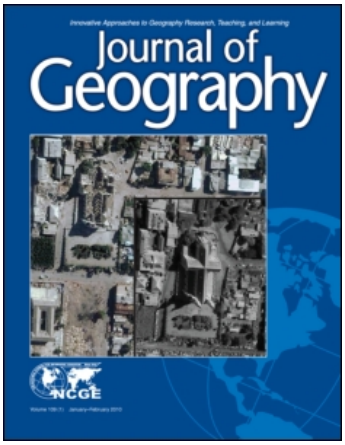

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Developing Online Geography Courses: Experiences from Michigan State University

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ABSTRACT

During academic year 1999–2000, the Geography Department at Michigan State University (MSU) launched a program of online geography courses. Since then, four undergraduate online geography courses have been collectively developed and delivered to over 4,500 domestic and international students in association with MSU's Virtual University Design and Technology (vuDAT). The creation of each virtual course has taught valuable lessons concerning course development and administration; interactions with students have shed insight on course structure, content, and instruction. This article addresses development, management, and pedagogic concerns pertinent to the operation of online geography courses and offers suggestions to others who wish to develop online courses. Preliminary evidence on the effectiveness of these courses is also presented.

Key Words: *online education, distance learning, virtual courses, virtual education*

Antoinette M.G.A. WinklerPrins, Alan F. Arbogast, and Richard E. Groop are professors of geography at Michigan State University, East Lansing, Michigan, USA. WinklerPrins and Arbogast have authored online courses. Groop is department chair. Beth N. Weisenborn is the virtual course coordinator, who administers the department's online courses.

INTRODUCTION

Online (also referred to as *virtual*, *distance*, or *Internet-based*) education is a growing sector in higher education, especially at large institutions such as state universities (Carnevale 2005; Allen and Seaman 2004, 2006). In recent years the growth of online courses (fully or in hybrid form) has exploded such that today 90 percent of all colleges and universities in the United States have at least one online course (Yong 2002). This trend is predicted to continue, with enrollments in online courses now over three million (Allen and Seaman 2006, 1). Although there continue to be those who question the validity and quality of online learning, it is clear that both the quality and the perception of the online experience are changing and increasingly seen in a positive light (Foster 2006; Allen and Seaman 2006).

Research on online courses indicates that large public institutions are those that have most successfully invested in and penetrated the online market. Michigan State University (MSU) is no exception. The geography department at MSU has some of the highest enrollments on campus in general education classes serving primarily MSU undergraduate students. This is consistent with research findings on online education in higher education (Allen and Seaman 2006). How active geography departments have been in online course offerings is unknown at this time as unfortunately there has been no survey done of available online geography classes (Solem 2006). Internet courses are not easily found or explored as they are typically password-protected and only open to those enrolled in them.

The objective of this article is to report on and offer advice from the successful development of a series of online courses in the Department of Geography at MSU over the last several years. We offer a description of how these courses were developed, how they are delivered in association with MSU's Virtual University Design and Technology (vuDAT),[1] some challenges we have encountered in creating and delivering online geography courses, and some preliminary results on their effectiveness.

COURSE DEVELOPMENT

The development of MSU's online geography courses began in 1998 as a pilot endeavor that would increase the department's visibility within MSU and beyond. Pedagogic objectives included the delivery of quality undergraduate courses that are convenient for students and the creation of innovative teaching environments in general education undergraduate geography courses.

The first course emerged when one of us, Alan Arbogast, was awarded a Lilly Teaching Fellowship in 1998 to develop an online course in Introductory Physical Geography, Geo 206V. Part of the fellowship involved a reduced teaching load and two graduate assistants for a year to assist with course development. At about the same time, MSU began an incentive program for departments to develop virtual university courses whereby 75 percent of the tuition revenue for off-campus student enrollments in online courses would be returned to the department.

After a successful offering of the physical course during summer of 1999 a second course called People and the Environment, ISS 310V,[2] was introduced the following year, also authored by Alan Arbogast. A second Lilly Teaching Fellowship, awarded to Antoinette WinklerPrins in 2002, helped underwrite the development of the third course, World Regional Geography, Geo 204V, which ran for the first time during summer 2003. Finally, an online Geography

the U.S. and Canada, Geo 330V, authored by Jay Harman, was developed and first offered in the summer of 2005.

As course development progressed it became apparent that a full-time virtual course specialist was needed to assist faculty, maintain courses, and provide consistent course delivery. This specialist, our Virtual Course Coordinator (VCC), Beth Weisenborn, organizes course materials, produces maps and other graphics, integrates supplementary course materials (textbook materials and publisher Web sites), and translates these into the course delivery system, ANGEL, used at MSU.[3] She also helps write and coordinate quizzes and exams, and trains and manages the graduate-student instructors who deliver the courses.

As the online course creation process evolved, we identified a number of additional requirements that facilitated the development of a course. These include faculty release time, a stream of qualified graduate-student instructors, and financial investment that supports creation, delivery, and maintenance of the courses. Although each course had its own timing sequence and development issues, the average costs of development for each course include:

- A one-time one-course release for an authoring faculty member[4]
- Anticipated one year time period from conception to delivery
- Availability of a skilled staff coordinator (full-time salary)
- Cooperation from technicians at MSU's vuDAT

The estimated dollar cost of developing an online geography course is about $70,000.

Obviously revenue generation is important for development and delivery of the courses and we recognize that this incentive may be unique to MSU. However, we have found that the key to successful online course development is the interest, enthusiasm, and skills of dedicated faculty, staff, and graduate instructors. Especially critical to a relatively large-scale program such as ours is the availability of a full-time coordinator who is technologically savvy, has knowledge and interest in geography education, and has good design sense. Figure 1 illustrates the connections between the various components of course development. Having a dedicated person managing the online courses is extremely helpful as it shifts day-to-day management away from faculty.

The format of each course is consistent in that each contains a series of lessons that individually focus on specific aspects of thematic or regional geography such as earth/sun geometry, soils, South-East Asia, or sub-Saharan Africa. Although the delivery of these lessons will be described in more detail later, we find it useful to think of each lesson as being consistent with one or two lectures, a chapter in a conventional textbook, or a unit to be covered during the semester. During the development phase of each lesson, animated graphics, maps, photo essays, and sidebar discussions were generated to make the online lessons attractive, stimulating, and interactive. Each course innovation was then incorporated into the next online course such that materials were built on and shared between courses. Several texts were consulted about online teaching and learning to assure that we were conforming to pedagogic standards for online teaching (Schweizer 1999; White and Weight 2000; Sanders 2001). Faculty also engaged and networked with staff at MSU's vuDAT and other technological information groups on campus for ideas and experiences. Many campuses have such units and we urge those interested in developing online courses to seek out their expertise.

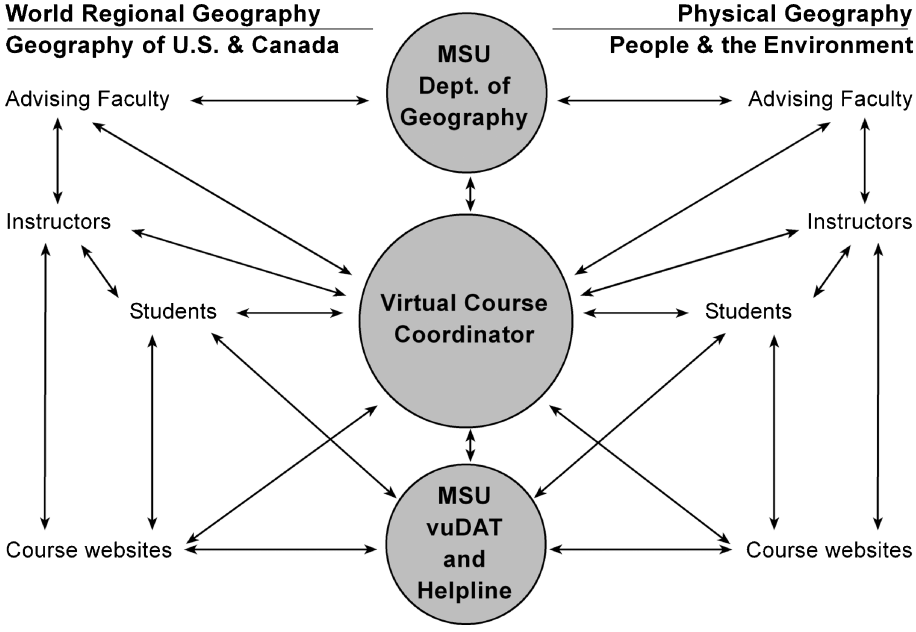

Figure 1. Interactions in the development and delivery of online geography courses at Michigan State University.

We believe that our courses adhere to a set of generally accepted standards for "best practice" online instruction (Moore 2005) including:

a) variation in content delivery such as pleasant and easy to navigate Web page design, high quality graphics and images, direction boxes, video streaming, links to other

electronic resources, and the integration of traditional resources such as textbooks and publisher-produced supplemental material;

b) content supplements for interested students;

c) interactions such as polls, chat-rooms, and pop-up questions;

d) variable assessments such as ungraded (review) quizzes, timed exams, and online writing assignments; and

e) an accessible online grade-book.

The World Regional Geography online course was assessed for its standards and effectiveness in 2005 and was awarded honorable mention in an all-campus AT&T Faculty-Staff Award Competition in Instructional Technology.

To date we have offered our courses only in a short-semester format (six to seven weeks) during the summer term, which means the courses are condensed and accelerated, and are an intensive experience for students. Thus, the online geography environment at MSU is one in which the student is largely self-directed, basically working at his or her own pace within three- to four-day modular intervals, with guidance offered by embedded direction boxes in the online lessons and a course calendar and schedule. Students like the ability to work at their own pace. Direction boxes guide students to the readings within the course Web site and to external Web sites, a textbook, photo essays, video clips, virtual fieldtrips, pop-quizzes, writing assignments (short reflection assignments completed online), use of preselected Web-based information, and textbook publisher supplemental materials. Course instructors are available via e-mail and telephone on a daily basis for questions and clarifications, and interact with students as managers of chat-rooms and graders of writing assignments. While the types of features used in our courses may not be unique, the way we use them are particular to our online setup. This is difficult to assess, as most online courses are password-protected and only offered to registered students. Therefore, it is difficult to review other online courses since data summarizing specific online design setups practiced elsewhere is limited.

Geography graduate-student instructors provide the main interface with students while a course is running. Typically, one half-time graduate-student instructor is responsible for 150 online students per course. The graduate-student instructor works as the course contact for enrolled students by handling student e-mail (student questions, clarifications, and further content discussions) and managing chat-rooms. The graduate-student instructor is also responsible for the grading of weekly online assignments (with faculty-produced grading rubrics), editing and contributing to the pool of exam questions, and maintaining the course gradebook. Graduate-student instructors typically report spending an average of 25–30 hours per week on a course, making the experience an intense one for them as well as the enrolled student.

From a graduate training perspective, we discovered that the virtual instructor experience is very valuable for graduate students who wish to pursue teaching and academic careers. Because graduate students are on the front line of student interaction and are primarily responsible for grading and student interaction, their level of responsibility is high. They gain first-hand teaching experience, as they are primarily responsible for running their sections and are provided with summer funding as teaching assistants, a significant source of financial support. In addition, graduate instructors are exposed to online pedagogy that may be an attractive feature to prospective employers. Based on data from graduate student experience evaluations as well as informal interviews, most graduate-student instructors thought they benefited academically from "teaching" their own section of an online course and found the experience positive. We found that as repeat graduate instructors become comfortable with teaching in the online environment, they seek more responsibility in the delivery of the course content and management of their section.

Faculty authors of the courses are very involved in the initial development of the course, but only marginally involved in their delivery. Authors do the complete substantive layout and approach of the course at inception and work with the VCC to integrate graphics and other course material. Once the course is delivered, the faculty authors introduce major units and explain relevance of key topics through videos. In the first of these introductory videos, the authoring professor also describes the course rules of engagement, which outlines the code of conduct during the course. Expectations and rules are important for students who may be in an online class for the first time. Online interactions tend to be informal, and students need to know what is and is not acceptable in a course. In this way the authoring faculty remain the "face" of the course.

Course faculty also remain involved with the courses they authored through annual maintenance and updates. These take place at the authoring faculty's discretion, usually during the academic year since our courses are only offered during the summer. DiBiase (2004) documented that modest economies of scale are gained through scaling-up courses without a noticeable loss in course quality. Because of the team approach we utilize in delivery of courses we achieve substantial economies of scale as our authoring faculty need only remain minimally involved after the initial investment. Compensation for continued faculty involvement with the course is through an informal mutual agreement between the course author and department chair.

The university's involvement in course development is primarily on the technical side. The courses are housed on

servers maintained by MSU and highly technical changes to them are made via the vuDAT staff. The courses are housed and delivered via ANGEL, which is a relatively user-friendly access interface for both instructors and students. Different universities use a variety of course delivery platforms such as Blackboard and webCT and anyone interested in developing an online course needs to become familiar with the platform that their institution supports.

Course Format

Students access their daily lessons, assignments, tests, and supplemental resources through the course Web site (Fig. 2). Only enrolled students can access the site and only during periods that the course is offered. Instructors control the availability of lessons and other course materials and also assign activities away from the computer such as additional textbook readings. All exams and quizzes are online and are time-controlled and randomized. Each student is given a unique test drawn from a large pool of similarly weighted test questions. Tests are designed as open book. While cheating is a possibility, student test scores thus far do not indicate variance from the norm.

Figures 2, 3a, 3b, and 4 illustrate lesson pages found in the online geography courses. Figure 2 is an Introductory page showing the tab navigation system at the top. With this system, students are able to proceed with the lesson,

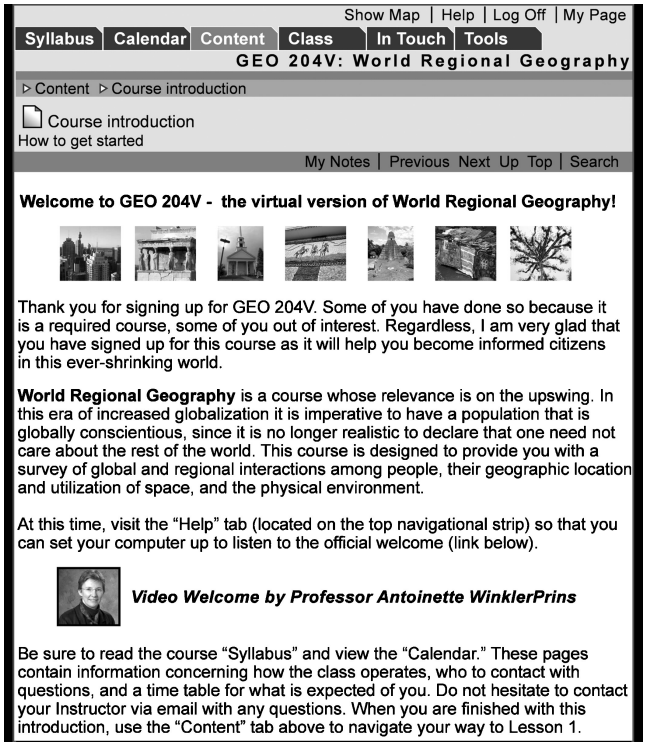

Figure 2. An example of a course introductory page.

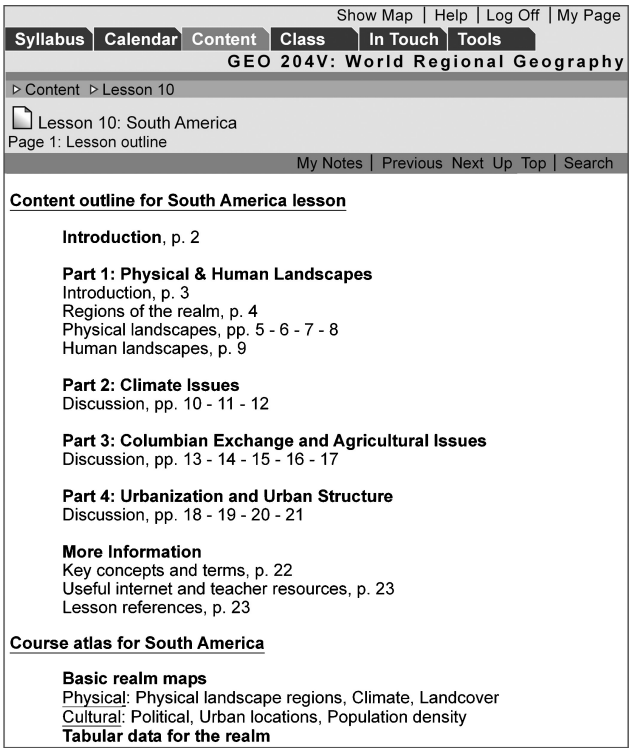

Figure 3a. An example of a lesson content-outline page.

view the course atlas or photo/video albums, or jump to other course activities such as chat rooms, announcements, calendar events, student performance statistics, online personal gradebook, information about their classmates and course staff, self-assessments, or e-mail.

Figure 3a shows the first page of a lesson, which provides a content outline for the material that follows. Students can use this page as a studying tool and an outline for taking notes. Also provided on this page are links to the course atlas (see also Fig. 3b), which contains maps and tabular data for each geographic realm or lesson depending on the course. Figures 3b and 4 demonstrate that the courses tend to be graphics-intense rather than text-intense. We believe that this helps maintain student attention and interest and acknowledges the learning styles of today's college student (Lyons *et al.* 2002).

Figure 4 illustrates the interactive nature of the lessons. Each lesson integrates various media to deliver course content and provides numerous avenues of individual learning for students. Additionally, the aim is to satisfy the needs of multiple learning levels and abilities. This is accomplished using a variety of text boxes, lists, highlighted passages, video segments, photo essays, directional boxes (e.g., "At this time. . . " boxes), supplementary notes (e.g., "A side note" boxes), popup and bullet questions, illustrations and photographs, and "Above And Beyond" activities for highly motivated

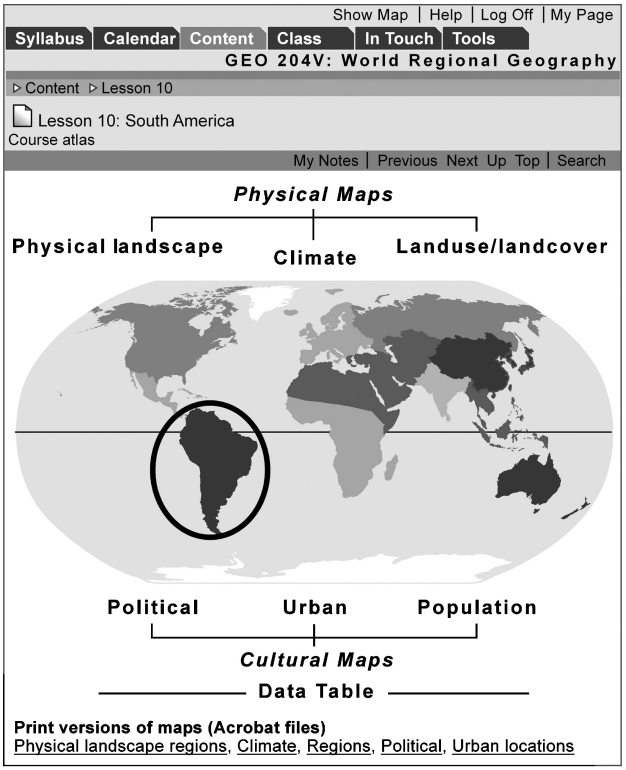

Figure 3b. An example of a course atlas page for a lesson.

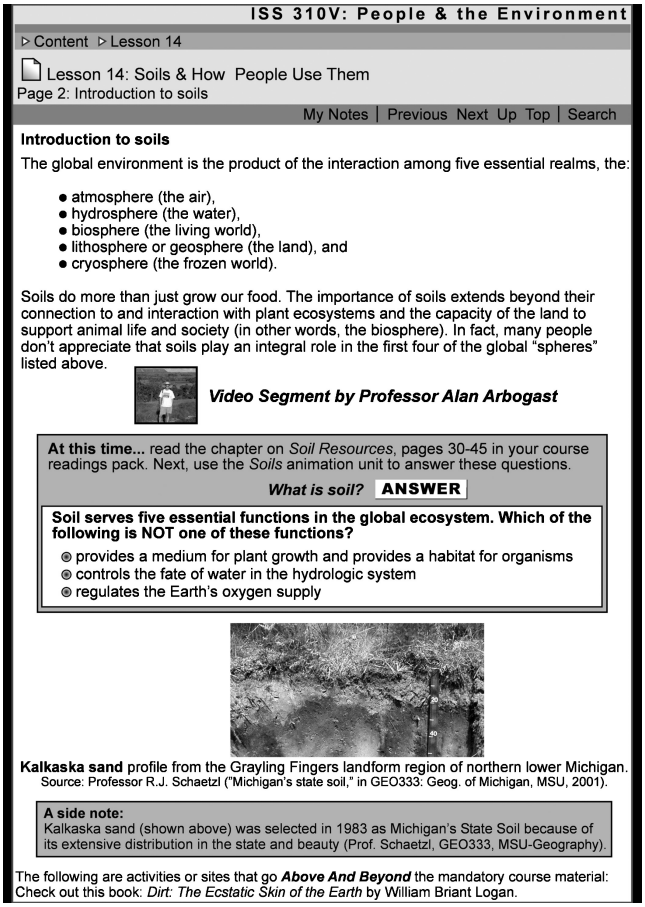

Figure 4. A condensed sample page from a lesson, showing some of the many components used to deliver content to students.

students who wish to go beyond course materials. Each lesson page typically contains no more than an introduction or discussion of one major topic to help students digest the material in reasonable parcels.

Evaluating the Student Experience

Figure 5 illustrates our eight-year enrollment figures. By the end of summer 2006 nearly 5,000 students had taken our online geography courses. These numbers suggest the courses are popular and they are in agreement with enrollment trends at other large institutions (Allen and Seaman 2006). From a pure enrollment perspective, we have been successful.

Assessing whether we have been successful from a learning perspective is much more difficult. We only have preliminary data to report, but the outlook is positive. For Geo 204V, World Regional Geography, we run an assessment questionnaire at the beginning and at the end of the course that clearly demonstrates improvement before and after taking the class as the average score at the beginning of the course was 53 percent, whereas at the conclusion the average score had improved to 66 percent (Fig. 6).[5]

Table 1 compares earned grades between in-class version of the courses and ones offered online. These figures compare favorably with studies comparing online and face-to-face courses taught by the same professor, which demonstrate that there were no appreciable differences between online and face-to-face course delivery (Neuhauser 2002). The exception is Geo 204V, where the difference of instructor likely explains the significant grade differential. Geo 204V was designed by a different instructor than the individual who teaches the course in the in-class version. For the other three courses

Table 1. Grade averages of in-class versus online course delivery.

Course	Lecture*	Online+
Geo 330V	2.72	2.85
Geo 206V	2.72	2.86
Geo 204V	3.24	2.76
ISS 310V	2.60	2.97

*For in-class grade averages we used a four-year average of all the lecture sections taught of that class.
+For online grade averages we used all the sections taught of the course since inception.

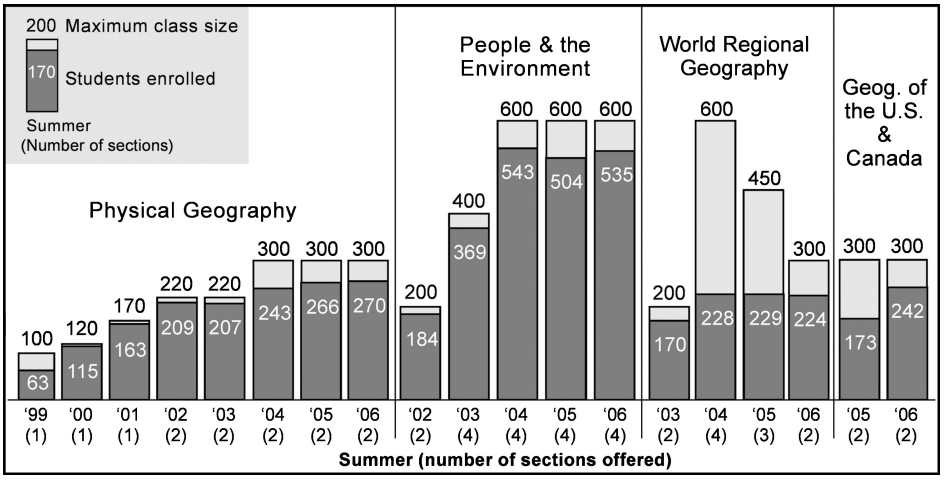

Figure 5. Enrollment numbers 1999–2006.

(Geo 330V, Geo 206V, and ISS 310V) the instructor is the same and therefore the grade comparison more realistic.

From an experiential perspective we find that students are at least as satisfied with their online experience as they are with an in-class format. In surveying students at the completion of our online courses, a majority of students (77%) answered "Agree" or "Strongly Agree" on a Likert scale in response to "I think the Web was used in an effective ways to teach this class." Additionally, in response to the question "If you had the choice between taking this course online or in the classroom, which would you pick?" the majority (68%) chose "online" across all of our courses. This is consistent with nationwide data on the online experience (Allen and Seaman 2006). Although most students did find that there was less interaction with instructors than in a traditional class, some were surprised by the interaction with their instructors:

> [The instructor] paid personal attention—even more so than in my classroom courses (Geo 204V, summer 2005);
>
> I was surprised by the involvement and helpfulness of the instructors and TAs (Geo 204V, summer 2006).

Young (2006) recently made an argument for seven elements that together define effective online teaching. The elements are:

(1) adapting to student need;
(2) providing meaningful examples;
(3) motivating students to do their best;
(4) facilitating the course effectively;
(5) delivering a valuable course;
(6) communicating effectively; and
(7) showing concern for student learning.

Of these, the most important is effective communication because through communication instructors remain visible in the online format. This is critical for student satisfaction with the course. Through our multitiered approach (faculty author, Virtual Course Coordinator, and graduate student instructor) we are able to maintain a high level of communication with students as well as addressing the other elements of effective online teaching. In designing new geography courses for the online environment we urge prospective faculty authors to focus on these elements.

Other Considerations and Issues

From a technical and logistical perspective there are two concerns that we continue to struggle with: the first is copyright and the second is marketing. Copyright issues for online courses are problematic, especially for graphics-intensive geography courses. Copyright clearances take time and may be expensive to obtain, and while newly created maps and graphics obviate copyright problems, they are expensive to produce and require substance and design expertise. We have been able to capitalize on the vast resources of our faculty and students in order to gain permission directly for using images that require copyright clearance, but this may not always be possible at other institutions or departments. Therefore, it is important to work with institutional copyright offices from the outset and plan enough time to obtain necessary copyright clearance. Another option is to adopt an accompanying textbook with well-developed online resources that can illustrate the course without necessitating copyright clearance.

The marketing of our courses also remains problematic. Although our enrollments continue to increase, we would like to see a greater diversity of students beyond the traditional undergraduate student at MSU. We had anticipated a greater interest on the part of in-service teachers for our online summer classes, but this has not happened. We believe that most of our enrollment is the result of word-of-mouth contact. We have developed a course Web site (*http://www.geo.msu.edu/virtualgeog/*), and have brochures that we distribute in the spring to advertise our courses, but are unclear as to their effectiveness. Like most universities, MSU has little experience in reaching potential student populations

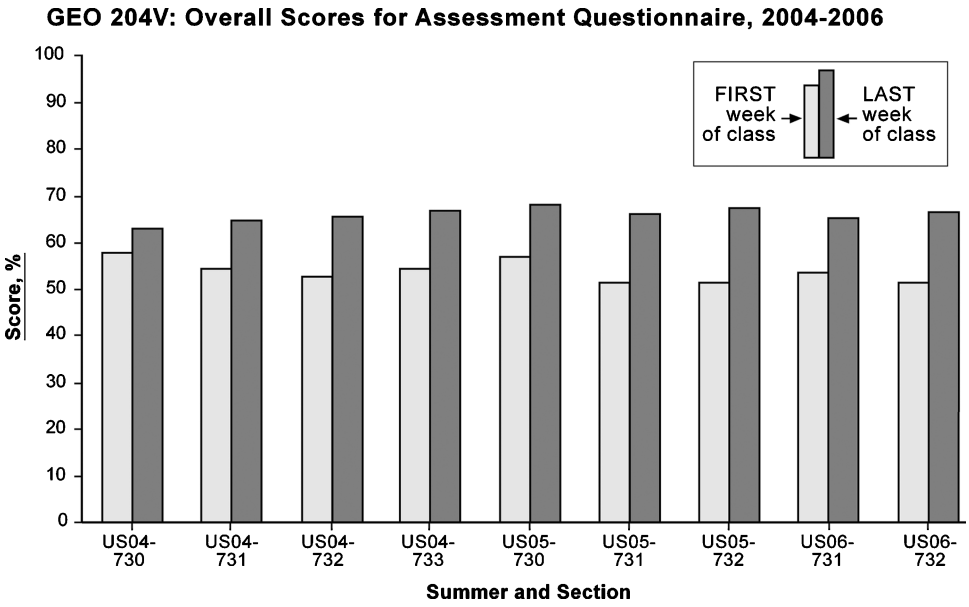

Figure 6. Student performance, by overall score, on the assessment questionnaire used in Geo 204V during the summers of 2004–2006.

beyond the campus. Better institutional resources and strategies for course marketing are needed.

From a nontechnical perspective, we continue to contemplate the issue of the validity of our online courses. A few faculty and administrators continue to question the value of virtual courses in relation to questions of student learning. Specifically, are motivated students learning as much in the virtual environment as the traditional classroom? At an intuitive level, many faculty tend to believe that actual face-time in a traditional classroom is a critical element in student learning because students have the opportunity to personally interact with each other and the professor. However, virtual course proponents believe that little actual student/faculty interaction takes place in large lecture classes. Ironically, it can be argued that most students in a typical lecture class are "virtual" because they exist in name only. Thus, it may not matter on a fundamental level whether a student is sitting in a classroom watching a professor lecture or working at his or her computer screen. Proponents also argue that students are free to work at their own pace in an online setting, the medium is better suited to graphic and interactive use, and students may be less inhibited using e-mail and chat facilities.

Based on course evaluations, most students agree that our courses are suitable for the online environment and have found the experience worthwhile, challenging, and informative. The bottom line for most students is convenience, which is particularly important during the summer session when students have very busy work and other schedules and appreciate the opportunity to knock-off a few credits at their convenience. We do find that a minority (about a quarter to a third) of typical first-time online students discover that online learning is not for them; they realize they need more face-to-face interaction with an instructor or do not have the discipline needed to get the work done and do well in the course (or both). We anticipate that this pool of students will always exist and that they may be better served by hybrid or traditional courses.

Looking Ahead and Final Comments

We will continue to develop other geography online courses as faculty interest and student demand warrant. Currently we are developing a virtual version of Geo 324, Introduction to Remote Sensing. This is a high-demand class that has been constrained by laboratory space. An online version will permit many more students to gain remote sensing expertise. Other, perhaps smaller, more specialized courses may emerge and these will be developed as we assess demand and faculty resources to author them.

Overall, we anticipate that enrollment in our existing courses will level off in the future. In the near future, we will begin to offer selected courses during the regular semesters in an effort to ease teaching loads and to reach more off-campus student clientele. We continue to acquire assessment data in an attempt to verify our assumptions about the quality of the courses and the student and graduate-instructor experience. We continue to update and revise our current course structures and content, hoping to keep pace with changing world events and today's technically savvy student population. As online technologies evolve, we strive to use its power to maximize the potential it offers in the teaching endeavor.

This article has been an illustration of how we, in the Geography Department at Michigan State University, have developed a program of online courses. We have tried to highlight issues that have worked for us and to offer suggestions for what might be different elsewhere. The most important advice we can offer is that any department that wants to venture into creating and delivering online geography courses needs to have dedicated and committed faculty and leadership (departmental and institutional) that believe in the quality and effectiveness of online teaching and learning. Resources are certainly a necessity, but from our experience these resources can be allocated if departmental and

institutional leadership believe in and are committed to trying online courses. Geography as a discipline appears to be well suited to the online environment and we hope to see many more geography courses be developed in the future.

ACKNOWLEDGEMENTS

We thank all those involved in the creation of the courses, especially the nonauthor course developers, Kathy Dowd, Erin Kelley, and Kathleen Baker; the instructors of the many course sections; MSU's vuDAT (Virtual University Design and Technology), especially our e-Producers, Ryan Yang, Tori Sawyer, and Randy Russell. Thanks also to the Lilly Teaching Program at Michigan State University for funding. We thank Harm DeBlij for contributions of video clips and photos, as well as all the many other people who also contributed photos, essays, and other materials. Last, we thank all the students who have taken the courses and offered feedback and critique. Material presented in this article was presented as posters at the AAG Annual Meetings in Philadelphia, March 2004, and Chicago, March 2006.

NOTES

1. We worked primarily with Ryan Yang of vuDAT.
2. ISS stands for "Integrated Social Science." These are general education courses offered across the College of Social Science at MSU. The Geography Department takes responsibility for a number of sections of these courses.
3. Our courses were originally developed in vu-Widgets, which was the software platform created and used by MSU's vuDAT at the time of course development. During summer 2004 all courses were converted to ANGEL, the platform currently supported by MSU.
4. A typical course load at MSU is two courses per semester (two semesters per academic year).
5. IRB approval was granted for this research for each of the years the assessment data were collected.

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