The Clipper Project:
Discovering What Online Courses Offer Residential Universities

Helping faculty employ technology in online courses ultimately prompted changes in their pedagogy

By **M. J. Bishop and Sally A. White**

Founded in 1865, Lehigh University is a four-year, medium-sized research institution in Bethlehem, Pennsylvania. The university's three campuses cover 1,600 acres and include more than 147 buildings that provide 3.6 million square feet of classroom, laboratory, library, performing arts, office, and living space. Lehigh does not envision abandoning its brick-and-mortar residential programs to become an online virtual university. The opposite is true—we are investing substantial resources in campus projects. So why would Lehigh engage in a five-year, Web-based, curricular research and development initiative?

In his 1999 inaugural address, Lehigh President Gregory C. Farrington asked the audience to "suppose for a moment that it's the 1930s…"

…You're the captain of the luxury liner, the Queen Mary, steaming across the Atlantic to New York. Suddenly, you hear a low drone. You look up and see a Pan Am Clipper, winging its way from London to New York. Would you realize that the age of steamships is about to end? Would the steamship company understand that its business actually is transportation, not ships?

The Pan Am Clipper represented more than a paradigmatic shift in the way goods and people were transported; it forced new ways of thinking about how we work and live. In fact, with the proliferation of flight, the transportation industry caused a societal transformation.

By analogy in his speech and in a subsequent *EDUCAUSE Review* article,[1] Farrington reminded us that we have a similar opportunity in higher education. The traditional classroom, with its focus on lecture-based teaching, is the university's Queen Mary. Learning, not teaching, is our business. Web-based technologies can make learning more effective and efficient, constituting an educational Clipper, if you will. The challenge facing us is to identify and capitalize on what Web-based instruction has to offer higher education, even if it means retraining "seafaring" faculty to pilot planes.

The Scholarship of Teaching and the "Clipper Model"

Driven by advances in instructional technologies, the processes of teaching and learning have come under new scrutiny in recent years. Some have called for renewed interest among faculty in the *scholarship of teaching*, whereby a portion of their time goes to assessing their pedagogical styles and seeking technology-enhanced alternatives to "chalk and talk" methodologies.[2] Faculty at a research-intensive institution like Lehigh, however, often view teaching and scholarship as separate and competing forces contending for their time.[3] Consequently, once faculty find a solution to a problem, they tend to stick with it regardless of how the available technology changes.[4]

It is from this perspective that the Clipper Project team approached the task of transforming the business of higher education from teaching to learning. They suspected that faculty's hesitation to embrace instructional technologies was less about opposition and more about solitary faculty not having the time to familiarize themselves with the unique features of new instructional technologies and explore ways of doing things differently.[5] The team reasoned that if faculty collaborated with instructional technology staff to explore best practices in teaching with technology,

■ whether the experience of having done so would have any influence on their overall pedagogical styles, and

■ what general effect the Clipper Model of collaboration between faculty and instructional technology staff would have on the university as a whole.

The Project

From the outset, the project team understood the important role of "championship" within the university for this endeavor to succeed. Therefore, an immediate goal was to identify early adopters of instructional technologies—those faculty who had already pursued or who were committed to investigating and implementing some form of Web-enhanced instruction in their courses. When asked, faculty reported having a variety of motivations for agreeing to participate in the Clipper Project:

> I was primarily interested in using the new technology that would be available through the Clipper Project to see how we could enhance teaching [in my department], and to drive changes in my own teaching.

> I thought it would be a good way to develop materials that could be used in [my regular classes]. I am not that good with technology, but I am very open to it. Most of the time I use computers as a research tool rather than as a teaching tool.

> Some people said that you can't enable the social construction of knowledge online. I said, "Let's do it."

Once identified, these individuals were involved in every aspect of the project planning, including helping to draft the overall research design in collaboration with the College of Education faculty who served as the project's principal investigators. These faculty volunteers also committed to teaching their online courses throughout the project.

The online courses envisioned at the beginning of Clipper—introductions

they might find exciting new ways to advance learning.

So, with the sound of the Pan Am Clipper's engine resonating in our imaginations and supported by funding from the Andrew W. Mellon Foundation, the Clipper Project team set out to provide participating faculty with a test bed for longitudinally explor-ing their teaching. With the help of instructional technologists, faculty designed and developed online instruc-tion methods. Among the many things the project explored, team members were interested to know

■ how faculty would transform their traditional on-campus courses for online delivery,

to calculus, economics, chemistry, English, and engineering—did not exist and had to be developed as part of the project. To accomplish this, each faculty member was assigned an instructional technology consultant from within the university's Library and Technology Services (LTS) department. This consultant served as the main contact between the instructor and the media support personnel who formed the course development team. During each course's three-year cycle over the four years of the project, this team worked to develop each online course from its initial conception, through various formative revisions, to the final version.

The project's longitudinal design allowed us to assess the long-term impact of the instructors' involvement in Web-based course development on their competence with instructional technologies, incorporation of technology-based instructional methods in other courses, and overall pedagogical styles. To assess faculty outcomes, we conducted periodic interviews and distributed end-of-semester questionnaires that asked faculty to reflect on their experiences and compare the online course they designed to their traditional courses. To assess Clipper's institutional impact, we recorded and transcribed all meetings with representatives from the many administrative units affected by the project. We also maintained a detailed log of various interactions and correspondences related to administration of the courses.

In addition to exploring the impact of online teaching on faculty and the institution, the planning committee was anxious to examine the extent to which Web-based technologies affected the students who participated. In particular, we wanted to know how online courses might be used to enhance the collegiate experience of Lehigh's first-year students by accelerating their social and academic transition to college. Thus, the team designed a quasi-experimental study measuring both qualitative and quantitative outcomes of students in three instructional conditions of the same course: traditional, face-to-face instruction of on-campus students; online instruction made up entirely of pre-matriculated high school seniors; and online instruction that comprised both pre-matriculated high school seniors and on-campus students.[6]

Summary of Findings

Overall, 451 students participated in the project. After adjusting for differences among the groups, the project's three instructional conditions provided the opportunity for between-group comparisons of adjustment to college in the first semester after matriculation, final grades, and course withdrawal rates. Statistical analyses of the adaptation-to-college data indicated that students who had the opportunity to participate in an online, college-level course prior to high-school matriculation adjusted significantly more easily to college in their first semester than did their colleagues.[7] In addition, we found that, overall, online students withdrew from their Clipper course in higher numbers than their face-to-face counterparts (41.5 percent versus 3 percent). There was no significant difference between online and face-to-face students' final course grades.[8]

Interestingly, when we examined final course grades across the "age" of the courses (whether each course was in its first, second, or third cycle), we discovered that the online students' mean scores improved significantly overall with each course cycle. Table 1 supplies the output of our one-way analysis of variance for final course grade by course age between groups of students.

Discussion

Analysis of the qualitative data we collected on faculty experiences over the tenure of the project indicated that while there was a strong initial temptation for the instructors simply to replicate traditional courses online, these early attempts at least exposed faculty to the unique features—or affordances[9]—that the new instructional technologies might offer. Over time it appears that faculty began to work with their instructional technology consultants to explore more innovative pedagogical approaches made possible by technology. Eventually, they incorporated those methods into their on-campus classes as well.

Initial Replication

Like their face-to-face equivalents, the online Clipper courses included the presentation of information, textbook readings, structured problems, and multiple-choice exams. Classroom lectures were replaced by PowerPoint presentations with audio or by mini-lectures or demonstrations using software such as Camtasia and Flash.

Several factors probably contributed to the initial high-fidelity approach. First, in order to assure that students in the online courses would benefit from the same high quality and rigor as the face-to-face course equivalent, the Clipper team deliberately adopted a conservative design approach of replicating traditional university classroom instruction online. The initial plan for the project proposed the following:

Each course will be designed as an online version of the on-campus

Table 1					
Course Grade by Course Age					
				ANOVA	
Course Age	**N**	**Mean**	**Standard Deviation**	**F(2,196)**	**p**
1	74	2.84	0.93	4.064	.019
2	72	3.23	1.06		
3	53	3.25	.97		
Total	199	3.09	.98		

course offered at Lehigh. This means the same content will be presented with the same expectations for success.

Second, some Web-based course-management technologies primarily support traditional instructional activities, with little to help instructors think differently about online teaching and learning methodologies. Third, in the absence of guidelines, educators—like everyone else—tend to adopt newer technologies as a substitute for older technologies.[10]

Lehigh faculty are not alone in the evolution of their thinking about Web-based instruction. It appears that the conservative, replication approach to the design of online courses has been a necessary first step for many institutions as they explore this new teaching and learning delivery system.[11] It becomes problematic, however, when we fail to build on this initial foray by recognizing the things that the new technologies have to offer education and using the opportunity, where appropriate, to experiment with more innovative pedagogical approaches.[12]

Recognition of Affordances

Faculty were asked at various junctures during the project to compare their online and face-to-face teaching experiences in terms of workload, social connections, and outcomes. While the faculty found teaching online to be more demanding initially than teaching face-to-face courses, they felt the payoffs were high in terms of their overall satisfaction and professional development. As a group, the Clipper faculty reported that the technology-enhanced communications and smaller sections allowed them to get to know the Clipper students better than their face-to-face students:

In Clipper, I feel that I do know the [online] students a lot better than I do in the regular class. Of course, in the regular class there are 60 students and it is hard to get to know many of them anyway.

I enjoyed the [online] section more and felt I had more contact with the

students even though I wouldn't be able to recognize any of them on the street.

I know the students so much more in the online discussion groups.

By the time of the project's 18-month external evaluation report, faculty appeared to be recognizing the things that instructional technologies offered and were becoming increasingly interested in enhancing the existing online courses:[13]

I like the fact that everyone's work is public. It enables peer feedback. The old model was students would write a paper and only the professor would read it. This is better.

…the online course shifts the burden to the student to learn rather than from the faculty to teach. In the regular course, students show up expecting you to interpret the material for them, and then they will learn the interpretation you give them.

Eventually, faculty participants began expressing some important ideas for improving their online Clipper courses:

…the first time we taught the course online, we tried to replicate the lectures with PowerPoint slides and audio. This was too boring. Now we're exploring other options…

We have the right principles in mind. We want to increase student engagement in the course, and we want to put the content into a meaningful context for them.

We need to study the outcomes of this approach. For example, we should look at how these students do in related follow-up courses…. I think we could add more synchronous components to the courses.

We need more interactions with the outside world. We should look into

combining our efforts with other institutions.

Pedagogical Shifts

By the end of the project, every faculty participant reported incorporating the technologies and materials developed through Clipper into their "regular" courses in some way:

[Clipper has helped] us create tools that we can use in our on-campus courses. For example, we are providing an increasing amount of help online for the students in our regular class.

I am already using in all my classes all tools used for the Clipper course (online notes, Blackboard, automated tests, surveys, etc.).

I think the online course highlights the importance of peer learning. In most courses that is informal, but I think I will try to make that a more formal part of my on-campus classes in the future.

I don't feel much difference between my online and face-to-face courses anymore. They have blended. On campus I teach in a computer classroom, and all student work comes via the computer and most of the important interaction comes via the computer as well. Funny, but not seeing the students doesn't seem to make an especially big difference…

More importantly, however, the faculty also observed that the technologies employed in their Clipper courses had challenged them to think differently about teaching and learning in all contexts:

Clipper has built up an infrastructure for experimentation with several core courses. We are using some of the ideas that we are learning in Clipper in our [other programs].

Another value from Clipper is that it helps us address the question of "How does online education fit within

the overall university program?" It opens up options for courses. We can use lectures, seminars, online, or some blend.

Over time, the Clipper Project faculty appeared to have discovered that rather than simply "digitize" what they had always done, they could use technology to support students' knowledge construction, explorations, learning by doing, discourse with others, and reflections:

> One example [of our pedagogy] is that online, I pose a question, have the students work together to explore an answer, and then have them compare their answer to an expert's answer. We are trying to get them to think like a real practitioner.

In this way, the Clipper Project helped clarify Lehigh's vision of online learning and crystallize its role within the university. One instructional technology consultant assigned to Clipper noted,

> It's given us a vision of the possibilities for online learning. It's changed our distance education model from video delivery to learning objects. There is a much better atmosphere for innovation, thanks to Clipper.

Thus, even though Clipper only directly impacted 451 students and 5 faculty members over its tenure, one of the most important project outcomes has been the impact of the Clipper Model on the university as a whole.

Project Outcomes

Because Clipper marked the first concerted effort that Lehigh University made in offering online courses, the project had implications throughout the university, from the Registrar's Office to the Educational Policy Committee. Many changes to procedures and policies had to be made during the project's tenure. Among the many positive influences that the Clipper Project had on the larger institution was the increased recognition on campus that large-scale course redesign using infor-

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mation technology involves an ongoing partnership among faculty, LTS staff, and administrators in both planning and execution.

The faculty-LTS staff collaborative model piloted as part of the Clipper Project was an initial test of extensive administrative reorganizations during the late 1990s and early 2000s. These organizational changes united academic computing, media services, administrative computing, distance education, digital initiatives, library services, and faculty development into a single organization, with the goal of advancing a vision of systemic change in the classroom.

One of the initiatives to come out of that reorganization was Lehigh Lab, for which the university received an EDUCAUSE Systemic Progress in Teaching and Learning Award in November 2004. Like Clipper, Lehigh Lab builds on the idea that the university as a whole is a laboratory in which faculty, staff, and students from across departments and disciplines work together to advance learning. The lab's primary objective is

to facilitate innovative undergraduate and graduate teaching that uses information and technology to its fullest in a learner-centered environment.

Lehigh Lab encompasses several high-tech instructional facilities that have contributed to its success. For example, the Technology Resource Learning Center in the university's main library and the Classroom of the Future in the College of Education are dedicated to the exploration and application of technology for teaching and learning through decentralized classroom environments permeated with easily accessible, state-of-the-art technologies. Lehigh Lab has been additionally strengthened by the university's ongoing commitment to upgrade existing teaching labs and classrooms. To date, more than 75 percent of Lehigh's classrooms are enhanced with technology.

Even more important to Lehigh Lab's success, however, has been the core of professional development and instructional technology consultants working with other LTS members from computing, library, and media services to provide faculty with technology-based solutions to teaching and learning problems. These consultants are deployed across the university, with assignments and offices embedded in each of the four colleges. They attend college faculty meetings and are actively engaged and visible at university events. They regularly run discipline-specific instructional technology workshops, provide individual or group support on best practices of instructional technology use, and field requests from faculty to develop course-specific materials such as simulations, videos, and databases. At the same time, the instructional technologists continually research state-of-the-art technologies to help keep the faculty in their colleges ahead of the instructional technology curve. According to one former Clipper instructor who remains actively engaged in the Lehigh Lab,

> The most important part is the people. They help me learn what I can do and turn my ideas into real products that make a difference. I

am able to make things happen in my teaching that go off without a hitch through collaboration with the people who know things about education and how people learn. Never try it alone!

Next Steps

The Clipper Model has been highly effective for Lehigh University, advancing the pedagogical methods of the faculty involved and helping the institution begin to think differently about how to support alternative models for teaching and learning. While almost unlimited opportunities exist to translate the Clipper Project's discoveries into practice, the LTS Strategic Plan for 2006–2010 has identified three specific challenges for the future:

- Increasing and improving collaborative learning spaces
- Continuing to engage faculty in using technology and embracing other pedagogical innovations without overloading them
- Providing enough support for students and faculty to use library and technology resources effectively at all the times they need it.

In the fall of 2002, LTS released the campus portal

> to facilitate the delivery of highly personalized information, access to Web services such as e-mail, calendaring, Web for Banner and Blackboard, and group-communication tools to clients based on their role at the university and customizable to their personal preferences.[14]

Pilot groups and the campus community at large had the opportunity to supply feedback on the portal's development. They also had ongoing training on the portal's features and functions. Faculty, however, have been slow to adopt the portal for their own use. While it is not entirely clear why, it would not be unreasonable to speculate that many faculty are uncertain about what to do with the portal.

We believe the campus portal may occupy the intercept of the challenges discussed above. Not only might it be an ideal tool to facilitate collaborative

learning, it could also serve as the vehicle for continuing the Clipper Model of collaborative instructional technology solutions by supplying just-in-time resources whenever faculty need them. Thus, we are interested in developing and assessing the impact of a "MyTA" campus portal area that would be an extension of the university's faculty development efforts. In addition to providing other resources aimed at helping faculty use technology to think differently about teaching and learning, MyTA would offer a comprehensive set of suggested lesson/activity plans and assignments to help faculty embed these resources within various discipline-specific topics.

Conclusion

The limitations of an older technology can define the way we think to use a new, less-limited technology. This "functional fixedness" is poignantly illustrated by the 1927 photograph that Cuban included in the front of his book, *Teachers and Machines: The Classroom Use of Technology Since 1920*.[15] Depicted is an extraordinary opportunity, even by today's standards, for students to experience geography firsthand from the windows of an airplane. But the students aren't looking out their windows from their bolted-to-the-floor airplane desks. Instead, their attention is focused on the teacher standing before a chalkboard at the front of the cabin, pointing at a globe.

All too frequently faculty use instructional technologies to teach students in much the same way they have always taught students. Most recently, this functional fixedness takes the form of digitizing and archiving a lecture on the Web, then later assessing students' recall and comprehension of what they were told using an online quiz administered by a course management system. Findings from Clipper and myriad other research studies indicate that while technology-based tools may help make teaching and learning more accessible and expedient, the mere addition of instructional technologies rarely results in significant improvements in learning outcomes unless the integration of the

tools also drives fundamental pedagogical changes.[16] So, while it is true that higher education must make available the necessary instructional technology tools and facilities, if faculty are not also provided with the collaborative support they need, higher education's shift from steamships to airplanes is not likely to result in the more important fundamental shift from a focus on teaching to a focus on learning. *e*

Endnotes

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6. High-school student participants were recruited from among the university's pool of early-decision admits and, therefore, had committed to matriculating at the start of the next academic year.

7. More detail on the project's adjustment to college findings is available at M. J. Bishop and S. A. White, "The Clipper Project: Exploring Whether Early Engagement Through Web-Based Instruction Can Help Ease High School Students' College Transition," *Journal of College Student Retention: Research, Theory, and Practice* (in press).

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M. J. Bishop (mj.bishop@lehigh.edu) is Assistant Professor of Teaching, Learning, and Technology, and Sally A. White is Dean and Professor, College of Education, Lehigh University, in Bethlehem, Pennsylvania.