

The Information Superhighway: Are Management Faculty Still Parked in the Driveway?

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Abstract:

The Internet, which began as a vehicle for scholars to convey ideas in an open forum, in real time and free of geographic confines, currently is viewed as a World Wide Web of computer networks carrying everything from books to stock trades almost at the speed of thought. In this article, the authors raise the question of how far academics have come in applying the technology that they pioneered. To explore the use of Web-based teaching methods among U.S. business schools, the authors ask the following questions: How many (and what types of) course materials are available to students accessing information via the Internet? Have faculty discovered the on-ramp to the information superhighway or are they still parked in their own driveways?

Article:

Multimedia technology, including sound, graphics, and video, is approaching a state-of-the-art stage in education and has coincided with the technology explosion in other industries. The changes and ensuing opportunities occurring in education as a result of digital technology have been described enthusiastically in practitioner and academic journals. Articles have included examinations of the characteristics of on-line teaching (Berge, 1997; Burgstahler, 1997), teaching effectiveness (Alavi, Yoo, & Vogel, 1997; Dellana, Collins, & West, 2000; Webster & Hackley, 1997), student perceptions and satisfaction (Karayan & Crowe, 1997), technology characteristics (Dede, 1996; Sandholtz, Ringstaff, & Dwyer, 1992), and the expected benefits for students and academic institutions (Brown, Nielson, & Sullivan, 1996).

Meising (1998), recounting David Bradford's spirited 1997 discourse, posted the following to the Organization Behavior Teaching Society Listserv:

I think the classroom is for the teacher's convenience. It maximizes teacher control (as well as whatever ego needs we have to perform/dictate) and sends absolutely the wrong message in today's world (that knowledge can be bundled in discrete packages that can be pre-labeled, that there is one leader with the answer, that most conversation should go through the leader, that conflict is to be discouraged, etc.).

I predict that we will focus more on measuring end learning and free up students to go about that in a variety of ways. I also predict that there will be more self-managed work teams.

In a world of increased ambiguity, we have to stop removing ambiguity by the highly structured classroom. (p. 754.)

Despite articles describing courses and programs offered on-line (Fornaciari & Forte, 1999; Kroder, Suess, & Sachs, 1998; Meisel & Marx, 1999; Meising, 1998), little research has been conducted on the extent to which educators have adopted the technology. The assumption is that everyone should be (and is) moving to adopt the new technologies in their courses. Most of the literature on Internet learning, however, has been (a) either predictive (Herther, 1997) or normative (Ueltschy, 2001) (b) has used small samples of students' perceptions (Arbaugh, 2000; Sweeney & Ingram, 2001), (c) has relied on business school administrators' estimations of

distance learning tool use by faculty, (d) has aggregated data at the programmatic or institutional level (e.g., 1999), or (e) was based on a combination of the above (Britt & Frand, 1999). Britt and Frand's study of members of the AACSB International —The Association to Advance Collegiate Schools of Business - is probably the most comprehensive work to date.

Three of Britt and Frand's findings are of particular interest. The study indicated that (a) schools with formalized distance learning programs spent 4.5% of their operating budget on computer-related expenses, compared with 3.5% for all respondents; (b) the characteristics of those schools using distance learning did not differ significantly from those that did not; and (c) 29% of faculty used the Web as a teaching aid.

The first two findings taken together are somewhat surprising. Given the additional expense, one might assume that larger, better funded institutions would be the first to adopt the new technology. The third finding, a measure of faculty usage, may be overestimated because the use of additional resources creates a "halo effect" among the administrators responding to the survey. Therefore, a study that directly observes faculty activity is warranted.

To our knowledge, no direct observation of faculty members has been reported; nor has the manner in which faculty use technology to support their classroom activities been directly observed. Similarly, the number of courses in a given curriculum that have an Internet component is unknown. The popular descriptions of distance learning portray a system of autobahns and space-age vehicles connecting students and teachers. However, the lack of direct empirical evidence led us to wonder whether business professors are "cruising" the Internet highway or merely idling on their blackboard driveways. Our purpose in this study was to assess the prevalence of Internet-based course materials and their content.

We conducted a survey of U.S. business schools accredited by the AACSB to determine management faculties' use of Web-based teaching utilities. In particular, we attempted to examine the management department faculty of 350 U.S. institutions during fall 1999. Findings from this group were compared with those relating to a subgroup of the top 50 schools as reported by U.S. News & World Report. We made additional comparisons based on Carnegie Foundation classifications, university enrollment, and data comparing public and private schools.

Terminology

Numerous words and phrases referring to new digital technologies have entered the vernacular. Therefore, before beginning our research, we had to clarify the nomenclature that we used to describe this subject, specifically as it relates to education. In our experience, the phrase "teaching over the Internet" has been used to describe the use of static HTML documents that can be printed in hard copy, totally interactive "virtual classrooms" with one-to-one exchanges, and a multitude of variations between these two extremes. In Figure 1 we portray the relative positions of the various applications on the continuum. Universities or individual professors may use some or all of the available approaches for instruction. The fundamental distinction between Web-assisted and Web-based courses hinges on the degree of face-to-face interaction between the student and instructor and the extent to which the course is tied to the physical classroom.

On one extreme is the traditional model, in which the class meets at a prescribed place and time and the instructor disseminates information via paper, chalk, lecture, and audio/visual aids. At the other end of the spectrum is an asynchronous (time-independent) environment in which students access audio/video lectures, receive/submit assignments, and participate in discussions at a time and a place of the students' choosing, all via the Internet.

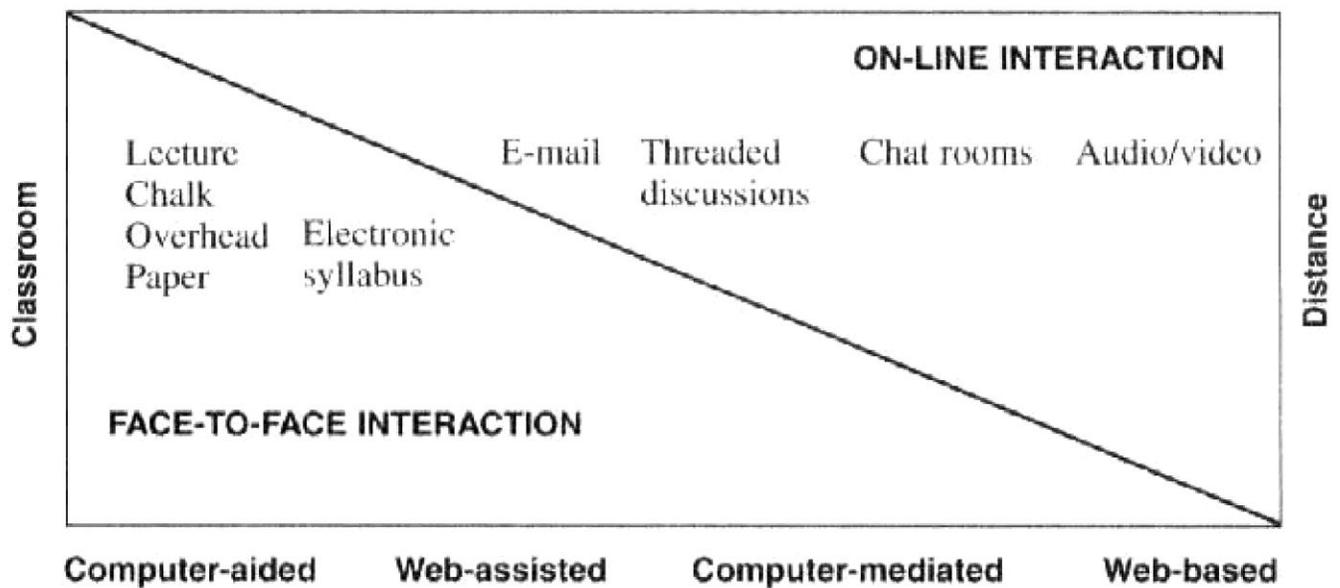
Computer-aided instruction is an older term used to describe a single student interacting with a computer application as a learning resource for a specific topic. Current technology permits groups of students to access multiple learning resources and use multiple interaction configurations simultaneously.

We prefer the term *Web-assisted learning* to refer to the high-interaction end of the continuum. The underlying assumption is that classroom instruction continues to be the primary delivery medium and Web-based resources are a supplement to classroom activities. For the most part, these applications alter information flows between professors and students. In essence, they are little more than the conversion of paper documents to electronic files. Included among these applications are phone messaging and electronic mail (e-mail), which are substituted for classroom-bound discussions.

Computer-mediated communication refers to the options that faculty and students have for exchanging information via computer linkages. These applications may be asynchronous, such as e-mail or bulletin boards, or fully synchronous (with all users on-line concurrently), such as chat rooms. Interaction occurs among students as well as between faculty and students. Communication applications may be Internet-based, hosted on a private server for restricted use, or some combination of both. When these options are used efficiently, dependence on face-to-face interaction in the classroom may be lessened.

Web-based learning refers to courses in which the Internet is the primary mode of instructional delivery and face-to-face interaction is minimized if not eliminated. Such an approach may require significant organizational restructuring, personnel changes or reeducation, and the development of new types of pedagogy. Using Internet technology at this level has enabled some universities—for example, Duke University through its Global Executive MBA program—to move beyond geographic and temporal boundaries and offer their educational products in distant markets. Using the Internet to deliver instruction to geographically distant sites is generally referred to as distance learning. The scope of applications used in a distance-learning curriculum may vary as widely as the applications used in classrooms, and the term should not be interpreted to mean that the technology is used to the exclusion of all other methods.

FIGURE 1. The Continuum of Internet Technology Application in Education: Classroom Versus Distance Instruction



Method

Three of us collected data for our study over a 4-week period during November and December 1999. Using a standard Microsoft Windows-compatible browser, we visited the Web pages of all schools in the study. Additional descriptor variables were abstracted from U.S. News & World Report's Graduate School Rankings (<http://www.usnews.com/usnews/edu/beyond/mba/gdmbas1.htm>), the Carnegie Foundation (<http://www.carnegiefoundation.org>), and College Source Online (<http://www.college-source.org>). We accessed the list of AACSB-accredited business schools through a list maintained by Central Michigan University (<http://www.mkt.cba.cmich.edu/aacsbmkt/>).

Sample

The sample population consisted of 350 business schools located in the United States and accredited by the AACSB. We used a linked list provided by Central Michigan University to access Web pages. We eliminated 35 schools from this sample because we (a) were unable to access the school's Web page (their server or computer network was not accessible on two separate days) (3 schools); (b) were unable to distinguish management faculty from students, staff, or members of other departments; or (c) found that the schools' faculty could not be disaggregated (22 schools). Identifying the management faculty was critical to our analysis because most teaching activities are individually determined, and the number of faculty formed the denominator of some ratios calculated. Finally, 10 schools had password-protected access to course materials at the school or department level. These schools represented less than 3% of the schools examined. We do not name individual faculty and schools in this study so as not to impugn institutions with considerable on-line resources that are not accessible to outsiders.

When we encountered combined departments (e.g., marketing and management), we scanned faculty biographies (when available) to determine whether the faculty member was responsible for traditional management courses. We included faculty whose titles or teaching responsibilities were listed as entrepreneurship, human resources, leadership, organization behavior, organization theory, production operations, or strategy. Information systems faculties were not included unless the departments defined themselves as including those faculties. Only courses taught by management faculty (as described by the school, department, or the process just described) were examined in this study.

Though we attempted to use a standard protocol to access course and faculty Web sites to collect the data from each school, the variety of systems architecture and path constructions made this difficult. Nevertheless, two basic paths and one roadblock to the desired data emerged. The first path, and by far the most common, required accessing each faculty member's personal homepage in order to determine the extent of Web use for courses that they taught. The second path used by schools, although far less common, was to group information about courses under a single link called "Courses On-line." This link led to a listing of all courses within the school that had some form of on-line assistance. As mentioned in the sample description 10 schools had password-protected sites. Our initial intention was to conduct a census of Web-based management courses, but unfortunately this proved impossible. Nevertheless, we gathered all of the data that were publicly accessible through an outside Web server without password protections. In Table 1, we illustrate the sample determination.

Results

The data in Table 2 show a profile of accessible sites of sample schools with Web-assisted or Web-based courses in the Departments of Management. Of the 315 schools examined, a total of 193 had at least one management course on-line. Slightly more than 38% had no identifiable courses on-line. The 315 schools examined had a total of 5,106 management faculty listed. Among these faculty, 761 taught one or more courses on-line for a total of 1,077 on-line courses. A comparison of the total number of faculty with the total number of schools visited showed that the average institution had 2.4 management instructors making use of the new technologies. However, this may overstate the number of faculty with courses, because several schools had nearly the entire faculty's syllabi on-line. The median number of faculty with course material on-line was 1.0 with a standard deviation of 3.8 and a mode of zero.

TABLE 1. Descriptive Profile of Schools

Schools	No.	%
Total	350	100
With technically inaccessible sites	3	0.9
With unidentified management faculty	22	6.3
With department password-protected sites	10	2.9
Total schools after exclusions	315	90.0
Total management faculty in these schools	5,106	

TABLE 2. Courses Identified

Course data	No.	%
Schools with courses online	193	61.3
Management faculty with courses online	761	14.9
Management courses online	1,077	100
Undergraduate	726	67.4
Graduate	350	32.6

As mentioned previously, data on Carnegie classification, school ranking, and school size were collected for all schools. Tests controlling for these variables and for faculty size all proved to be insignificant. Presence of on-line courses did not differ between public and private schools, between small and large student enrollment, between small and large faculty departments, or by Carnegie classification.

Of the 1,077 courses identified, 1,004 had a syllabus on-line. In Table 3, we present the course materials used in the Web-based courses. Few courses contained any material beyond the syllabus. PowerPoint slides, assignments, and sample papers were used much less frequently than syllabi, with video/audio resources and on-line testing used the least, and with approximately 2% of those features available in on-line courses. Undergraduate and graduate courses did not differ in type of on-line materials.

The survey methodology underestimates the number of courses with computer or Web-based support. Some professors use private providers of course material (e.g., blackboard.com or WebCT). Many textbook publishers provide course support materials via the Web to accompany text adoptions. Finally, some schools have student servers accessible only as part of a local area network (LAN), which is not accessible via the World Wide Web. Technically speaking, use of LANs is closer to computer-assisted instruction than is Web-based learning as we have defined it. Nevertheless, if we had been able to access such systems we could conclude that professors are moving beyond traditional classroom instructional methods.

TABLE 3. Pedagogical Tools Used by Management Faculty in Web-Based Courses Examined (N = 1,077)

Course material	Courses	
	No.	%
Syllabus	1,004	93.2
Undergraduate	663	91.3
Graduate	341	97.4
Use of PowerPoint	285	26.5
Undergraduate	198	27.3
Graduate	87	24.9
Assignments	279	25.6
Undergraduate	195	26.9
Graduate	84	24.0
Sample papers	174	16.2
Undergraduate	118	16.3
Graduate	56	16.0
Video/audio resources	23	2.14
Undergraduate	12	1.65
Graduate	11	3.14
Online testing/feedback	20	1.86
Undergraduate	15	2.07
Graduate	05	1.43

Discussion

Even if we take into account the underestimation of Web-based support in this study, our findings indicate that management faculty in AACSB-accredited schools of business, as a group, have not embraced the use of information technology in their management classes. Our finding that 14.9% of faculty members are making use of Web-based technologies is nearly half the amount (29%) reported in a survey of AACSB administrators (Britt & Frand, 1999). Further, the majority of management faculty members using the technology have not progressed beyond the automation of information flows related to course requirements. As Leidner and Jarvenpaa (1995) have pointed out, this automation may be efficient and convenient, but it does not result in fundamental changes to teaching and learning.

It was evident that many schools had implemented a common template to facilitate the placement of course-related material on the Web. In many instances, however, the pages were "under construction." Many of the templates that were operational suffered from a lack of maintenance. For example, one school site that we visited in fall 1999 had course materials from 1994. Several individuals attempted to reduce the maintenance burden by removing the dates from the syllabi. Regardless, the majority of Web-assisted courses are undoubtedly driven by individual faculty with the desire to learn and use new technologies. The lack of significant differences between types of schools (e.g., public vs. private) seems to support the conclusion that individuals, not institutions, drive application of the technology. The overall scarcity of faculty maintaining on-line resources may be attributable to faculty resistance to change (for a discussion of this issue, see Bilimoria, 1997).

In addition to faculty resistance, apparently only a few schools have devoted the necessary resources to help faculty use technology. The results of this study suggest that faculty training and ongoing assistance in maintaining Web materials is not widespread. Until schools and departments devote ongoing operational

resources to the use of technology in the delivery of courses, management education will continue to underuse information technology. Numerous authors have discussed the information superhighway by using analogies referring to potholes, dead ends, on-ramps, and so forth. However, our results suggest that management faculties may still be in "park" with respect to the road to adoption of Web-based technology.

Future research should survey faculty concerning their attitudes toward and use of on-line resources. In particular, their preference for using LANs versus the World Wide Web—for security or convenience—should be explored. Further research should also be conducted on exemplary schools to assess their development, training, and maintenance practices. Their approaches, including the human and financial commitment to the use of technology, should be of interest to faculty and institutions implementing Internet-based curricula.

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