The coming of the cyberclassroom may shake the education industry to its core and change almost everything we do in teaching economics. In this article, a "cybereconomics course" will be narrowly defined as one in which *little or no instruction takes place in the traditional physical classroom*. Instead, most or all of the instruction takes place in a cyberenvironment through the use of different instructional technologies, such as "on-line" interactive websites and/or "off-line" CD-ROM-based lectures.

This specific definition of cyberlearning is useful because it emphasizes two distinctions. First, it helps to distinguish between complete cyberlearning environments versus traditional classroom environments that integrate certain cyberlearning technologies into the curricula. For example, one-third of all classes in fall term 1998 used Internet resources as part of the syllabus, as compared with 25 percent in 1997 and 15 percent in 1996, and the percentage of classes using e-mail has increased from 8 percent in 1994 to almost 50 percent in fall 1998 (Institute for Higher Education, 1999). However, while these web-supplemental resources have important pedagogical implications, the use of such resources is not considered to be sufficient to define a cybereconomics course for the purposes of this article.

This article will discuss the size and scope of the cybereconomics market; the range and mix of instructional technologies; course design, development, and content; cyberinfrastructure and technical support; student characteristics, performance, and access; and labor issues and instructor attitudes. As preparation for this discussion, I conducted an extensive literature search; analyzed numerous cyber-
economics courses; conducted 24 formal interviews with cybereconomics instructors; and had more than 50 less formal discussions with more than 100 other instructors, administrators, publishers, web infrastructure providers, and technical support staff.\(^1\)

Table 1 provides a snapshot of the formal survey respondents and a summary of some key responses. What follows are observations based on these results, my discussions, and my own experience logging countless hours developing, delivering, and evaluating cybereconomics content.

**Size and Scope of the Cybereconomics Market**

I have located close to 50 institutions offering over 100 cybereconomics courses, where little or no instruction occurs in a physical classroom. These institutions span the spectrum from large state universities and community colleges to smaller private colleges and religious institutions. They were located with the help of several research assistants primarily through an extensive Internet search. From this search, the following observations can be made.

First, the actual cybereconomics market remains in its infancy, with no more than a few percent of students now learning economics in cyberspace. This observation is consistent with one of the most complete surveys of the overall on-line education market conducted to date, which estimates that "less than 100,000 students have been served" in total through on-line education for the more than 100 institutions surveyed (E-curriculum.com, 1999, p. 7).\(^2\)

Second, the cyberlearning option appears to be increasing both market scope and the overall pool of students. With cyberlearning, institutions are able to reach beyond their traditional pool of students, both in geographic terms, by reaching into underserved rural and global markets, and in demographic terms, by reaching out to students who are older and working, raising a family and who would otherwise find it difficult to pursue traditional higher education within its more rigid time and space constraints. In fact, a large majority of the cybereconomics offerings today are available only through the "adult education," "extension," or

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\(^1\) Initially, I conducted several of the formal interviews on the phone. However, I quickly learned that it was easier and faster for both parties simply to e-mail a request to complete the survey with the survey questionnaire attached. The formal survey instrument is posted at (http://www.powerofeconomics.com). The sample, with schools selected based on my knowledge that they were actually using cybereconomics courses, included instructors from nine state universities, four community colleges, four private religious universities, three private colleges, and one strictly Internet university. The more informal interviews were conducted over the time span of about a year. In addition, cybercourses at an additional 25 institutions were analyzed for the range and mix of instructional technologies, as explained further in the text below. The statistics in this article are derived primarily from the formal surveys.

\(^2\) The participants in the E-Curriculum.com survey are listed in Appendix B of their report and include a representative mix of state universities, community colleges and private colleges and universities, as well as nationally-oriented institutions and technical institutes.
Table 1
A Snapshot of the Survey Respondents and Results

<table>
<thead>
<tr>
<th>Instructor Characteristics:</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Male</td>
<td>71%</td>
</tr>
<tr>
<td>Median Age</td>
<td>43</td>
</tr>
<tr>
<td>Tenured</td>
<td>42%</td>
</tr>
<tr>
<td>Unionized</td>
<td>17%</td>
</tr>
<tr>
<td>Taught Principles</td>
<td>71%</td>
</tr>
<tr>
<td>Experienced Technical Problems</td>
<td>92%</td>
</tr>
<tr>
<td>Instructors Believed That:</td>
<td></td>
</tr>
<tr>
<td>Students Performed Same or Better in Cyberspace</td>
<td>79%</td>
</tr>
<tr>
<td>Had Adequate Professor-to-Student Interactions</td>
<td>63%</td>
</tr>
<tr>
<td>Had Adequate Student-to-Student Interactions</td>
<td>54%</td>
</tr>
<tr>
<td>Dropout Rate is Higher</td>
<td>42%</td>
</tr>
<tr>
<td>Students Have Adequate Computer Resources</td>
<td>79%</td>
</tr>
<tr>
<td>Institution Provides Adequate Technical Support</td>
<td>67%</td>
</tr>
<tr>
<td>Instructors Stated That:</td>
<td></td>
</tr>
<tr>
<td>Spent More Time Developing Cyber Course(s)</td>
<td>92%</td>
</tr>
<tr>
<td>Spent More Time Teaching Cyber Course(s)</td>
<td>67%</td>
</tr>
<tr>
<td>Enjoyed Teaching As Much or More In Cyberspace</td>
<td>71%</td>
</tr>
</tbody>
</table>

"long distance learning" arms of institutions. These extension programs primarily serve alternative students rather than degree-track undergraduates; and at such institutions, the economics departments or business schools often provide nothing more than a faculty member or adjunct lecturer on loan to facilitate the course offering. Clearly, cybereconomics is not yet a mainstream phenomenon on most campuses.

Third, the most common economics cybereconomics courses offered by a large margin are introductory micro- and macroeconomics, accounting for over 70 percent of the offerings in the survey. This finding is not much of a surprise, since nearly a million college students take principles courses each year, and introductory economics ranks with introductory biology and psychology as one of the top educational “staples.” This focus on the large-scale principles courses makes sense if there are high fixed costs in development and equally large possible economies of scale in the distribution (but not teaching) of cybercourse materials. However, I also encountered institutions offering courses ranging from business, managerial, and global economics, to money and banking, econometrics, economic development, and more.

In this regard, while the actual market for cybereconomics is still small and theoretically, all of college economics could be cybereconomics, the more interesting immediate problem facing many school administrators and department chairpersons is how to address very large enrollments in certain key undergraduate economics courses, especially principles. (This problem is particularly acute at institutions like the University of California that project large increases in the student population over the next decade without a commensurate increase in physical plant.) In these kinds of circumstances, cybereconomics will likely make its
greatest impact. This is all the more true since principles courses are often taught in large lecture halls of up to 400 students or more. These “cattle calls” lack significant one-on-one interactions with instructors; and in such an impersonal environment, cyberteaching might compete especially well with the existing arrangement.

The Range and Mix of Instructional Technologies

There is no standard cybereconomics course model in the marketplace—at least not yet. Instead, there is a set of instructional technologies that can be used in various mixes to deliver cyberteaching content. In Table 2, these technologies are rank-ordered roughly by their frequency of use reported in the survey (as indicated by the percentages in parentheses). Their major pedagogical functions are also briefly noted, and the technologies are further identified as either synchronous or asynchronous; that is, according to whether students and teachers need to be using them at the same time or not.

To clarify the implications of the instructional technology mix for a cybereconomics course, consider two polar opposite models of instruction on the pedagogical spectrum: the “digitized text” approach and the “fully interactive, multimedia approach.”

In the digitized text approach, the cybereconomics instructor posts noninteractive material lacking any audio or video augmentation on a website—essentially digitized text. Such materials might include a syllabus, textbook excerpts, lecture notes, and/or a study guide. Students are assigned this on-line material in a sequence, typically with some textbook readings. They are required to take one or more multiple choice tests as their principle source of evaluation, often in a nonproctored on-line environment. Interaction with the instructor is limited to low-volume e-mail correspondences, typically initiated by the student.

The digitized text approach appears most likely to realize the worst fears of those critics who warn of “digital diploma mills” and a sterile educational landscape populated by alienated students and instructors (for example, Noble, 1997).

In the fully interactive, multimedia approach, the centerpiece of the student's experience is some type of instructor surrogate to simulate the traditional classroom lecture, such as an interactive, multimedia CD-ROM, videotaped lectures, or TV broadcasts (satellite or cable, live or video). Although neither videotaped lectures nor TV broadcasts are “interactive” in the sense of a CD-ROM, in this model, the interactions in this case can also come from technologies such as e-mail, an Internet bulletin board or a chat room, and teleconferencing. A typical approach is to post questions based upon web-linked news articles. Students respond to this material, as well as to other student responses, in a “threaded” format that allows conversations to be traced out. An unproctored electronic testing center is used, both for evaluation and to motivate keeping up with the material. However,
Table 2

Instructional Technologies for the Cyberclassroom

<table>
<thead>
<tr>
<th>Instructional Technology</th>
<th>Major Pedagogical Function</th>
</tr>
</thead>
<tbody>
<tr>
<td>E-mail (100%)</td>
<td>Asynchronous professor-to-student interactions.</td>
</tr>
<tr>
<td>On-line lecture notes (83%)</td>
<td>Content provision. Asynchronous.</td>
</tr>
<tr>
<td>Internet Chat Room (71%)</td>
<td>Synchronous professor-to-student and student-to-student interactions.</td>
</tr>
<tr>
<td>Electronic Bulletin Board Discussions (71%)</td>
<td>Content provision and asynchronous interactions.</td>
</tr>
<tr>
<td>On-line textbook or study guide (54%)</td>
<td>Content provision. Asynchronous.</td>
</tr>
<tr>
<td>On-line Testing (50%)</td>
<td>Evaluation and/or motivation for students to assimilate content. Asynchronous.</td>
</tr>
<tr>
<td>CD-ROM Lectures (17%)</td>
<td>Content Provision. Substitutes for traditional classroom lecture. Asynchronous.</td>
</tr>
<tr>
<td>Teleconferencing (13%)</td>
<td>Synchronous professor-to-student and student-to-student interactions.</td>
</tr>
<tr>
<td>Video or Cassette Tapes (8%)</td>
<td>Content Provision. Substitutes for traditional classroom lecture. Asynchronous.</td>
</tr>
</tbody>
</table>

students may also be tested through a proctored evaluation process, which can require students to answer exam questions in short-answer or essay format.

This fully interactive, multimedia approach appears to provide a viable competitive challenge to the traditional economics course classroom in terms of pedagogy as well as both student satisfaction and performance (Navarro and Shoemaker, 1999a, 2000).

Note, however, that a significant fraction of the cybercourses examined had far more in common with the digitized text model than the fully interactive, multimedia approach. An obvious reason is that cheaper and more available technologies are more widely used. E-mail and class websites with digitized text are relatively cheap and simple to provide. Many brands of off-the-shelf software are now available for electronic testing and electronic bulletin board services, but each requires a significantly higher level of web infrastructure and staff support, and these technologies are seen less often. The highest cost and least available instructional technology is also the least frequently observed—namely, some type of interactive, multimedia presentation designed to simulate the lecture experience; only about a fourth of the courses examined featured such a lecture surrogate.

Course Design, Development, and Content

As a starting point for addressing these issues, let me share some data from my own experience producing The Power of Macroeconomics and The Power of Microeconomics for Irwin/McGraw Hill. This set of interactive, multimedia CD-ROMs on four disks contains 25 lectures covering introductory micro- and macroeconomics. It was
specifically designed as a traditional lecture substitute for use in cyberbased principles courses.

The cost of production was about $115,000. Cost components included $3,000 for a computer, $8,000 to equip an in-house recording studio and digital editing system, and another $4,000 for CD-ROM stock and JAZ drive cartridges, both of which were used for storage of the multimedia material. In addition, each lecture required an average of 24 hours of my time for writing, recording, and editing the presentations. Each lecture also required 162 hours of sound engineering, multimedia development and design time from my assistant. Thus, total labor costs (including an imputed cost based on my salary for my time) totaled almost $100,000 and constituted the bulk of total costs.

This example underscores two fundamental issues that any institution seeking to offer cybereconomics courses must face. First, the development of high quality, customized multimedia course content is expensive. At the low end, some have budgeted cybercourse development at $10,000 to $12,000 per instructional hour, while at the high end, doing commercial course content development and marketing with a full-time multimedia staff can run as high as $90,000 per course hour (Marchese, 1998).

Second, and more subtly, such development also invariably raises copyright issues. An instructor’s typical set of lecture notes consists of numerous figures, graphs, examples, and perhaps even text excerpts from a published textbook. Simply converting published textbook material into a customized multimedia presentation without the appropriate permissions goes far beyond “fair use” and exposes the developer and institution to copyright violations and legal action.

In meeting the challenges of cybercourse design and production, there are two broad options: build it within an institution or buy it from outside. Thus, institutions or consortia have developed their own proprietary software and set up their own multimedia departments, often with the goal of converting the lectures of their own professors into viable cybercourses. The clear advantage of this “build option” is that it allows an institution to present customized material. But it entails significant costs, and copyright issues can lurk in the background.

Other institutions are subcontracting some or all of the design, development, and delivery of course content out to two types of private sector firms: “on-line campus integrators” and “learning platform providers.”

On-line campus integrators, such as Collegis, Convene, eCollege.com, E-Education, FirstClass, and UOL, offer turn-key solutions, with services ranging from web hosting, technical support, and course development to faculty training and marketing. These firms allow institutions lacking basic infrastructure and course development expertise to start up a program very quickly.

However, high pricing can be a significant deterrent to the use of these companies (E-Curriculum.com, 1999). For example, one of the largest on-line campus integrators charges from $60 to $120 per student per course for its services. At some institutions, this is close to the entire course fee a student might pay. In this regard, it may be useful to note that course pricing by most on-line campus
integrators at this time seems somewhat at odds with what we know about optimality. In this particular case, for example, it might make more sense to charge a large lump sum to cover fixed costs, and then a low or declining charge per student, since the marginal costs of the on-line campus integrators are quite low.

Learning platform providers, such as Blackboard, Lotus Learning Space, TopClass, WebCT and WebMentor, offer a hybrid “buy with some building” option. These firms provide off-the-shelf course development tools, course development assistance, and faculty training, along with web hosting and technical support. This option is generally less expensive up front, and it allows institutions to maintain more direct control over course content and delivery. However, it also requires a more intense use of institutional resources that must be factored into overall costs.

From an institution’s perspective, using either an on-line campus integrator or a learning platform provider has several advantages. These firms have both more experience and a comparative advantage in proper course design, development, and delivery. An institution can often shift both the risk and cost burden of introducing on-line education to these third party providers through a payment structure that consists of a slice of student fees rather than any up-front monies. Finally, either type of provider can help an institution quickly close its infrastructure and technical support gaps, which can be substantial.

According to the E-Curriculum.com (1999) survey, 18 percent of the institutions currently providing cybercourses use their own proprietary software and deliver about 40 percent of the courses currently available, while on-line campus integrators account for 25 percent of the course offerings and learning platform providers for 27 percent. This data is consistent with what I found in my sampling of economics courses.

However, the discussion of content providers to this point has ignored a slumbering giant who may awaken to become the most important future content and infrastructure provider of all. This is the textbook publishing oligopoly.

In a representative market survey, just four major publishers account for over 90 percent of the economic principles textbook market: Irwin/McGraw-Hill (44 percent), Pearson Education Group (which owns Addison Wesley Longman and Prentice Hall) (21 percent), Harcourt Brace Jovanovich (15 percent), and International Thompson Publishing (12 percent) (Monument Information Resource, 1998). These publishers are now investing heavily in cybercourse content development, as well as the provision of the web infrastructure necessary to help institutions deliver that content. Some publishers are now offering substantial cybereconomics course content; and invariably, such content is largely principles-oriented. This content ranges from on-line study guides, slide presentations, and CD-ROM lectures to free class websites, links to economics content on the web, and textbook-specific, electronic test banks. This content is often provided free by publishers as a “loss leaders” to help sell textbooks. In just a few years, it should be a relatively simple matter for any institution to deliver a high quality, semi-customized, multimedia cybereconomics principles courses at a small fraction of the current cost—without the institution having to worry about copyright violations.
However, at the time of this writing at the start of 2000, only two major publishers—Irwin/McGraw-Hill and Harcourt Brace Jovanovich—offer fully interactive cybercourses with multimedia lecture components. The two firms offer an interesting contrast in strategies. Irwin/McGraw-Hill is seeking to bundle its CD-ROM lectures with its own texts (McConnell and Brue, Samuelson and Nordhaus, Schiller, and Colander), and to provide the extensive cybercontent (including free website design and on-line testing) as a free add-on for adopting one of the books. In doing so, it is clearly trying to protect its dominant share in the textbook market.

Conversely, Harcourt Brace is using a newly acquired subsidiary—Archipelago Distributed Learning—to develop CD-ROM courses that can be used with any textbook and, indeed, are textbook optional.\(^3\) In doing so, it is seeking to make the traditional textbook obsolete and to seize market share by undercutting the dominant textbook model. Regardless of which corporate strategy eventually triumphs, economics instructors should soon have much more abundant course content and web resources upon which to draw for their on-line offerings.

The Cyberlearning Infrastructure and Technical Support

Technical problems and failures appear to be a common fact of cyberlearning life. Over 90 percent of instructors reported frequent problems, with web congestion and web infrastructure failures the most common complaints. Other major complaint problems noted included electronic test site failures, conflicting e-mail formats, incompatible student computers and Internet browsers, and password protection failures. As one respondent put it: “If there is a bug in the system, then students will find it.”

These observations underscore the need for a well-functioning cyberlearning infrastructure. From an instructor’s point of view, three “rules of the cyberlearning road” should be kept in mind. First, expect technical problems and plan for them. For example, rather than follow a rigid schedule for the completion of assignments, build flexibility into the deadlines, and provide several different assignment options that require different instructional technologies so if one technology fails, the assignment can be completed using another. Second, inform your students to expect and plan for technical problems. Otherwise, such problems can sap the morale of cyberlearners and lead to both lower performance and a higher dropout rate. In particular, warn students not to wait until the last moment to complete cyberassignments. Third, encourage your institution to build its cyberlearning program upon a solid technological base, including hardware, software, “fail-safe” redundancies, and ongoing technical support for instructors and students.

\(^3\) For more information on Archipelago Distributed Learning, see (http://www.archipelago.com). For information on The Power of Microeconomics and The Power of Macroeconomics, from Irwin/McGraw-Hill, contact (http://www.powerofeconomics.com).
Student Characteristics, Performance, and Access

The cyberstudent mix, at least at this point in the early history of cybereducation, appears to be somewhat different from the traditional student mix. This fact complicates the task of comparing how well a cyberlearning environment works, since the students being compared are not alike.\textsuperscript{4} On this matter, the jury will likely remain out for a very long time, but a large majority of the instructors who responded to my survey (79 percent) believed that their students performed as well or better in cyberspace. At the same time, a number of respondents seemed to agree that the older students often seem more motivated and self-directed. Conversely, many respondents noted that the students who have the most trouble learning in cyberspace are precisely those that lack self-direction and motivation.

The underlying reality here is that many students rely on a web of student-to-student and professor-to-student interactions to generate a sense of direction and motivation. A community of learners can generate positive externalities, which is why many institutions spend considerable sums on fostering such interactions.

A cyberenvironment can attempt to create and nurture such interactions with chat rooms, teleconferencing, e-mail, bulletin board discussions, and so on. But on this issue, 37 percent of my survey respondents indicated that professor-to-student interactions were insufficient, while 46 percent cited a lack of adequate student-to-student interactions as a particular problem. This latter observation, in particular, suggests that, unless it is adequately addressed, a key potential defect to cybereconomics courses may well turn out to be the absence of student-to-student contact.

Nonetheless, a significant number of respondents also believed that their cybercourses actually involved more professor-to-student contact. For example, several respondents pointed out that discussions in traditional classrooms are often dominated by a few loud voices, whereas in cyberspace everyone has a chance to be heard. The result can be a higher degree of student participation in discussions. Other respondents pointed out that, compared to the large lecture hall format in which many principles courses are taught, the level of student participation can be higher in cyberspace. As one respondent concisely put it: “I got to know the students. They couldn’t ‘hide’ from me.”

A final concern about cyberlearning is that it runs the risk of excluding the disadvantaged poor (for example, Phipps and Merisotis, 1999). For a cybercourse, students typically must have a computer, a modem, Internet software, an Internet service provider—and the education and skills to use the new technologies. At most of the institutions surveyed, students currently are largely bearing the burden of providing their own computer and Internet resources. However, it may be possible to address this problem with a marginal infusion of resources targeted at the

\textsuperscript{4}This is an age-old debate within the broader context of long distance learning. For a comprehensive list of studies showing that such there is “no significant difference” between the performance of traditional versus long-distance learning students, see T. L. Russell (1998).
relatively small percentage of students without adequate resources. This can be
done by either reserving a small fraction of computer lab capacity or by having a
laptop computer “loaner pool.” It may also be that the problem of access is a
relatively short-term one, as computers continue to fall in price and web access
becomes cheaper and easier.

Labor Issues and Instructor Attitudes

Perhaps because of the vineyards in which economists toil, we appear to be
acutely aware of the many labor issues raised by the introduction of cyberlearning.
Will professors work more or less in the cyberclassroom? Will we be paid more or
less for the work we do? Will the work be more or less enjoyable than traditional
classroom service? Will we retain the rights to our intellectual property as we
produce cyberlearning content? How will cyberteaching affect promotional oppor-
tunities?

Of the respondents to my survey, 92 percent indicated that it took significantly
more time to develop a cybercourse than a traditional course. Perhaps most
startlingly, over 73 percent of those who said it took more time said it took twice as
long or more for course development.

By the same token, about two-thirds of the cybereconomics instructors re-
ported spending more time teaching, while only 20 percent reported spending less
time. However, most of the respondents reported receiving the same compensation
for teaching a cyberclass as a traditional class. This observation raises a concern that
unless compensation patterns are adjusted, instructors may have an incentive to use
a less interactive mix of instructional technologies to avoid being sucked into a time
drain.

More broadly, there appears to be a significant “triple whammy” visited upon
many instructors who teach cybercourses: the up-front, fixed costs of course prep-
paration are considerably higher; the variable costs of servicing a course likewise
appear to be higher, more complex, and more unpredictable; and the economies
of scale appear to be far less, so that the marginal cost of servicing each additional
student does not fall at anywhere near the same rate as with a traditional course.

Consider the costs associated with the preparation and teaching of a large
traditional lecture course (without web supplemental accoutrement). The first time
one teaches it, there is a large up-front investment in course preparation. However,
in subsequent years, the “course prep” consists only of updating notes each year, so
that the up-front costs are amortized fairly quickly. Each year, the primary variable
cost is an instructor’s lecture time, which is quite predictable: We go to class, we
lecture, and other than some administrative chores and office hours, we are done.
Finally, there are huge economies of scale. An instructor can lecture just as easily
to 400 students as 100, so that the marginal costs of providing course content to
additional students falls quickly towards zero.

Now contrast this with a comparable cybercourse offering. Here, the up-front
course preparation costs appear to be considerably higher. While such costs can likewise be amortized, it is unclear whether, in a world of constantly changing technology, a portion of these up-front costs actually will be recurring as cybercourse professors are constantly forced to update their materials.

As for the variable costs, a cyberprofessor trades the “chains” of lecturing in a classroom for a predictable number of hours at a specific time and place for the more unpredictable “freedom” of being accessible by e-mail and other technologies. In this cyberworld, an instructor is likely to spend a significant time coping with various technical problems. If the cybercourse uses technologies such as electronic bulletin boards or on-line testing, these require additional tending as well. Thus, at this stage in cybercourse development, it appears that the variable costs may be higher and of a more complex nature than those associated with a traditional course—as well as more unpredictable.

Thus, many cybercourse instructors do find themselves being drawn into an endless time drain. As one respondent put it: “Time does not diminish with experience—unlike traditional teaching where I can rely on some good notes from the past, on-line requires a large time commitment every time through to monitor and assist students.”

In the light of these observations, it is perhaps not surprising that 29 percent of the instructors I surveyed said that they had less enjoyment from teaching in the cyberclassroom, and a few bluntly indicated that they were only doing it “for the money” or because of “departmental pressure.” The most common complaint was the absence of live interactions with the students. However, a third of the respondents clearly do enjoy the challenge of cyberteaching more and are particularly drawn to its flexibility. For example, one working mother was able to teach her cyberclass while barely missing a beat after giving birth.

More broadly, many respondents noted “convenience” and “flexibility” as clear advantages of cyberteaching. This appears to hold true despite the increased workload. As one respondent put it, it was “far more work than expected” and “far more rewarding than expected.”

Perhaps the more general point here is that cyberteaching is not for everyone. Over time, I suspect that our profession will no doubt sort itself out, just as students will, into those who prefer the cost, convenience, and quality tradeoffs of the traditional classroom and those who consider the same tradeoffs and prefer cyber-space. Future research may want to focus on what kind of attributes are key for successful cyberlearning, for both instructors and students. Over time, I suspect that the market will reinforce this sorting as demand (and presumably compensation) for cybereconomics instructors conceivably increases in the future. This may happen because there are higher demands on faculty for creating a cybercourse than widely appreciated, and because there are ongoing demands on faculty time

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5 It is perhaps equally worth noting that, at least in the surveys I have given to my own cyberstudents, they, as a group, have reported that they believe they spend about the same time working on the cyberclass as they would for a traditional class.
for running such a course. Finally, over time, I also suspect that at least much of the high, up-front costs of cybercourse preparation will diminish as publishers provide more and more sophisticated cybercontent packages. Nonetheless, the high variable costs will remain.

As for intellectual property issues, the transformation of an instructor's traditional classroom lecture notes and course content into a multimedia, cyberlearning presentation raises a basic property rights issue: Does the instructor or the university own the course? Depending on the answer, other thorny issues arise: What happens to the course if the instructor leaves the institution? Will the instructor be compensated if another instructor uses the material or if the course is licensed to another institution? If a third party content provider assists an instructor or institution in developing course content, what rights to the material might the third party retain?

The most comprehensive survey results I found on the issue indicates that, of the institutions surveyed, fully 58 percent retained the rights to on-line course ownership while only 12 percent grant such ownership solely to faculty (E-curriculum.com, 1999, p. 14). Perhaps disquietingly, I found in my more informal discussions little awareness of these issues among economics faculty.

A number of respondents reported positive reinforcement from their colleagues for their cyberteaching. However, others reported negative reactions ranging from skepticism and jealousy to distrust and anger while some respondents even expressed concern that cyberteaching might injure their promotional opportunities. As one particularly disgruntled respondent put it:

My department was so incredibly critical, antagonistic, and skeptical, that you would have thought I was the anti-Christ who spent most of my free time molesting their children. I have basically withdrawn from most departmental activities since my colleagues tried to "lynch me" for my efforts about two years ago. Make note that I am a 20-year veteran of the department, a full professor, and in the top five in publications and salary.

An excerpt from an article in the New York Times (September 2, 1999), sheds further light on the potentially problematic interaction between cyberteaching and promotional opportunities: "'I can't get people in my own school to talk to me about it,' [Professor Robert] Connolly said. Colleagues who have been willing to acknowledge his distance-education work expect that his research—a professor's ticket to tenure—must be suffering....'They look at it and say, 'If you are spending time on that, that takes time away from your research and publishing.'"'

In this regard, my broad impression is that faculty resistance will slow the pace of the diffusion of cybereconomics into the mainstream curriculum, particularly at institutions where faculty are unionized or where, by institutional practice, faculty share a large role in the governance of the institution. Thus, in the short run at least, it will be the generally private and more entrepreneurial institutions that will carve out the largest share of the cybereconomics market.
References


Saba, F. 1998. “Discontent with the Use of Tech-


