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Teaching with the Case Method Online: Pure Versus Hybrid Approaches

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ABSTRACT

The impact of hybrid classroom/distance education approaches is examined in the context of the case method. Four distinct semester-long treatments, which varied mixes of classroom and online discussion, were used to teach a graduate MIS survey course. Specific findings suggest that by using Web technology, college instructors may offer students the option of participating in high-quality courses using the case method pedagogy in an online environment. Students not only appear to do as well as in the traditional classroom, but the data suggest that students in the online environment may perform better at multiple levels of learning outcomes, especially when using a blend of classroom and online technologies. Furthermore, the precepts of the case method pedagogy may be enhanced by the use of online discussions. Instructors employing the technique may find their own importance devalued, while the time demands of the approach can be much greater than for traditional classes. The findings infer that it is the model of learning and its fit with supporting technologies, rather than the presence of technology per se, which enhances learning outcomes.

Subject Areas: Case Method Pedagogy, Distance Education, Graduate Business Education, Learning Interaction, Learning Outcomes, and Technology Mediated Learning

INTRODUCTION

Developing a better understanding of the role of technology in facilitating learning has been identified as an important research objective for the field of Management Information Systems (MIS) (Alavi & Leidner, 2001; Piccoli, Ahmad, & Ives, 2001). At the present time, one of the most rapidly growing uses of technology-mediated learning (TML) is in support of distance education. The potential benefits that TML can provide in this context—freeing students and instructors from the constraints of place and (sometimes) time—are enormous. Unfortunately, the

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theoretical justification for the pedagogy of distance education has not kept up with the growth in its practice (Phipps & Merisotis, 1999).

Two problems confounding the study of TML in distance education are the wide range of pedagogies employed and the equally wide range of content areas. What applies to one particular technical content area may not apply to another, more humanistic, body of subject matter. What applies to one mode of distance learning (e.g., synchronous chat) may not generalize to other modes (e.g., asynchronous discussions). As a consequence, research is forced to proceed on a case-by-case basis. Conducted in this fashion, progress is necessarily incremental in nature. Such progress is critical however, if we are not to rush, willy-nilly, into a sea of ill-conceived educational offerings driven by the administrative, rather than educational, benefits accruing from our growing technological capabilities.

A particularly significant trend that has been observed in higher education is the adoption of hybrid (a.k.a. blended) models of education that promote a mix of classroom and distributed learning environments. This is a global trend (Cookson, 2002) driven by institutional leaders (Hardy & Robinson, 2002) in their efforts to address student and institutional needs in an increasingly competitive higher educational environment (Symonds, 2003). Hybrid models of education have resulted in the convergence of the traditional classroom and distance learning (Shale, 2002; Smith, 2001), which is a trend that parallels the adoption of cost-reducing blended learning methods in corporate training programs (Strother, 2002). This convergence has been made possible by the application of advanced information technologies and has the potential to change educational processes in both the traditional classroom and the distance-learning environment. However, the effect of hybrid models on learning processes and outcomes is not well understood, leading to the adoption of many different approaches within graduate business programs (Smith, 2001). To better understand these effects, research on the effects of information technologies across the wide range of learning environments is crucial.

In this article, we examine the impacts of hybrid classroom/distance education approaches in the context of one particular pedagogy—the case method. Specifically, our research focuses on the use of this highly interactive instructional method in the traditional classroom and in a Web-enabled discussion environment. Using a quasiexperimental design (Cook & Campbell, 1979), four distinct treatments (which varied the mix of classroom and online discussions) were used to teach the same body of material in a graduate MIS survey course within a college of business. The results were then analyzed, yielding both qualitative and quantitative insights into the efficacy of different course delivery strategies.

Our findings provide insights in two important areas. First, they address the impact of blending online and classroom instruction, with potential relevance to both higher education (Smith, 2001) and industry (Strother, 2002). Second, they address the types of outcomes that can be expected from courses, whose primary pedagogy is case discussions, an area where existing research findings are very limited (Barnes, Christensen, & Hansen, 1994).

THE CASE METHOD

Having its theoretical roots in constructivism, the case method is used in many graduate schools of business. A number of the most prestigious of these

schools—such as Harvard Business School (HBS) (where it was first developed) and the Darden School at the University of Virginia—report employing the case method pedagogy almost exclusively throughout their entire master's degree programs. In this section, we contrast the case method with traditional lectures, and then look at research involving cases in the TML area.

Case Method Versus Traditional Lectures

The case method differs from traditional classroom teaching (i.e., lectures) in three important ways: in its objectives, in the role of the instructor, and in its emphasis on induction. Each of these is now considered.

Objectives

The central goal of the case method pedagogy is to enable fruitful discussion between students in the classroom (Barnes et al., 1994; Lynn, 1999; Wassermann, 1994). Using the written case as the foundation, the class unfolds as a complicated interaction of the situation provided by the business case, the individual student, the overall class section, and the discussion leader (Barnes et al., 1994). Ideas flow back and forth between instructor and student.

Five principles are proposed for the effective use of the case method pedagogy: the primacy of situational analysis, the imperative of relating analysis and action, the necessity of student involvement, the nontraditional role of the instructor, and a balance of substantive and process teaching objectives. The most critical objective of the process is to develop an administrative point of view (Barnes et al., 1994).

Role of Instructor

The nature of the case method pedagogy demands a very different role for the instructor from that of a traditional lecturer. The case instructor's central role becomes that of discussion leader and facilitator, rather than information provider. The instructor must listen, attend, and comprehend student statements. The instructor must then choose questions that guide the discussion and focus students' attention on the case's big ideas, as well as promoting cognitive dissonance to exercise critical thinking skills (Wassermann, 1994).

Role of Induction

The case method is particularly distinguished from other pedagogies by virtue of its reliance on induction, rather than theoretical frameworks. As described by a note on case teaching developed at HBS:

> A truly effective case instructor relies on his/her students to learn inductively from the case data. In comparing a series of cases and contrasting them with each other, students should learn to slowly construct a framework built out of relevant information, consolidate it and sharpen it as a robust way of understanding not only the case issues discussed, but as a useful platform to support future thought on related issues (Rangan, 1995).

To be consistent with this philosophy, the case method pedagogy cannot be satisfied through the analysis of a single isolated case. Instead, it requires a collection of case studies; sufficient so that the inductive framework can be established.

Although the case method pedagogy has been used for nearly a century, there has been relatively little research on how to measure the actual educational outcomes resulting from the use of the case method (Barnes et al., 1994). For this reason, student participation in case method discussions is usually weighted at least as heavily as other outcome measures (e.g., examinations, which typically involve analyzing a case study) in assessing student performance.

Case Method and TML Research

A review of the literature reveals a dearth of research on the effectiveness of the case method in a TML environment. Given the importance of the case method in colleges of business and the rapid emergence of affordable advanced information technologies, this lack of findings is a call for study of this area. There are, however, related findings in the educational and TML research that are useful in guiding the formation of research questions and design. The first, a positive, is the potential for superior outcomes from the apparent fit of the case method with the capabilities offered by networked synchronous and asynchronous information technologies. The second is the distinction noted when comparing case studies reported in the existing TML research with the HBS case method. The third is a caution highlighting the level of care required when designing studies where both information technology and instructional design are of interest. Lastly, research on distance learning cautions that research should consider the potential effects instructor and individual student variables may have on learning processes and outcomes.

Fit Between the Case Method and TML

Even in the absence of direct research on the case method, there is support that TML may be a reasonable fit with the pedagogy. A shift from the structural issues of how to physically organize and support delivery of education to a focus on the transactional processes of teaching and learning has been called for in distance education research (Garrison, 2000). This reflects a change from an industrial view of distance education focused on achieving economies of scale to a postmodern learner-centered view and is consistent with research agendas proposed in information systems (Alavi & Leidner, 2001). A key change in this view is a transition in the role of the instructor from one-way provider of information to a co-participant with students in the learning process, facilitated by advanced information technologies (Garrison, 2000). The change from a predominately one-way top-down communication pattern is facilitated by recent information technologies with capabilities to support *n*-way synchronous or asynchronous communication in which instructors can engage multiple students in discussion and/or students can interact with each other. The learner-centered view achieved in implementing the case method is highly consistent with this recent trend in distance learning.

Case Method versus Case Studies

The distinction between the "case method" and the use of case studies in experimental settings is particularly critical in assessing TML research relating to the case method. Case studies have frequently been used in the context of TML research (e.g., Alavi, 1994; Alavi, Yoo, & Vogel, 1997). Most commonly, researchers select

the task of analyzing business cases in their research designs, particularly in studies of cooperative learning and group decision support systems. A fairly typical protocol for such studies might include an initial lecture by the instructor, assignment of team tasks to students, analysis of the case by student teams, preparation of team reports, and individually graded questioning by the instructor (e.g., Alavi, 1994). The nature of such studies, however, precludes them from being considered tests of the case method pedagogy—stimulating discussion is not normally the primary objective of the experimental task, the role of the instructor is far different from that of a moderator and limiting an experiment to a single case more or less eliminates the likelihood of any useful induction. None of these differences should be interpreted as calling into question the value of such experimental designs. The differences simply mean that the experiments are not testing the case method pedagogy.

Effects of Media on Learning

Another challenge regarding the use of TML in the case method relates to the interpretation of results—a general concern for all TML implementations. Claims of technology-driven positive learning outcomes have generated a debate on whether it is appropriate to treat technology as a "cause" of learning outcomes (Clark, 1994; Kozma, 1994). The heart of this argument is whether there should be a distinction between the method of instruction and the medium used to deliver the instruction. This controversy has arisen over the many studies that have produced evidence of the positive effects of various media on learning. Clark (1994) asserts that most studies of technology impacts on learning outcomes have failed to control for the effect of the teaching method (instructional design) employed in the study. The argument here is that changes in the teaching method embodied in the detailed instructional design used, for example, within a computer-based training package, were the causal factor in achieving superior learning outcomes. Clark takes an extreme view, arguing that any impact on learning outcome must be due to the influence of the instructional method and cannot be due to the technology (Clark, 1994). Counterarguments are that researchers must consider the capabilities of media, and the methods that employ them, as they interact with the cognitive and social processes (Kozma, 1994; McIsaac & Gunawardena, 1996).

Instructor Resistance

The research literature also suggests that attempts to introduce TML (particularly distance learning) into the case method pedagogy may face serious resistance. Many faculty members in higher education have reported a preference for face-to-face traditional teaching over teaching at a distance. Participants in distance education have reported feeling isolated due to lack of direct interpersonal contact (Cho & Berge, 2002). A preference for face-to-face approaches is likely to be particularly pronounced for case method instruction, given the highly interactive nature of a case discussion in the classroom. Furthermore, instructor training in technology, often focused entirely on the operation of equipment—rather than on methods of integrating communications media with instructional methods—may magnify such resistance, rather than reducing it (McIsaac & Gunawardena, 1996).

Individual Differences

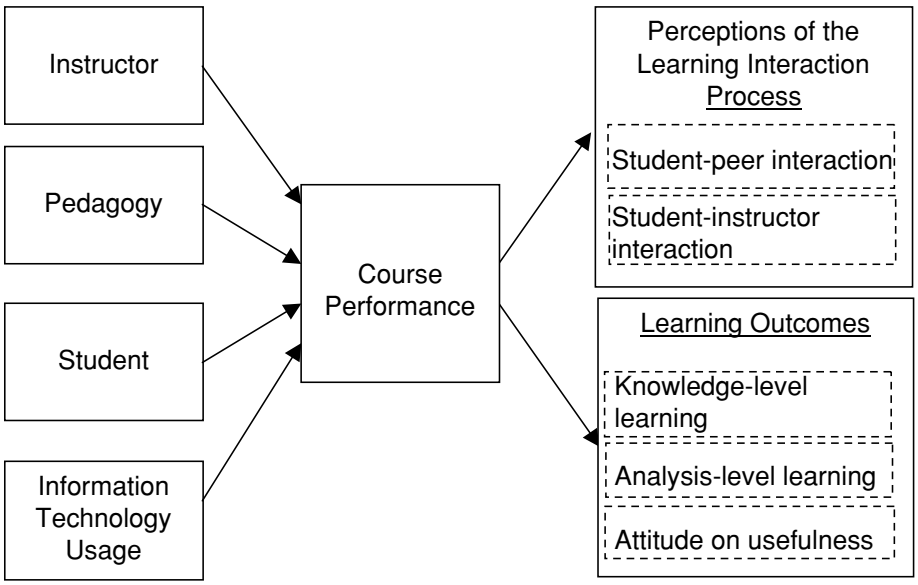
Another issue that may impact TML effectiveness is sensitivity to learner characteristics. Distance education courses have a history of high dropout rates. Individual factors reported to influence the completion of distance education courses include maturity, level of self-motivation, and previous academic success of the students (Keegan, 1996). Other factors potentially affecting learning success include the individual learner's demographics, educational background, cognitive styles, learning styles, psychological type, and attitudes (Jonassen & Grabrowski, 1993). Failure to control for such differences could lead to erroneous conclusions being drawn related to effectiveness.

Given the promises of fit and the cautions on research design derived from the literature, the next section presents the research model used to evaluate the effects of the case method on learning processes and learning outcomes.

Research Model

Technology-mediated learning occurs in an environment where the learner's interactions with learning materials, peers, and instructors are mediated through advanced information technologies. Central to the emerging TML stream of research is the need to better understand and control for effects on learning processes and outcomes. In the absence of any well-developed process model of case method instruction, the research employs a rather simplistic exploratory model, as depicted at Figure 1, that was adapted from an Alavi and Leidner (2001) research framework.

Figure 1: Research model for assessing the effects of technology approach on the case method of teaching.



The model posits that learning processes take place in a "black box" called "course performance." Few assumptions are made regarding the nature and sequence of activities taking place within the box—vagueness made necessary by the lack of general models that are available for such processes. What the model does assume, however, is two things:

1. Whatever processes take place will be the result of a complex interaction between four factors: technology, pedagogy, instructor, and student. The choice of these is consistent with the interaction process construct, which has been described as having the four dimensions—learner-instructor, learner-peer, learner-context (Moore, 1989), and learner-interface interactions (Hillman, Willis, & Gunawardena, 1994).
2. Should course performance processes be consistent with the case method pedagogy, evidence of certain activities should be present. As discussed previously, these activities include peer interaction, role of the instructor as moderator (rather than information provider) and learning through induction.

The first of these leads to the choice of independent variables. The second implies that both qualitative process indicators and learning outcome measures need to be considered.

Existing research further suggests that the measurement of learning outcomes must be broken into a number of components. One categorization (Leidner & Jarvenpaa, 1995), for example, proposes five dimensions synthesized from the literature on learning. These outcome dimensions include (1) self-oriented variables such as interest, motivation, and self-efficacy; (2) levels of learning ranging from factual to conceptual; (3) level of cognition ranging from lower order to higher order thinking; (4) behavior measured by participation and attention (low to high); and (5) performance measured by improvements on objective assessments.

RESEARCH DESIGN

Research Questions

Consistent with questions emerging from the fields of information systems and distance education, this study seeks to address the effect of technology on learning processes when employed in the context of the case method pedagogy. In the broadest sense, we are interested in two questions:

1. What types of changes take place as the case method is implemented in a TML/distance-learning environment?
2. Is a TML/distance-learning implementation of the case method faithful to the precepts of the pedagogy?

More specific versions of these questions can be posed by breaking them into process and outcome questions and by specifying the TML/distance-learning environment to be asynchronous discussions.

Process Questions

A defining aspect of the case method pedagogy is a reliance on certain types of interaction (e.g., peer-based learning, instructor as moderator). Framing the original first question more specifically in these terms:

> When applying the case method pedagogy at the graduate level, what is the effect of asynchronous information technology on learning interaction processes?

The second question could be reframed as follows:

> To what extent can an asynchronous approach to the case method pedagogy lead to learning interaction processes consistent with the precepts of that method as compared with a classroom version?

Outcome Questions

Another defining aspect of the case method is its reliance on learning through induction. A second set of research questions can, therefore, be posed that focuses on learning outcome. The first general question might be framed as follows:

> When applying the case method pedagogy at the graduate level, what is the effect of asynchronous information technology on learning outcomes?

Similarly, the second question becomes:

> To what extent can an asynchronous approach to the case method pedagogy lead to qualitatively similar learning outcomes—particularly with respect to inductive processes—as a classroom version?

Operationalization

The four independent variables in the model were operationalized using a combination of control, measurement, and experimental manipulation. The design was accomplished as follows:

- Instructor: *controlled* by having a single instructor for all treatments.
- Pedagogy: *controlled* by limiting the study to the case method pedagogy.
- Student: *controlled* by choosing sections of the same course for all treatments. Individual differences were *measured* using a questionnaire.
- Information technology use: *manipulated* in a quasiexperimental approach through the creation of four distinct treatment groups, classified using the percentage of online case discussions employed during a semester. Pure classroom treatments were courses having no online case discussions while pure online treatments were courses having all online case discussions. Two hybrid treatments were courses having different mixes (percentages) of online and classroom case discussions.

The dependent variables were operationalized using a variety of measurements, as follows:

- Perceptions of the learning interaction process: student perceptions of student-instructor and student-peer interaction were assessed using a questionnaire

- Learning outcomes: student learning was assessed using a multi-item questionnaire that included topic-related factual and analysis-level learning items.

In order to address the research questions comparing classroom and asynchronous discussions, it was important to establish that the classroom discussions were conducted in a manner faithful to the case method pedagogy. This aspect of design was established primarily through choice of instructor. Specifically, the instructor used for all treatments had extensive experience as (1) a case method participant (participating in over 800 discussions as a student), (2) a case method content developer (with 15 published teaching cases, numerous published research cases, and experience teaching a semester-long doctoral seminar on the case method), and (3) a case method instructor (over 10 years using the case method to teach MBA and executive courses, with a number of teaching awards recognizing the effectiveness of these efforts). In addition, the instructor had more than 5 years' experience as a moderator of asynchronous discussions, both as an electronic bulletin board system operator and as an instructor.

Hypotheses

Because applications of existing TML theory to the case method pedagogy were limited, it was difficult to establish widely accepted predictions to be tested. For the sake of analysis, however, certain findings in the literature were identified that could be supported or refuted. These included:

- Studies in the field of distance education that have found technology-supported distance learning to be at least as effective as traditional classroom instruction (Russell, 1999) and has, in some studies, resulted in more effective instruction (TeleEducation NB, 2002).
- Participants in distance education have reported feeling isolated due to lack of direct interpersonal contact (Cho & Berge, 2002)

Stated in general terms, then, there would be some (albeit extremely tentative) support in the literature for predicting slightly improved performance resulting from distance learning, with associated declines in interaction. Five hypotheses were, therefore, developed to test these predicted relationships based upon the research model.

H1: Knowledge-level learning outcomes will *increase* in treatments having a higher proportion of online cases.

H2: Analysis-level learning outcomes will *increase* in treatments having a higher proportion of online cases.

H3: Perceived levels of student-peer interaction will *decrease* in treatments having a higher proportion of online cases.

H4: Perceived levels of student-instructor interaction will *decrease* in treatments having a higher proportion of online cases.

H5: Student perceptions that this case discussion course would enable them to be better managers will *increase* in treatments having a higher proportion of online cases.

In addition to the five hypotheses to be tested, there were two comparative questions to be considered relating TML to classroom approaches. Rather than framing these as separate hypotheses, it was noted that support for H2 (being suggestive of inductive processes), H5 (being central to case method objectives), and, to a lesser extent, H4 (being suggestive of reduced instructor role) would generally be consistent with the precepts of the case method pedagogy. Support for H3, in contrast, would be highly inconsistent with the pedagogy. Any outcome relating to H1 could be viewed as largely irrelevant, since it is not a central goal of the case method pedagogy.

Experimental Design

MBA courses at a large public university in the southeastern United States, in which there existed student demand for alternative delivery methods of instruction, were used for the study. Five different classes participated, each being a section of the university's "Introduction to MIS" graduate course. In order to reflect the case method pedagogy as realistically as possible:

- no fewer than 10 cases were discussed in each class
- class participation represented at least 50% of each student's grade, with some sections also having a written case analysis as a final exam (25% of their grade)
- the same individual—an experienced teaching case writer and case discussion leader—was used as the instructor for each section.

The number of graduate students in each section ranged from 20 to 30. Each section lasted from 10 to 15 weeks. The entire experiment was conducted over a period of 20 months.

Each case discussion was conducted according to one of two protocols. The first protocol, classroom discussion, took place during a 75-minute class session, conducted using the traditional case method pedagogy. Students reported that preparation time in advance of each discussion took approximately 2–3 hours. The second protocol, online discussion, took place over a 1-week period, using asynchronous discussion boards provided by a number of vendors (SiteScape, E-College, and WebCT). The same protocol was followed in conducting each of the online discussions:

1. The instructor assigned introductory questions to four to six students, and gave them 24 hours to post their responses, which became the introductory discussion threads.
2. For approximately 5 days after the initial postings, all members of the class would engage in active discussion on the board. Students were permitted to reply to existing threads and to initiate new threads. Throughout the discussion period, the instructor would monitor the progress frequently, posting requests for clarification or responses to student posts where it was deemed beneficial to the discussion.
3. Approximately 2 days before the end of the discussion, the instructor would assign students to randomized groups of four or five persons (different groups were assigned for each discussion). These groups would

then prepare a case summary, which was sent to the instructor by private e-mail.

4. The instructor then graded each summary and posted the summaries to the discussion board (identifying each group only by its randomly assigned number), along with his comments.

This process was repeated for each online discussion conducted.

The experimental treatments used in the study involved manipulating the proportion of case discussions conducted over a semester according to the in-class and online protocols. Four distinct treatments were used, ranging from all in-class case discussions to all online case discussions, with two intermediate hybrid treatments. Because online discussions were found to be substantially longer than in-class discussions, the number of cases actually discussed also varied according to treatment—the more online cases in a treatment, the fewer cases discussed overall. In addition, a certain number of assignments that were not case discussion related were given in some sections (e.g., a database assignment using MS Access). These were required to ensure each treatment's consistency with the university's expectations for the course.

To further enhance the experimental design, the actual cases used in each treatment were changed so that nearly every case used in the experiment was used in at least one online discussion and one in-class discussion. The only exception to this was a pair of cases used in Treatment 0 but not used in any other treatment. A summary of the treatments is presented in Table 1.

Data Collection

To acquire the data for the current study, a comprehensive questionnaire was administered to students at the conclusion of the course. The questionnaires were voluntary, anonymous, and separate from the graded course activities. Any student who chose not to participate had the option of not handing in their questionnaire, or handing in a blank questionnaire. There was no specified time limit for filling in the questionnaires, but all students remained in the classroom until all questionnaires had been handed in. The instructor remained in the room, seated at the front where he could not see student answers, throughout the process.

The data collection procedure had to be slightly modified for Treatment 3 (Pure Online), as there was no "class time" in the virtual environment. In the modified procedure, students were required to mail their questionnaires to designated group leaders (assigned as part of a case presentation exercise), who removed them from their envelopes (to maintain anonymity) and then mailed them to the instructor. All students were required to mail the questionnaire to their group leader. In the event a student decided not to participate, he or she simply wrote "Decline to Participate" on the questionnaire. Group leaders then sent the collected questionnaires to the instructor, without revealing the identity of who submitted each questionnaire.

The questionnaire took the average student approximately 40 minutes to fill out. It was designed to measure a variety of different learning outcomes—because anonymity precluded correlating other learning measures (such as exam grades

Table 1: Experimental treatments.

ID	No. Sections	Treatment	Period	Online Cases	In-Class Cases	Total Cases	% Online[a]	Cases Per Week	Other Required Assignments	Case-Related of Grade (%)
0	1	Pure classroom environment	Fall 99	0	18	18	0%	1.2	(1) Database (2) Case study exam	75
1	1	Light online hybrid environment	Summer 00	4	11	15	27%	1.5	(1) Database (2) Case study exam (3) Class presentation	75
2	2	Heavy online hybrid environment	Fall 99 & Fall 01	9 & 10	3	12 & 13	75% & 77%	.80 & .87	None	100
3	1	Pure online environment	Summer 01	10	0	10	100%	1.000	(1) Database (2) Group case presentation	75

[a]Used as the basis for classifying treatment groups.

or participation scores) with responses—as well as to gather various demographic and attitudinal data. The instrument was organized into four parts (summarized in Table 2).

The design of the survey instrument was made difficult by the fact that the research being conducted was exploratory on two dimensions: (1) its focus on hybrid course delivery techniques and (2) its attempt to quantify student-learning outcomes resulting from case discussion. In neither area were existing instruments, adaptable to the purpose of this study, found. Furthermore the central focus of the study, examining knowledge acquired and induced over the course of an entire semester of case discussion experiences (as mandated for any realistic test of the case method), made conducting a useful pre-test impractical. As a consequence, the philosophy used in designing the instrument was to concede its exploratory nature, and consequently gather as rich a collection of data as possible—both to provide a means of triangulating results and as a means of identifying promising methods for use in future research. To assess face validity, several faculty colleagues were given copies of the original instrument draft and their suggestions on how to improve its clarity were incorporated prior to its initial use.

In attempting to assess knowledge acquired by students, the first section of the instrument was constructed using the same principles that might be used in developing a course examination. For the ID portion of the section, verifiably correct responses could be determined. For the concept questions section, the instructor developed a scoring scheme based upon his assessment of the relevance of each case to the specified "lesson learned." Students were then required to classify cases according to lessons learned. The student score—based upon his or her classification of cases—was then calculated as a percentage of the "optimal" selection (i.e., the sum of the instructor-assigned scores for the three highest cases). This particular assessment approach was used because classification is one of the most common tasks accomplished through induction (Holland, Holyoak, Nisbett, & Thagard, 1989).

The second section assessed student perceptions of the assigned cases using two separate measures (described in Table 2). To validate this measure, a comparison of student case ratings was made with student rankings of their top and bottom three favorite cases. A Pearson correlation coefficient of .527 ($p < .001$) suggests consistency in the two measures of case perceptions.

The third section, demographic data, was compared to known class demographics with no discrepancies noted.

The fourth section, course perceptions, included questions that were similar in nature to those commonly used by universities in student evaluation of courses. According to literature on student course evaluation, this type of assessment has been shown to be valid for instructor evaluation in a number of studies and meta-analyses, with students who learn also rating the classroom teaching received as more effective (Marsh, 1994). Most studies of student evaluation of teaching effectiveness have focused on understanding and use a global measure of instructor effectiveness. However the multidimensionality of student assessments is generally acknowledged (Greenwald, 1997), which leads to difficulties in developing theoretically grounded validated instruments for assessing instructor effectiveness (Marsh & Roche, 1997).

Table 2: Questionnaire organization.

Part	Type	Purpose	Comments
1. Case knowledge	ID questions	To test factual recollection of names, places and systems from the cases	Left-hand columns had names, places and systems. Right-hand column had list of 10 cases plus "Not mentioned in course" and "Mentioned in another case" options.
	Concept questions	To determine the degree to which the student induced course concepts and could relate them to specific cases	Student would be given a statement such as "The adoption of an IT can have a major impact on the nature of the work performed by an organization's employees" and would be asked to: (a) assess its relative importance in the course (using a 1–7 Likert scale), (b) identify the case studies most relevant to it from a list of 18 cases.
2. Case perceptions	Case impact	To determine the degree to which students felt a case impacted their thinking about MIS	Students were given a statement "Degree to which the case enhanced your knowledge of MIS" and asked to Agree/Disagree on a 7-point scale for each case in a list of 18 cases. (N/A was also available, since not all sections had all 18 cases.)
	Favorite/ least favorite	To identify cases students liked and disliked	Students identified the three cases they liked most along with the three cases they would most like to see dropped from the course.
3. Demographic data	General information	To gather controlling data on factors such as age, sex, experience	Students were also asked to specify their expected grade in the class.
4. Course perceptions	Time spent	To specify the time students spent preparing for each case and the entire class	Questions varied somewhat, according to treatment, as questions about online time were irrelevant to Treatment 0, and so forth.
	Course assessment	To assess student agreement with a series of statements about the course	Students responded to 10 statements such as "In many case discussions in this class, I learned more from my classmates than I did from the professor" on a 1–7 Likert scale. Five of the statements were the same across all questionnaires, the remaining five varied according to course content.

The multiple dimensions of student course perceptions are useful as diagnostic tools for assessing the efficacy of instructional techniques (McKeachie, 1997). Frey (1978) reported two dimensions, rapport and pedagogical skill. Other dimensions reported include facilitating interaction, delivering instruction, and evaluating student learning (d'Apollonia & Abrami, 1997). The objective of the items used in this section was to gain an understanding of the learning process using hybrid delivery techniques and the case discussion method of instruction. This fills a gap in measurement of student perceptions that has emerged as methods of teaching and available instructional technologies have evolved (McKeachie, 1997).

Given the dearth of validated instruments for case method assessment, questions were developed to assess several variables of interest: student perceptions of the case learning method, interaction between student peers, and interaction between students and instructor. The final item of each questionnaire asked students to agree/disagree with the statement: "I feel I will be a better manager as a result of having taken this case discussion course." This particular item was chosen as an overall measure of perceived course effectiveness in order to be consistent with the generally accepted goal of the case method pedagogy—the most critical objective of the process being to develop an administrative point of view (Barnes et al., 1994).

Hypothesis Testing

Using a multivariate analysis of covariance method, multiple outcome variables were analyzed by treatment groups while controlling for exogenous variables (Tables 3–7). A general linear model procedure available in SPSS version 11 statistical software was used to perform the analysis of the data. Descriptive statistics on dependent variables are listed in Table 3 and correlations of dependent variables are in Table 4. Multivariate tests (Table 5), between subject tests of treatment and covariates on dependent variables (Table 6), and pairwise comparisons of treatments (Table 7) were performed on the data. Dependent variables evaluated were learning outcomes in applying concepts in cases to course theme (analysis-level learning), learning outcomes in recognition of case facts (knowledge-level learning), perceptions of student-peer interaction, perceptions of student-instructor interaction, and perceptions that the case discussions would make them better managers (perceived usefulness). The treatment variable having a significant effect on the dependent variables in the multivariate analysis of covariance was the use of technology to facilitate case discussion: classroom, light online hybrid, heavy online hybrid, or pure online (Table 5). Significant covariates in the multivariate analysis were (1) the student's expected grade in the course and (2) the student's preferred teaching method, measured by student perceptions of how interesting case discussions are compared to the lecture method (Table 5). Potential covariates that were determined to be insignificant to the multivariate analysis included: years of IT experience, employment status, grade point average, age, gender, time spent preparing case discussions, and time spent preparing for other MBA courses.

The type of treatment affected learning outcomes at both the knowledge and analysis level, the questions addressed by hypotheses H1 and H2. As shown in Table 3, knowledge-level learning increased in treatment groups having a higher

Table 3: Descriptive statistics of dependent variables by technology treatment.

Variable/Applicable Item	Treatment	Mean	Std. Deviation	*N*
Perceived Student-Peer Interaction	0	2.47	1.264	19
"In many case discussions in the	1	3.38	1.722	26
class, I learned more from my	2	4.12	1.788	34
classmates than I did from the	3	5.25	1.118	20
professor" (Scale: 1 = strongly	Total	3.84	1.794	99
disagree, 7 = strongly agree)				
Perceived Student-Instructor Interaction	0	2.37	1.674	19
"The instructor should have taken	1	2.77	2.006	26
a more active role in directing	2	3.12	1.629	34
the progress of in-class and	3	4.90	1.774	20
online case discussions."	Total	3.24	1.954	99
(Scale: 1 = strongly disagree,				
7 = strongly agree)				
Knowledge-Level Learning Outcome	0	4.53	2.091	19
Number correct on ID questions	1	6.62	3.774	26
(see Table 2)	2	7.91	3.817	34
	3	10.95	5.472	20
	Total	7.54	4.422	99
Analysis-Level Learning Outcome	0	28.9%	12.1%	19
Average percentage correct on	1	35.3%	13.3%	26
concept questions (see Table 2)	2	41.4%	14.7%	34
	3	39.7%	22.2%	20
	Total	37.0%	16.2%	99
Attitude on Usefulness (perceived outcome)	0	5.37	2.191	19
"I feel I will be a better manager	1	5.88	1.366	26
as a result of having taken this	2	5.82	1.507	34
case discussion course" (Scale:	3	4.95	1.959	20
1 = strongly disagree, 7 =	Total	5.58	1.733	99
strongly agree)				

Treatment 0: all classroom; Treatment 1: light online hybrid; Treatment 2: heavy online hybrid; Treatment 3: pure online.

proportion of online cases (H1). Knowledge-level learning had a highly significant ($p < .001$) technology treatment effect with an adjusted R^2 value of .198 (Table 6). In examining each of the four treatment levels, there was a significant difference between the pure in-class treatment and the heavy-hybrid and pure online treatments (.05 level of significance). The difference between the pure online and the two hybrid treatments was also significant (Table 7). The difference between the two hybrid treatments was insignificant for knowledge learning outcomes, which is interesting given that the difference in student workload per week was greatest for these two treatments. Generally, the data support the hypothesis that there is an increase in knowledge-level learning outcomes in treatment groups having a higher

Table 4: Correlation matrix of dependent variables.

	Attitude on Usefulness	Perceived Student-Peer Interaction	Analysis-Level Learning Outcome	Knowledge-Level Learning Outcome	Perceived Student-Instructor Interaction
Attitude on Usefulness	1.000	−.117	.048	.0120	−.179
Perceived Student-Peer Interaction	−.117	1.000	.041	.161	.086
Analysis-Level Learning Outcome	.048	.041	1.000	.482	.123
Knowledge-Level Learning Outcome	.012	.161	.482	1.000	−.090
Perceived Student-Instructor Interaction	−.179	.086	.123	−.0090	1.000

proportion of online cases. There were no significant covariates associated with this hypothesis test (Table 6).

For the analysis-level learning outcome (H2) the technology treatment effect (Table 3) was also significant ($p < .016$) when accounting for the one significant covariate, that is, student perceptions that the case method of teaching was more interesting than lecture method (Table 6). The adjusted R^2 was .103 (Table 6). Significant differences were found only between the pure in-class treatment and the heavy hybrid and pure online treatments (Table 7). No significant difference between the three online treatment groups was detected. The data analyzed provide evidence of differences in analysis-level learning between in-class and online case treatments, but do not support differences between hybrid and pure online treatments.

The effect of the technology treatment on student perceptions that more was learned from classmates than the professor, the measure used to gauge perceived student-peer interaction (Table 3), was highly significant ($p < .001$) with an adjusted R^2 of .237 (Table 6). However, the data show that rather than decreasing as hypothesized, the perceived level of interaction dramatically increased with the percentage of online discussions, making a strong case that the hypothesis (H3) should be rejected. There were no significant covariates associated with this effect. An examination of the difference in treatment groups reveals significant differences between every level of technology except between the pure in-class treatment and the light online hybrid, p value .059 (Table 7). The pure in-class group had the lowest perception of student-peer interaction and the pure online case had the highest perception of student-peer interaction. In treatment groups with a higher proportion of online cases the perception of higher student-peer learning increased. The mean of the heavy online hybrid and pure online treatments was on the opposite side of the Likert scale midpoint from the other treatments signifying a change in perceptions from disagreement to agreement with the item (Table 3).

The effect of technology treatment on our measure of student-instructor interaction, student perceptions that the instructor should have taken a more active

Table 5: Multivariate tests[c] of effect of treatment and significant covariates on five dependent variables.

Effect/Applicable Item		Value	*F*	Hypothesis df	Error df	Significance
Intercept	Wilks' Lambda[a]	.656	9.339[b]	5.000	89.000	.000*
Significant covariate:	Wilks' Lambda[a]	.683	8.247[b]	5.000	89.000	.000*
Perceived preference for case method						
"Overall, case discussions—both online and in-class–are more interesting than traditional lecture courses"						
Significant covariate:	Wilks' Lambda[a]	.848	3.203[b]	5.000	89.000	.010*
Expected course grade						
"What grade do you expect to get in this course?"						
TREATMENT:	Wilks' Lambda[a]	.505	4.614	15.000	246.091	.000*
Information technology Usage Level						
Treatment 0—all classroom						
Treatment 1—light online hybrid						
Treatment 2—heavy online hybrid						
Treatment 3—pure online						

*Significant at the .05 level.
[a]Tests using Pillai's Trace, Hotelling's Trace, and Roy's Largest Root were equally significant.
[b]Exact statistic.
[c]Design: intercept+ perceived preference for case method + expected course grade + information technology usage level.

role in leading the case discussions, was also highly significant ($p < .001$) with an adjusted R^2 of .209 (Table 6). A significant covariate was student perception that the case discussion method of teaching is more interesting than the lecture method. As the proportion of online cases increased, the perception that the instructor should have taken a more active role in leading case discussions increased, supporting hypothesis H4 (Table 3). However, only the pure online treatment was significantly different from the other treatments. As shown in Table 3, this was the only treatment having a mean above the midpoint of the Likert scale (agree rather than disagree with the item). Students in the pure online treatment on

Table 6: Tests of between-subjects effects by technology treatment and significant covariates.

Source	Dependent Variable	Type III Sum of Squares	df	*F*	Significance
Corrected Model	Attitude on Usefulness	97.988(*b*)	5	9.290	.000*
	Perceived Student-peer Interaction	86.932(*c*)	5	7.077	.000*
	Analysis-Level Learning Outcome	.383(*d*)	5	3.253	.009*
	Knowledge-Level Learning Outcome	458.226(*e*)	5	5.844	.000*
	Perceived Student-Instructor Interaction	93.436(*f*)	5	6.190	.000*
Intercept	Attitude on Usefulness	4.150	1	1.967	.164
	Perceived Student-Peer Interaction	55.647	1	22.650	.000*
	Analysis-Level Learning Outcome	.281	1	11.907	.001*
	Knowledge-Level Learning Outcome	246.983	1	15.750	.000*
	Perceived Student-Instructor Interaction	26.253	1	8.697	.004*
Perceived Preference for Case Method	Attitude on Usefulness	54.903	1	26.025	.000*
	Perceived Student-Peer Interaction	.655	1	.267	.607
	Analysis-Level Learning Outcome	.156	1	6.627	.012*
	Knowledge-Level Learning Outcome	11.724	1	.748	.389
	Perceived Student-instructor Interaction	12.472	1	4.131	.045*
Expected Course Grade	Attitude on Usefulness	17.194	1	8.150	.005*
	Perceived Student-Peer Interaction	3.431	1	1.397	.240
	Analysis-Level Learning Outcome	.003145	1	.133	.716
	Knowledge-Level Learning Outcome	18.675	1	1.191	.278
	Perceived Student-Instructor Interaction	8.000	1	2.650	.107

Table 6: (continued).

Source	Dependent Variable	Type III Sum of Squares	df	*F*	Significance
TREATMENT: Information Technology Usage Level	Attitude on Usefulness	8.781[a]	3	1.387	.252
	Perceived Student-Peer Interaction	84.838[b]	3	11.511	.000*
	Analysis-Level Learning Outcome	.254[c]	3	3.596	.016*
	Knowledge-Level Learning Outcome	370.736[d]	3	7.880	.000*
	Perceived Student-Instructor Interaction	60.719[e]	3	6.705	.000*
Error	Attitude on Usefulness	196.194	93		
	Perceived Student-Peer Interaction	228.483	93		
	Analysis-Level Learning Outcome	2.192	93		
	Knowledge-Level Learning Outcome	1, 458.400	93		
	Perceived Student-Instructor Interaction	280.746	93		
Total	Attitude on Usefulness	2, 367.000	99		
	Perceived Student-Peer Interaction	1, 113.000	99		
	Analysis-Level Learning Outcome	16.193	99		
	Knowledge-Level Learning Outcome	7, 538.000	99		
	Perceived Student-Instructor Interaction	872.000	99		
Corrected Total	Attitude on Usefulness	294.182	98		
	Perceived Student-Peer Interaction	315.414	98		
	Analysis-Level Learning Outcome	2.575	98		
	Knowledge-Level Learning Outcome	1, 916.626	98		
	Perceived Student-Instructor Interaction	374.182	98		

*Significant at the .05 level.
[a]$R^2 = .333$ (Adjusted $R^2 = .297$).
[b]$R^2 = .276$ (Adjusted $R^2 = .237$).
[c]$R^2 = .149$ (Adjusted $R^2 = .103$).
[d]$R^2 = .239$ (Adjusted $R^2 = .198$).
[e]$R^2 = .250$ (Adjusted $R^2 = .209$).

average perceived a need for more student-instructor interaction. For the pure in-class treatment and two hybrid treatments students did not perceive a need for increased student-instructor interaction. The data partially support hypothesis H4, but only for pure online cases. For the hybrid online treatments support for H4 was not significant.

Table 7: Pairwise comparisons by technology treatment used.

Dependent Variable	(I) Treatment: Information Technology Usage Level	(J) Treatment: Information Technology Usage Level	Mean Difference (I-J)	Std. Error	Sig.(a)
Attitude on Usefulness	0	1	−.632	.439	.153
		2	−.542	.425	.205
		3	.048	.474	.920
	1	2	.08987	.388	.817
		3	.680	.440	.126
	2	3	.590	.412	.156
Perceived Student-Peer Interaction	0	1	−.905	.473	.059
		2	−1.750(*)	.458	*.000
		3	−2.854(*)	.512	*.000
	1	2	−.845(*)	.419	*.046
		3	−1.949(*)	.475	*.000
	2	3	−1.104(*)	.445	*.015
Analysis-Level Learning Outcome	0	1	−.06855	.046	.143
		2	−.136(*)	.045	*.003
		3	−.130(*)	.050	*.011
	1	2	−.06763	.041	.103
		3	−.06189	.046	.186
	2	3	.005735	.044	.895
Knowledge-Level Learning outcome	0	1	−2.086	1.196	.085
		2	−3.084(*)	1.158	*.009
		3	−6.152(*)	1.293	*.000
	1	2	−.998	1.058	.348
		3	−4.067(*)	1.199	*.001
	2	3	−3.069(*)	1.123	*.008
Perceived Student-Instructor Interaction	0	1	−.384	.525	.466
		2	−.506	.508	.321
		3	−2.278(*)	.567	*.000
	1	2	−.122	.464	.793
		3	−1.894(*)	.526	*.001
	2	3	−1.772(*)	.493	*.001

Based on estimated marginal means. Treatment 0: all classroom; Treatment 1: light online hybrid; Treatment 2: heavy online hybrid; Treatment 3: pure online.
*The mean difference is significant at the .05 level.
[a]Tukey least significant difference method.

Analysis of between-subject effects (Table 6) found an insignificant treatment effect ($p < .255$) on perceptions that the case discussions would make them better managers (H5), suggesting this hypothesis should be rejected (Table 3). Two covariates did significantly affect this perception. The students' expected grade and the students' perception that case discussions were a more interesting teaching model than lectures had a significant positive association with their expectation of becoming better managers as a result of the case teaching method. The data suggest no differences in the perceived usefulness of the case method when using alternative technologies, leading one to conclude there were no detrimental effects on perceived course usefulness.

Table 8: Prediction of correct answers based on controlled factors using regression analysis.

Variables	R^2	F Statistic	B	Std. Error	t Statistic	p Value
Dependent variable						
Knowledge-Level Learning Outcome	.077	30.59				.000*
Predictors/independent variables						
Proximity of Case Study to instrument Completion (weeks)			−.029	.003	−9.360	.000*
Online (Y/N)			.112	.027	4.176	.000*
Treatment: Information Technology Usage Level			−.301	.084	−3.562	.000*
Total Number of Cases Covered			−.117	.031	−3.752	.000*
Student Employed (Y/N)			.130	.031	4.242	.000*

*Highly significant.

With respect to the comparative research questions, the support for H2, the modest support for H4 and the strong rejection of H3 appear highly consistent with the proposition that the TML implementation of the case method was consistent with the precepts of the pedagogy. This conclusion is highly sensitive to the characteristics of the instructor, however, since it depends on the assumption that the classroom measures gathered represent a reasonable baseline for effective case discussions.

DISCUSSION

One important aspect of the study's findings not addressed during hypothesis testing was that the use of hybrid technology appeared to have advantages over both pure in-class and pure online technologies. Consistent with previous literature (Russell, 1999), the use of technology in the case method classroom does not appear to have a negative effect on learning outcomes. For both the knowledge and analysis levels of learning outcomes, treatments incorporating some degree of online discussion had significantly superior results, a finding consistent with prior research (TeleEducation NB, 2002). A reason for this may be that each student must be engaged in the online discussion as compared with the traditional classroom where some percentage of the students may revert to a passive role, observing the instructor and other students during discussions intended to involve the entire class. While an in-class discussion may intuitively have lower transactional distance, and therefore appear to be superior, it may be that such superiority is mainly applicable to those students who actively (and routinely) engage in classroom discussions over the course of a semester. For other members of the class, the transactional distance could be lower for the online class than in the classroom. For example, asynchronous discussion allows students to contribute without having to interject

themselves into a discussion, since students can prepare postings simultaneously and there is no need to wait for a "break" in the discussion to make a contribution. Also, the asynchronous nature of a Web discussion may also enable students to consider their contributions more thoughtfully, without the time constraints of the traditional classroom discussion.

This notion of increased student engagement is supported by the analysis of student-peer interaction, which steadily increased for treatments having a higher proportion of online discussion. This is consistent with theory advocating the use of cooperative models of learning and argues that students more effectively learn from one another in well-structured cooperative learning environments. An advantage of online case discussion is that it appears specifically to increase the level of student-peer interaction, which suggests that online discussion encourages more student engagement in the learning process. Indeed, these results could be used to support the view that online discussion may, in some ways, be truer to the underlying philosophy of the case method pedagogy than the traditional classroom discussions—particularly when classroom discussions are led by a highly directive instructor. Furthermore, it is also reasonable to conjecture that the online protocol could be replicated more easily at different sites than classroom teaching techniques, which vary considerably across different case method instructors. Such replication could be facilitated, for example, by archival records of online discussions that can easily be maintained—allowing instructors to share examples with other instructors. In addition, lower levels of instructor contribution, combined with less time pressure associated with contributions, could make it easier for instructors to follow a specific protocol, should that be their objective.

The value of the case discussion method in terms of whether students perceived the case discussion to be helpful in making them better managers was insignificant regardless of treatment. This is consistent with findings of no significant differences (Russell, 1999) in distance education. The use of technology to deliver courses in higher education appears to have no adverse effects on student attitude concerning the worthiness of the case teaching method.

This study suggests that when implementing the case discussion method, a hybrid approach to technology use could be superior to either a pure online or pure in-class approach. Increased student interaction and increased learning outcomes were observed at the knowledge and analysis levels of learning without inspiring negative student attitudes toward the process. Although knowledge-level learning outcomes continue to increase in treatments having a higher proportion of online discussions, analysis-level learning outcomes leveled off with the hybrid treatments. The finding suggests that the negative effects on student-instructor interaction observed with the pure online treatment may be mitigated through a balance of face-to-face and virtual interaction achieved with hybrid treatments at the course level.

A limitation of the study was the use of single-item self-report measures for student attitudes and perceptions of the learning process. Another potential limitation of the study was the unequal number of cases across treatments, caused by the available time in various semesters. In examining the number of cases assigned to students per week, their workload varied somewhat. The light online hybrid treatment had the heaviest workload at 1.5 cases per week and the heavy

online hybrid treatment had the lightest workload at .75 and .81 cases per week. The workload per week for the pure in-class treatment was between these at 1.2 cases per week while students in the pure online treatment had a workload of 1 case per week. Another potential limitation is that the student population in this study consisted of graduate students, who often fit the profile of the successful distance learner (Keegan, 1996).

To attempt to assess the impact of some of these factors, an analysis was performed that considered the individual ID questions—where the difference between treatments was most pronounced—and controlled for a number of factors, including proximity of the case study (i.e., at what point in the semester the case was discussed), whether or not the case was conducted online, the class "treatment," the total number of cases covered, and whether or not the student was working (other variables were also tested, and found to be insignificant). The results of the test are presented in Table 8.

These results show a significant positive coefficient for the online variable, meaning the student was more likely to make a correct ID if the question was from an online case, versus one discussed in class. This is true even after the number of cases and treatment type are controlled for, suggesting that the observed effect cannot entirely be attributed to differences in class structure. The most significant correlation is the proximity coefficient (entered in such a way that smaller numbers imply closer proximity), strongly supporting the conclusion that the more recently a case has been discussed, the more likely the student will be able to identify items from that case—providing a type of "integrity check" on the data, as well as controlling for timing differences between online and classroom cases. Finally, a significant positive relationship was observed with student employment, controlling—to some extent—for differences in background and outside obligations.

Particularly in light of the relationship with employment, caution should be used when generalizing these findings to other populations such as university undergraduate programs, community colleges, or K-12 educational settings. Likewise, caution should be used when applying these findings in the industrial setting beyond executive-level programs, where subjects have a similar background to the population in this study.

Future research is needed to expand our understanding of learning processes associated with the case teaching method. A comparison of self-reported interaction and observation of student interaction in each classroom setting (traditional and virtual) would be useful to validate these findings. An expansion of the study to address other learning models in the hybrid technology environment, controlling for relevant variables, would also be useful. These studies should not only seek to address the impact on learning outcomes, but should address the fit of various available technologies and learning models in the context of hybrid environments. Definitive criteria and guidelines (Goodhue & Thompson, 1995) to be used by instructors in education and industry for assessing task-technology fit and its impact on learning processes and learning outcomes would be useful at the instructor level. At the administrative level, an understanding of superior combinations of technology and instructional models would aid in the identification of resources required to support the rapidly emerging hybrid-learning environments.

CONCLUSIONS

The findings of our research can be presented in both specific and general terms. The specific findings suggest that by using Web technology, instructors in institutions of higher education may offer students the option of participating in high-quality courses using the case method pedagogy in an online environment. Students not only appear to do as well as in the traditional classroom, but the data suggests that students in the online environment may even perform better at multiple levels of learning outcomes, especially when a mixture of classroom and online technologies are employed. Furthermore, the manner in which learning is supposed to take place—through peer-to-peer discussion, according to the precepts of the case method pedagogy—may even be enhanced by the use of online discussions. Naturally, such benefits are not necessarily without cost. Instructors employing the technique may also find that their own importance, in the eyes of the students, is devalued. Furthermore, as is typically true for distance learning when compared with classroom techniques, the time demands of the approach, for both instructor and student, can be much greater than for traditional classes.

At a more general level, our findings provide strong support for the position that it is the model of learning and its fit with the supporting technology, rather than the presence of a technology per se that enhances learning outcomes. Although the course we presented used many technological devices similar to those used in previously studied online courses (Clarke, Flaherty, & Mottner, 2001), including posted course materials, syllabi, and multimedia lecture content, the final student perceptions turned out to be very different. The most striking of these differences was the way that pure online students in this study felt they learned more from their peers than from the instructor. We propose that such a difference cannot be viewed as an intrinsic property of either the discussion board technology employed or the case method pedagogy. Rather, it was the result of the interaction between pedagogy and technology—neither of which can be viewed in isolation.

While much remains to be learned, the specific and general findings presented in this research advance our understanding of TML effects in a relatively unexplored area of pedagogy. The insights offered inform future research directions, emphasizing the need to explore task-technology fit in the educational context. The findings also inform instructors and administrators alike of the potentially positive effects of hybrid course designs when using technology to support the case method of instruction in a distance-learning environment. [Received: May 2004. Accepted: October 2004.]

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