
- Communication of associated knowledge and processes.

Within this framework, students are the primary initiators, and instructors act as facilitators rather than teachers. Similar experiences have been conducted at the EM Lyon (School of Management), the ISTUD (Istituto Studi Direzionali of Milan) ⁵, and the Helsinki School of Business and Economics.

The data collected from these experiments are based on participants' comments. As outlined in (RUTKOWSKI et al, 2002), we will use the "onion skin" model to summarize our findings. “...The model distinguishes multiple categories of problems that can be encountered in virtual teamwork. Each category becomes a barrier to effective interaction and a hurdle to be cleared...” (RUTKOWSKI et al, 2002, p.222). The “onion skin” model includes nine layers from Motivational issues to Creative content formation. One cannot reach the internal layers if substantial barriers are imposed by the outer ones.

- Motivational issues are emphasized because students have to participate;
- Context preparation is easier and we have noticed fewer problems in group dynamics. There needs to be a leader at the beginning of the experiment
- Technological problems were not encountered. Students had similar technical backgrounds
- Interaction is successful after explaining to students their role in the virtual team.
- Structure provides ways of reducing variability in activities and procedural aspects of projects as well as use of technology. (RUTKOWSKI et al, 2002, p.225) We used this opportunity to structure students' activities within this environment.
- Process reinforces students' beliefs about activities such as planning within project management area.
- National cultural background is non-existent in our experiment. Presently we do not mix students from different cultures or even different universities, since the experimentation has been solely carried out at the first author's university.
- Professional background reflects different ways of working. All our participants are management majors, so this was not an issue in this experiment.
- Creative content formation is achieved by the strong interaction of three categories of users: students, teachers (specifically those involved in the scenarios) and administrative personnel.

3.2 Scenario 2: Building an E-community

In another class (17 students), we introduced the use of an e-community (Figure3). The course is case-based: students use this platform to interactively formulate a project in the field of marketing. Project goal is to launch a new agribusiness product in the cheese sector. Students must create the business procedures required to propose a

⁵ Milan's Institute of Management Studies

new product based on three indicators: a market study with real data, a marketing strategy, and a marketing mix.

The different groups (4 groups) are formed by teachers, with a leader elected for each group. We introduce two objectives for students: sharing of information inside a private room created on this platform and sharing of information among groups using other rooms, such as Forum, Bibliothèque (library), etc as shown in Figure 3. The main role of the teachers (as leaders within organisations) is to coach and motivate teams, as well as monitor communications.

One consequence of this experiment is that students acquire knowledge on "Business Service Applications Providers" (companies that provide computer and related support services to their clients) and on how decision makers need to consider such outsourcing in the field of information technology. Today, major software companies are packaging their applications and tailoring them to a client's specific problems.

The screenshot shows the Mayetic Village e-community interface. At the top, there is a yellow navigation bar with links: "Créer votre eCommunauté", "Recommander à un collègue", "Produits et services", "Aide", "Contacter Mayetic", "mayeticVillage", and "Informations sur l'eCommunauté". A search bar and a "Résultats du sondage mayeticVillage !" button are also present. Below the header, there is a sidebar on the left with a vertical menu titled "the new way of working" and "mayetic". The sidebar contains sections for "Actualités" and "Outils". A red circle highlights a list of navigation options under "Actualités": "Espace de travail", "Equipe Agrosim", "Equipe Agropub", "Equipe Agrosup", "Projet 1", "Actualités", "Forum", "Bibliothèque", "Index", "Personnaliser", and "Membres". The main content area features a header "Communautés Collaboratives" and a welcome message: "Bienvenue dans votre eCommunauté mayeticVillage !". Below this, there is a paragraph explaining the e-community and a list of bullet points: "Formation à cet espace de travail collaboratif", "Echange des meilleures pratiques avec d'autres utilisateurs mayeticVillage", and "Créer des pages dans votre espace de travail".

Figure 3: The e-community: AGROSIM – The circled list is explained in Figure 4.

Functionalities linked to e-collaboration are provided within this environment: forum, documents sharing, notification, creation of folders, creation of shared rooms, and group agenda. Pages are of different types: pages created with Microsoft Pack Office, simple pages created directly in the environment (hidden HTML code), imported pages, Vikao pages, and Acrobat files. For security reasons, we do not allow students to manage or modify public documents. The notification function is helpful because it alerts users when they receive e-mail. All users have access to a site map (Figure 4). With this functionality, end-users can rapidly determine which of the different areas are shared or not shared.

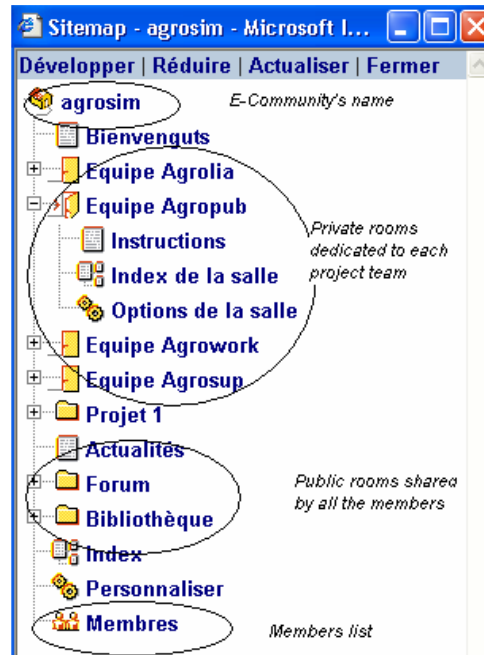


Figure 4: The site map

Three types of data were collected in this experiment: evaluation of students' interactions with environment, their production, and a face-to-face interview for each group. This project was conducted over a five-week period. Students and teachers reported that this site map was very useful for project management.

3.3 Scenario 3: Development of a learning portal

Thanks to a gift from the SAGE foundation, the second author has progressively implemented a learning portal for the MBA program at Newcastle University (U.K.). Major project objective is to allow part time executive students an increased visibility of courses, program and university life in Newcastle, whether they are on campus or at their companies. Other project objectives include the creation of dynamic and interactive communication tools to initiate and extend contacts with the school and its business community.

Three competencies were targeted for this business community. The first is natural assimilation of the tools in their executive students' workspace at school, as well as at their companies. The second concerns using this technology in their daily work. This is a key step in educating students about the efficacy of learning to adopt new tools for current use, as well as for their life-long learning experience. Finally, collaboration has been viewed as a key competence in itself: the program has been constructed not as a series of individual courses, but as a set of collective learning paths.

The implementation of those objectives required technical and methodological choices, for which the SharePoint platform was the best choice. We worked with the teaching staff to develop means of learning evaluation, which takes into account the acquisition of targeted competencies. The individual evaluations of the modules incorporate students' activity on the portal, the nature of their collaboration, and their ability to adapt portal structure to the needs and objectives of their work.

The portal project has been viewed very favourably by a large majority of MBA students. Portal was explicitly mentioned in written evaluations of both their course and their instructor. Most students have praised the use of the portal to explore and structure their course work rather than using the technology simply to “store PowerPoint presentations”. The majority of students also feel that the project focuses on developing competencies that were market relevant and not just abstract knowledge. Finally, several students have underlined that public access to their work would be a definite advantage in selling their skills to current and future employers.

The instructors of other courses in the MBA program provide a more mixed evaluation of the portal strategy. Although they felt that the technical skills required to manage their course portal are easily attainable, they struggle with how to adapt their current course content and process to benefit from the project. Many have expressed different opinions over the required coherence degree of programme’s learning objectives, as well as to what degree their courses could be digitized. Most feel that the project entails more work than more traditional instruction, and many have expressed concerns of how such work would be recognized by their professional communities.

Program administrators stressed the contrast between project potential and university real environment. On the one hand, they have applauded the focus on developing individual and team competencies rather than “classroom learning”. They have stressed the positive spin-off for recruiting and developing professional networks. On the other hand, they feel poorly equipped to drive organizational and pedagogical changes needed to reap the full benefits from this proposal. They have cited real challenges in compensating instructors for their use of the portal, in dealing with administrative concerns over standard university practice, and in providing a clear road map for the future of blended learning.

The university administration must also be considered in evaluating project success. The University’s policy of centrally driven technology initiatives has been perceived to be directly challenged by this departmental initiative. Some university officials have been concerned that project design to provide maximum value to the program conflicts with university goals of assuring minimum functionality in an e-learning platform across departments. Given the visibility of e-learning initiatives on campus and within University community, the project has been subject to conflicts of interest present in most universities that limit the possibilities of a shared vision concerning the role played by IT in supporting higher education.

4 CONCLUSION AND DISCUSSION

In this contribution, we have raised a number of hypotheses on how collaborative technologies can impact management education. We suggested that information systems are often flawed mirrors of the managerial system they are designed to represent. We argued that the potential value of collaborative technologies is strongly influenced by organizational context, both in and between the university and the business community. We proposed that the effectiveness of collaborative technologies depends to a large degree upon the depth and coherence of learning objectives designed for the learning and work places.

We conclude with the idea that improving the effectiveness of collaborative technologies will require aligning the design of learning environments with the corporate cultures and visions we are trying to reproduce. Information technology is a mirror that offers a reflexion of who we are and how we interact with our personal and

professional environments. In this mirror, we view our skills and competencies in the context of those around us. For the university, information technology helps structure our views both of the learning place, and of the larger environment of our professional communities.

The learning place, much like the work place, is defined by the nature of our relationships with other students, faculty and administrators, as well as the learning agenda, structures, and outcomes. What is our institution's learning agenda, and what role does information technology play in shaping that agenda? How is our university structured to support learning, and to what degree does information technology strengthen (or weaken) its organizational foundations? How have our programs defined the desired outcomes or university experience, and to what extent does e-learning enrich this experience?

Based on this experience, our students enter the work place defined by its own set of decision-makers, agendas, and outcomes. Does the use of information technology in our university environment adequately prepare our students for managing the constraints of time, place and culture inherent in today's marketplace? How has our university used information technology to prepare the foundations for the students to understand the visions and agendas of corporate enterprise? How have our programs used e-collaboration to favour pedagogical outcomes that bridge the "gap" between learning and work?

What do we need to learn about management to work profitably in today's economy? If the needed skills can be studied related to functional disciplines that structure the university environment, associated competencies are a result of their application in the work place. How can information technology help our students understand the context, culture, motivations, and visions that shape the corporate environment? How can learning technologies help develop the competencies that will help our students resolve their future business challenges?

Information technology can bridge the perceptual gap between learning and work with either vicious or virtuous cycles. If information technology is used only to standardize, normalize and quantify the learning process, e-learning often results in a vicious cycle that creates a vision of work void of purpose, performance and creativity. If learning technologies are instead applied to encourage agility, talent, and research, e-learning can result in a virtuous cycle leading to a definition of the work place strengthened by innovation, passion and value. How has information technology been used in your institution to reflect who you are, and where you want future generations to go to?

We hope our recent experiences can contribute to create future opportunities for effectively integrating technology into the core of teaching (management) students both for short-term as well as long-term objectives.

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