Balancing Standardization with Organizational Indeterminacy: The Use of IT in Universities

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Abstract

Universities are highly computerized places with a strong technological infrastructure ranging from ERP implementations used for the re-organization of administrative processes to web-based learning applications and development tools deployed to restructure existing leaning models. However, the outcome of these technological interventions is not quite clear mainly because the interaction between information technology and the fluid organizational structure of universities is only narrowly considered in the IS literature. In this paper we examine whether current technological solutions designed to support primarily well structured organizational operations can enable coordination among loosely coupled elements. To this end, we present the case of an inter-university collaboration which deployed advanced information technologies as the backbone for collaboration among its members. We posit that the introduction of information technology in fluid environments has many implications which lead to the gradual rejection of the technological solutions. We conclude by critically examining the growing pressures for a more flexible university with the extensive use of advanced information technologies.

1.   Introduction

The potential of new types of interaction among geographically distributed, functionally and/or culturally diverse entities enabled by advanced forms of information and communication technologies (DeSanctis & Monge, 1999) influenced greatly the discussion on the future of universities and especially business schools (Van Baalen & Moratis, 2001). Over the last decade, info-enthusiasts predicted "*the decomposition of the university as a particular place and its recomposition as a set of wholly mediatized relationships, tied together by information and communication technologies (ICTs)*" (Cornford, 2000: 509). The new "intellectual/electronic infrastructure" (Ives & Jarvenpaa, 1996) is not only considered as the primary medium for providing education but also as the basic enabler of organizational change leading to the retooling of the university.

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However, this technology-centred discussion on the future of the university (e.g. Dumort, 2000; Pease, 2000) has not taken into account the idiosyncratic nature of universities as organizations. Universities do not adhere to the bureaucratic principles of organizing (Weick, 1976). It is, therefore, important to examine the potential of IT by taking into account that universities are loosely coupled systems in the sense that "*coupled events are responsive, but that each event also preserves its own identity and some evidence of its physical or logical separateness*" (Weick, 1976). To this end, the basic question is whether current technological solutions designed to support primarily well structured organizational operations can enable coordination in a fluid environment.

To answer this question, we examine the case eMaster[1], an alliance among ten universities collaborating at the postgraduate level. eMaster fits the model of a distributed virtual university (Van der Perre, Roosendaal, & Van den Branden, 2001) where "the use of ICT is of central importance to its functioning not only in the sense of providing education through ICT, but also to establish networking between participating universities that initiate activities together" (Van Baalen & Moratis, 2001: 145). To explore the potential of IT as a coordination mechanism in loosely coupled systems we focus on the practices of the various actors and on their interactions with IT. In the following section, we examine the nature of universities as unique organizational forms. Moreover, we examine the role of new technologies in universities thus far. In section 3 we briefly describe our empirical setting, the eMaster alliance, as well as our data collection and analysis techniques. The main body of the paper focuses on the analysis of the ways eMaster members negotiated with IT as a coordinating mechanism in a fluid environment. Section 5 discusses the role of IT in loosely coupled systems and how technologically-induced standardization can be balanced with organizational fluidity. Finally, the last section presents the conclusions of the paper.

2.   Universities as Organizations: The Role of IT

Universities are unique organizational forms combining many features of the bureaucratic ideal-type, such as formal role delineation and rule-bound behavior, in their coordination and administration apparatus (Gamoran & Dreeben, 1986). However, there are other aspects of university's social structure that cannot fit in such an organizational model (Tyler, 1985). As Pollock & Cornford (2004: 36) explain the prevailing image of university is that of "*a band of scholars coming together in pursuit and dissemination of knowledge, governed by a more or less collegiate model of organization, based around a complex structure of committees and with a high degree of individual and departmental autonomy*". The fluidity and processual looseness implied by this image of universities can be better described by the concept of loosely coupled systems (Weick, 1976) which carries connotations of the tacitness characterizing educational organizations.

According to Weick (2001: 383) "*loose coupling exists if A affects B (1) suddenly (rather than continuously), (2) occasionally (rather than constantly), (3) negligibly (rather than significantly), (4) indirectly (rather than directly), and (5) eventually (rather than immediately)*". In the case of university loose coupling suggests that the various departments or even faculty members within the same department can operate autonomously while it is not always clear how local actions are going to affect the overall system or its constituting elements. Goal indeterminacy, however, is the most effective way to administer a system which relies on variety in order to fulfill its basic function; engage students with communities of practice and concepts (Brown & Duguid, 2002). Universities must provide extensive access to different communities of practice for

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1 For privacy reasons, the name of the postgraduate programme is replaced by a pseudonym

students initially to learn about and then, gradually, learn how to be a member (Brown & Duguid, 1995).

Coordination of a system consisting of different subassemblies which preserve their identity, uniqueness and separateness is a complex task which cannot be based in direct control since events unfold unevenly, sporadically or unpredictably (Weick, 2001). An organizational logic based on tight procedures and causal relationships demands great amounts of financial and human resources without ensuring effectiveness. On the contrary, with loose coupling universities need only minimum coordination which results in fewer conflicts and fewer inconsistencies among highly differentiated activities (Weick, 1976) while potential failures are not destructive since breakdown is avoided by sealing off failing components.

This hybrid nature of universities as organizations is reflected also in the information technologies implemented in such settings the past decade. Universities are highly computerized places with a strong technological infrastructure ranging from ERP implementations used for the re-organization of administrative processes (Cornford, 2000) to web-based learning applications and development tools deployed to restructure existing leaning models (Alavi & Leidner, 2001). The study of the phenomenon in the information systems literature followed two different paths reflecting the nature of technological solutions as it is evident in table 1.

Table 1: Summary of key themes and findings concerning the introduction of IT in universities

	Topic	Findings	References
Administrative apparatus	ERP implementations	Universities are turned into more concrete institutions There are adaptations of the software to fit local needs however most of the organizational processes are aligned with the pre-designed processes of the software	Scott & Wagner (2003), Pollock & Cornford (2004), Pollock (2000)
Instructional activities	Technology-mediated learning	Students showed higher levels of interest in learning Only informed and motivated learners can benefit from technology In virtual environments the findings are mixed depending on faculty involvment	Alavi (1994), Leidner & Jarvenpaa (1993), Alavi, Yoo & Vogel (1997)

The first stream of research examined the implementation of ERP systems in the administrative functions of the university. Researchers investigated how standard software packages designed for commercial organizations are implemented in organizational settings administered according to different premises (Pollock, Williams, & Procter, 2003). Despite local adaptations of software components to fit the idiosyncrasies of university operations (Scott & Wagner, 2003) researchers predict the emergence of "a different, and more concrete, type of institution, one in which the heterogeneity of the institution is reduced in the sense that the various parts of the organization must be made to fit together and be aligned in the same direction" (Cornford, 2000: 520).

The second stream of research examines the use of technology-mediated learning technologies (Alavi & Leidner, 2001) by universities in order to add more value on their educational offerings. Discussions are centered around the effects of information

technology on learning and educational effectiveness. To this end, computer-mediated learning is considered an appropriate way to address serious weaknesses of the education system such as lack of critical thinking skills and problem solving capabilities (Alavi et al., 1997). Additionally, IT-enabled teaching is found to be more effective in comparison to traditional teaching methods (Leidner & Jarvenpaa, 1993). However, most of these research efforts do not examine the effects of technology-mediated learning technologies on the underlying organizational structure of the university. Even researchers who specifically address the introduction of IT in the classroom (e.g. Leidner & Jarvenpaa, 1993) do not examine teaching as an organizational process but center their analysis on how learning is realized in computerized environments.

It is therefore evident that the effects of information technologies in loosely coupled systems are not quite clear since research efforts focusing on the organizational effects of IT in universities (e.g. Pollock & Cornford, 2004) examined their administrative apparatus which follows the premises of bureaucratic organization while research efforts (e.g. Alavi et al., 1997) examining IT in the elements of universities which are actually loosely coupled did not focus on the organizational aspects of these implementations. We address this issue on our case study, which investigated how IT has been introduced in the context of a collaborative effort among ten universities. In this case, IT has been the principal mechanism through which the partners tried to combine their knowledge and expertise in delivering a postgraduate programme in eManagement. To this end, we can see whether IT can function as a mechanism enabling coordination in settings characterized by processual fluidity and goal indeterminacy.

3. Research Methods

The eMaster alliance emerged as a response of leading E.U. and North American Universities to the demands for a more up-to-date executive education that would incorporate the changes ICT brought to managerial practices. In this section, we present an overview of the research setting and describe our data collection and analysis techniques.

3.1 Empirical Setting: The eMaster Postgraduate Programme

The eMaster alliance is an international network of business schools sharing a common curriculum in e-management at the masters degree level. The alliance evolved in two stages. The founding core included five large European Business Schools and one partner from the Unites States of America. These six universities established the curriculum of the programme and launched jointly the first academic year in September 2000. However, the increasing demand from prospective students in various participating universities led the alliance to launch a second academic year in December 2000. In this second academic year, the alliance was also joined by four new members: two European universities and two from North and Central America.

The content of the postgraduate program offered by the consortium was arranged around three general streams, Business, Technology and Policy and Law. Courses were classified in three main categories. The first included Internet-based courses, common for all eMaster partners. Internet-based courses were part of the technological stream. The second category included courses common in terms of topic but different or at least varying in terms of content. eMaster faculty was allowed to select their own material and teaching methods, however the core of the lessons was common as they involved a joint assignment called Virtual Team Exercises (VTE) that entailed the collaboration of students from all university members in multinational teams. Finally, eMaster included

also school specific courses to capitalize on local expertise and comply with local policy and accreditation issues. As part of its innovative approach in teaching methods, eMaster offered also International Seminars three times per academic year.

3.2 Data Collection and Analysis

The data were collected during a longitudinal interpretive case study conducted between September 2001 and December 2003. The first author participated in various activities of the eMaster alliance (e.g. International Seminars, director meetings). She conducted numerous informal interviews and 17 semi-structured interviews ranging from 60 to 90 minutes with eMaster participants including students, faculty, directors, and administrative staff. The second author taught a course in E-Commerce in one of the European Universities hosting the programme. She was also holding the position of eMaster's assistant director in that university and thus participated in numerous meetings with the directors of the other members of the alliance. The authors reviewed also e-mails exchanged among members of the alliance, minutes from directors' meetings and various other documents published by the alliance.

The purpose of the case study was to investigate the potential of IT as a mechanism enabling coordination in loosely coupled systems like universities. Research was conducted in two phases. In the first phase, the purpose of data collection was to acquire a solid picture of the alliance. Both interviews and archival data collection aimed at creating a retrospective case history (Van de Ven, 1992) of the major events during eMaster's formation. In the second phase, which was based primarily on in-depth interviews, participants were asked to commentate on the events identified in phase one with emphasis on instances affecting tasks common to all alliance parties, which also involved use of IT.

Data analysis proceeded with an interpretive reading of documents, e-mails and interview transcripts. The major question guiding data analysis was the following: Can IT serve as a coordinating mechanism in systems characterized by loose coupling? All data were thematically coded during the first phase of the research in order to reveal existing patterns and interrelationships. This second phase of research was used to elaborate, confirm or challenge, but primarily clarify, the emerging material (Zuboff, 1988). Following Zuboff's (1988) example, in this paper we use these quotations that represent the main trend in any topic. Moreover, we used surprising responses in order to vividly describe how actors experienced the role of technology in the context of a university alliance.

4. Introducing IT in Loosely Coupled Systems

Even from inception the major organizing principle in eMaster was the preservation of the autonomy of the participating universities. Collaboration was imagined as a flexible network arrangement that would permit alliance members to operate autonomously in order to conform to the local demands of their institutional environment while being part of an innovative organizational arrangement. Our interviews with the programme's directors revealed that ICT was considered the more logical solution in this effort to maintain an efficient but flexible collaboration.

Following the requirements of the various courses offered by the alliance and the degree of necessary co-ordination, a number of technology mediated learning solutions were deployed including Internet-based material, and collaboration platforms like Blackboard™. For the purpose of this paper, we describe the role of IT in two course

categories, the Internet-based courses and the courses with common title that included Virtual Team Exercises. Both these course categories demanded large efforts of coordination and collaboration among faculty members since the organizational model adopted for the operation of the alliance predicted the teaching of all courses to be performed locally at each university. To this end, much of the necessary coordination was embedded in the IT solutions implemented for that purpose. The information technologies deployed for this reason are presented in Table 2.

Table 2: ICTs deployed in eMaster

Technology	Purpose of use
Internet-based material	The purpose of using this material was twofold: to induce commonality to the teaching material and to use new technologies to reduce the need for in-class teaching since eMaster was an executive postgraduate programme.
Blackboard ™	This programme served as collaboration mechanism among students especially in courses with common title. As initially conceived, students would have access to the course material taught in all participating universities.

Despite the initial enthusiasm about the potential of information technology to facilitate coordination and collaboration among alliance members, the majority of these technologies were not used by both faculty and students. Our research identified a number of important implications explaining this gradual misuse of ICTs from the practices of both faculty and students. These implications are explained in the following sections.

4.1   Top-Down Standardization of Common Teaching Material

Internet based courses were part of the technology stream and aimed at providing an overview of the majority of technological issues regarding eCommerce. From our interviews, it became evident that the guidelines for the structure of the courses, the bibliographic resources deployed and the presentation of the material were not the outcome of faculty collaboration across the alliance. On the contrary, instructions to course designers were given by the eMaster programme directors in a top-down effort to standardize teaching material. The outcome was a course combining a variety of topics such as security, information systems, eCommerce. This plurality of content did not satisfy the faculty or the students. Faculty members coming from different disciplines had difficulties in teaching all topics of the course. As one of faculty members stated:

> *Faculty members could not easily teach that course. This was due to the fact that everybody originated from a different discipline. For example, the tutors with expertise in IT had no problem in teaching databases or somebody with IS expertise could easily teach the relevant topics. However, many had difficulties in analyzing some interdisciplinary issues or e-Commerce topics. They needed coaching themselves to cope with the demands of the course. This wasn't a single incident since many of the tutors involved in the course faced this kind of problem.*

Students on the other hand, did not like the sterile and detached teaching methods these courses involved. They preferred in-class discussions in order to exchange experiences from their work environment instead of accessing the material from home and studying it in isolation. To this end, Internet-based courses were gradually abandoned and faculty used more traditional teaching methods. However, this also entailed more variety in the teaching material and less potential for coordination among universities.

4.2   Absence of Incentives for Faculty Coordination

In eMaster the technologies deployed for collaboration purposes among students necessitated close coordination between faculty members regarding the content. Especially, in courses with common title and content, where Blackboard^{TM} served as a collaboration mechanism, faculty had to upload all materials and coordinate the sequencing of modules taught to their students. However, interviews showed that coordination remained at minimum levels. In some instances it was even problematic since some faculty members, as our interviews revealed, refused to share any of their course material with anybody else because of intellectual property issues.

This limited coordination is mainly attributed to the fact that faculty members were left without specific targets to be accomplished at the alliance level. Even more, the existence of a course manager acting as intermediary among faculty actually obstructed direct communication since faculty did not have direct knowledge of their peers in the other members of the alliance. As one faculty member explained:

> *… Since I communicated mainly with the course manager the actions of my colleagues teaching the same course in other universities were completely invisible to me. I did not even know who they were. Only if the course manager carbon-copied messages to other colleagues I could see their names in the e-mail. … After a while it became obvious that the course manager didn't have any task list in reality. Even now I' m not sure what he actually did or even if he did anything for the course.*

Thus, faculty never actually had the incentives to coordinate since the importance of such an effort on the operation of the alliance was never really communicated to them by the programme's directors. Moreover, the structure of coordination was not facilitating interaction and therefore faculty following traditional course design methods decided for their teaching material by themselves.

4.3   Inefficient Communication across Alliance Members

In the case of Internet-based courses, interaction among students simply was not inscribed in their design. These courses were the only curriculum component identical for all eMaster partners. Moreover, they involved intense use of information technology as part of the educational process. However, the interface design of each course included only the possibility for on-line tutoring, not interaction among students. Therefore, students could not interact during the sole scheduled common task while the exchange of ideas or experiences was left to their own initiatives. The use of the course interface as communication medium was never fully exploited for a more practical reason as well. Technology courses have been distributed to the students in the form of CD for convenience reasons so the on-line experience never actually unfolded to its true potential.

Irregularity, or rather absence of communication, characterized the interface among faculty members regarding common courses. The design of the Internet-based courses was not assigned to them and the actual designers never really communicated with faculty members during the creation of the Internet-based courses. During the familiarization period before teaching, faculty members communicated mainly with the designer and seldom with each other. Additionally, the interface structure of the course was fostering interaction between tutors and students within the same institution and not across alliance partners. Since the Internet-based courses were taught from their CD version for practical reasons the possibility for communication across alliance partners was lost and interactions were limited within each institution, as in traditional programs.

In the case of courses with common title supported by Blackboard^{TM} the situation was even more fluid since faculty did not incorporated at all this technology in its instructional activities or it had assigned to teaching assistants the task of uploading the material simply to conform to the demands of the programme. The organizational indeterminacy characterizing loosely coupled systems like eMaster permitted the programme to operate even without technological support with however limited interaction among alliance members at the faculty and students level. However, eventually, the consequences of limited coordination in instructional activities became evident since students had problems collaborating in joint activities like Virtual Team Exercises and International Seminars.

From the analysis, thus far, it is evident that IT-enabled coordination at the alliance level necessitated heavy collaboration primarily among faculty members. However, in the organizational model adopted by eMaster, flexibility and loose collaboration lied precisely at the faculty level. To this end, following traditional models of postgraduate programmes organization, eMaster directors left coordination at the discretion of each faculty members. As one director acknowledged:

> *Ultimately faculty will choose to collaborate or not, on their own volition. You can't force them by terms of employment or whatever. In an executive program you try to find the best faculty who can teach in that type of a setting. It is a very special kind of setting and even good faculty in regular courses does not do very well in executive. And whether this also commensurates with their interest in collaborating internationally with other faculty you have to look at it as something of a bonus.*

The consequence of introducing IT applications demanding heavy collaboration at the alliance-level and at the same time preserving loose coupling among faculty led to the rejection of both Internet-based courses and Blackboard^{TM} as facilitating mechanisms. Many of students and faculty members attributed this fact to technology itself without considering the effort they had to invest in order to incorporate these applications to their practices. However, the way information technology was introduced in loosely coupled systems like inter-university collaborations raises important issues on the way standardization as a prerequisite for successful IT implementations can be balanced with the indeterminacy characterizing loosely coupled systems. These issues are going to be further discussed in the following section.

5.   Balancing Standardization with Organizational Indeterminacy

The aim of this study was to explore the effects of IT implementation in loosely coupled systems. For this reason we examined the case of an inter-university alliance which introduced technology-mediated learning as a way to support and coordinate teaching activities among its members. From our analysis it became evident that the

implementation of information technologies in organizations not administered according to the premises of bureaucracy creates a number of problems leading to the rejection of technological interventions. These findings challenge the current imagery of a novel, flexible university following current organizational trends in its operations (e.g. Alavi et al., 1997; Van Baalen & Moratis, 2001) and thus deserve further analysis.

Over the last decade, a growing number of universities invested in information technologies conforming to pressures for a more flexible organizational model. According to the prevailing imagery, information technologies, such as enterprise systems, intranets or the Internet, would enable forms of organizing induced with "functionally decentralized, eclectic, and participative managerial structures" (Heydebrand, 1989: 327). These new organizational forms would have increased capabilities for coordination across smaller, decentralized units which would be coupled with each other through advanced information technologies (Fulk & DeSanctis, 1995). However, this discussion on the properties of novel organizational forms looking more like a nervous system than traditional pyramidal organizations (Fulk & DeSanctis, 1995) shadowed the fact that all this structural flexibility assumed a strict processual standardization if new information technologies were to successfully support distributed organizational operations. The ubiquitous nature of standardized behavior in modern organizing (Kallinikos, 2004) has not permitted a more critical examination on the prerequisites of IT-induced organizational flexibility even when pressures for flexibility targeted organizations not administered as bureaucracies as in the case of universities.

Standardization is not widely discussed in the literature on IT implementations on universities. The topic appears only in accounts of ERP implementations in universities (e.g. Pollock & Cornford, 2004; Pollock et al., 2003; Scott & Wagner, 2003) which nevertheless concern the administrative core of the university. The issue does not seem important in research efforts on technology-mediated learning although loose coupling among universities refers primarily to faculty. The reason for this apparent paradox can be found in the nature of research efforts examining the role of IT in learning. Most research efforts focused on attempts to introduce IT in learning activities orchestrated by a single institution (Alavi, 1994). Even in cases where more than one universities collaborated (Leidner & Jarvenpaa, 1993) one faculty member was responsible for the teaching material of each course. However, in our research we examined a more complex case of technology-mediated learning where coordination was also important at the faculty level across the alliance.

The case of eMaster is quite revelatory in that respect. More specifically, our findings show that Internet-based courses and Blackboard™ were abandoned by eMaster's students because faculty resisted standardization and this way technology became obsolete. The adoption of both these technologies stumbled in the absence of common teaching material and joint efforts by the alliance faculty. As a result, the technological infrastructure could not support functions which followed local needs instead of conforming to an alliance-wide standard. However, there is an important parameter which can explain the mixed findings in the literature. During our research it became evident that faculty resisted standardization of teaching when eMaster followed an organizational model based on courses which had to be uniformly taught across the alliance in order to allow technology to support them. In that model, students were located in the universities where initially enrolled. So the effort of coordination and standardization rested in the faculty. When eMaster changed its organizational model to a more traditional one grouping all students together in common classes hosted by the various universities-members then Blackboard™ and other on-line material were enthusiastically adopted by students. It is therefore evident that information technologies can successfully support operations in organizations where predictability is limited and processes unfold loosely without straight-forward connections among their constituting parts (Weick, 2001). What

needs to be considered is at which level the systems are loosely coupled in order to avoid standardization efforts which are going to be rejected by organizational members.

In the case of IT-enabled collaborations among universities our research showed that loose coupling among individuals and particularly faculty members is not compatible with efforts to standardize teaching at the alliance level. Information technology is primarily automating processes that can be rationalized and routinized (Zuboff, 1988). This leaves intact activities that demand artful methods that humans have devised for dealing with one another. Teaching belongs in this category of activities which cannot be standardized and thus evade any attempts to be incorporated in IT applications which demand heavy coordination. This is because universities are loosely coupled precisely at the level of individuals and therefore the highly standardized IT solutions cannot support inter-university operations.

6.   Conclusion

The role of IT in the transformation of the university into a more concrete organization has been considerably discussed in the literature (e.g. Pollock & Cornford, 2004; Scott & Wagner, 2003). However, these research efforts focus primarily on the automation of administrative processes in order to discuss the effects of standardization on unique organizational forms like universities. Our research has showed that the use of IT requires also standardization in the teaching activities especially when it also has to support collaboration among geographically dispersed universities. IT applications aiming at supporting inter-university activities demand a strict standardization of teaching materials and instructional processes in order to operate properly. This IT-enablement is quite complicated since universities as systems are loosely coupled at the level of faculty and therefore evade standardization especially in complex inter-organizational environments.

If IT enablement is to succeed, as our research showed, the nature of standardization needs to be thoroughly examined. As Agre suggest (2000) standardization is a force of both good and evil depending on how it is introduced in systems characterized by processual looseness. To this end, universities need to carefully consider which aspects of their teaching functions will be standardized and in what manner.

References

Agre, P. E., (2000): Infrastructure and institutional change in the networked university, Information, Communication & Society, Vol. 3, No 4, pp. 494 - 507.

Alavi, M., (1994): Computer-mediated collaborative learning: An empirical evaluation, MIS Quarterly, Vol. 18, No. 2, pp. 159-174.

Alavi, M., Leidner, D. E., (2001): Research commentary: Technology-mediated learning - A call for greater depth and breadth of research, Information Systems Research, Vol. 12, No. 1, pp. 1-10.

Alavi, M., Yoo, Y., Vogel, D. R., (1997): Using information technology to add value to management education, Academy of Management Journal, Vol. 40, No. 6, pp. 1310-1333.

Brown, J. S., Duguid, P., (1995): Universities in the digital age, Change: The Journal of the American Academy of Higher Education, Vol. 28, No. 4, pp. 10-19.

Brown, J. S., Duguid, P., (2002): "The social life of information (2nd ed.)", Harvard Business School Press, Boston, MA.

Cornford, J., (2000): The virtual university is ... the university made concrete?, Information, Communication & Society, Vol. 3, No. 4, pp. 508 - 525.

DeSanctis, G., Monge, P., (1999): Introduction to the Special Issue: Communication Processes for Virtual Organizations, Organization Science, Vol. 10, No. 6, pp. 693-703.

Dumort, A., (2000): New media and distance education: An EU-US perspective, Information, Communication & Society, Vol. 3, No. 4, pp. 546 - 556.

Fulk, J., DeSanctis, G., (1995): Electronic communication and changing organizational forms, Organization Science, Vol. 6, No. 4, pp. 337-349.

Gamoran, A., Dreeben, R., (1986): Coupling and control in educational organizations, Administrative Science Quarterly, Vol. 31, pp. 612-632.

Heydebrand, W., (1989): New organizational forms, Work and Occupations, Vol. 16, pp. 323-357.

Ives, B., Jarvenpaa, S. L., (1996): Will the Internet revolutionize business education and research?, Sloan Management Review, Vol. 37, No. 3, pp. 33-41.

Kallinikos, J., (2004): The social foundations of the bureaucratic order. Organization, Vol. 11, No. 1, pp. 13-36.

Leidner, D. E., Jarvenpaa, S. L., (1993): The information age confronts education: Case studies on electronic classrooms, Information Systems Research, Vol. 4, No. 1, pp. 24-54.

Pease, P. S., (2000): The virtual university: Jones International University™, Ltd, Information, Communication & Society, Vol. 3, No. 4, pp. 627-628.

Pollock, N., (2000): The virtual university as "timely and accurate information", Information, Communication & Society, Vol. 3, No. 3, pp. 349 - 365.

Pollock, N., Cornford, J., (2004): ERP systems and the university as a "unique" organization, Information Technology & People, Vol. 17, No. 1, pp. 31-52.

Pollock, N., Williams, R., Procter, R., (2003): Fitting standard software packages to non-standard organizations: The " biography' of an enterprise-wide system, Technology Analysis & Strategic Management, Vol. 15, No. 3, pp. 317 - 332.

Scott, S. V., Wagner, E. L. (2003): Networks, negotiations, and new times: The implementation of enterprise resource planning into an academic administration, Information and Organization, Vol. 13, No. 4, pp. 285-313.

Tyler, W. B., (1985): The organizational structure of the school, Annual Review of Sociology, Vol. 11, pp. 49-73.

Van Baalen, P. J., Moratis, L. T., (2001): "Management education in the network economy", Kluwer Academic Publishers, Boston.

Van de Ven, A. H., (1992): Suggestions for studying strategy process: A research note, Strategic Management Journal Vol. 13, No. Strategy process: Managing corporate self-renewal, pp. 169-191.

Van der Perre, G., Roosendaal, H., Van den Branden, J., (2001): The distributed virtual university, "New Learning", A. R. Trindade (Editor.), Universidade Aberta, Lisbon.

Weick, K. E., (1976): Educational organizations as loosely coupled systems, Administrative Science Quarterly, Vol. 21, No. 1, pp. 1-19.

Weick, K. E., (2001): Management of organizational change among loosely coupled elements, "Making sense of the organization", K. E. Weick (Editor), Blackwell Publishing: Oxford.

Zuboff, S., (1988): "In the age of the smart machine: The future of work and power", Basic Books: New York.