Integrating the Web and the Geography Curriculum: The Bosnian Virtual Fieldtrip

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The portion of the Internet known as the World Wide Web has risen to prominence over the past few years with a stunning rapidity. Although precise figures vary, until recently the number of actual Web sites has been growing exponentially with a current doubling time of as little as six months. Much of this growth has been due to the advent of commercial Web sites, now constituting over 60% of the Web. Although recent surveys have indicated a stabilization of Web growth, this is likely due to market saturation rather than slackening interest (CyberAtlas 1997). Such strong growth contrasts with the previous history of the Internet per se, which despite its beginnings more than 25 years ago grew slowly and without commercial participation (Hafner and Lyon 1996). It remains to be seen whether commercial and academic sites will continue to co-exist on the original Internet, or whether developments such as the Internet2 (1997) will capture the academic market by offering bigger bandwidth and connectivity.

Academia has seen widespread adoption of Web capabilities from K-12 through college. Web-based educational resources are appearing more frequently within academia and are an exemplar of multimedia approaches in general (Krygier et al. 1997). Prior to the popularization of the Web (before 1994) academics were the most significant users of the Internet. Today they potentially play an important role in developing rich content for Web delivery, but two major concerns remain to be addressed.

THE WEB AND THE CURRICULUM: TWO CONCERNS

Two sets of concerns exist: implementation and implications. The first concern is how best—if, or indeed why—we should integrate the Web and the curriculum. Although it is becoming increasingly accepted that computer-aided learning can be beneficial, relatively little is known about the specifics of Web-based materials. What should Web-based educational materials consist of? At what level should they be introduced? Are they more effective when used comprehensively or incidentally? Do they realistically test student understanding? These questions also assume that Web-based materials are beneficial—but are they? A related issue for faculty interested in using the Web is the lack of established procedures for assessing untenured faculty's research and publications on the Web. To what degree can faculty afford to spend time developing Web materials of any substance? Are any quality resources

ABSTRACT

This article analyzes and evaluates how World Wide Web resources (exercises, labs, data browsing and synthesis) can be integrated into the curriculum. The resources consist of an integrated site called The Bosnian Virtual Fieldtrip (BVF), written by two geography department faculty members prior to the semester of use. The target audience of the BVF is diverse, and includes both off-campus and residential students. The site is fairly large but completely modular in order to allow educators to integrate the materials into their own courses. Students navigate and synthesize information (e.g., maps, pictures, glossary) and are challenged to construct meaning via role playing and opinion forming and justification. Outcomes include timeliness and relevance of materials (the Dayton Peace Accords were signed during the semester), a facilitation and exemplification of geographic concepts to students and the public, and incorporation of the World Wide Web into the curriculum. It is concluded that the resources are worth disseminating, but are not an end in themselves.

Key Words: Web resource integration, Bosnia, virtual field-trip

Jeremy W. Crampton is Assistant Professor in the Department of Geography and Earth Science, George Mason University, Fairfax, Virginia 22030 USA.

already available in their subject area which could be incorporated into the curriculum?

The second concern is that the Internet potentially has dangers and conflicts. In general, these include surveillance (invasion of privacy), boredom, over-commercialization, and inequalities of access (Brook and Boal 1995, Burstein and Kline 1995). In education we note increasing student use of the Web for research (and an implied decrease of library use), and the same kinds of inequalities of access to computer resources as experienced by the population at large. A recent survey of computer access in American high schools found significant disparities in student access to computers, geographically, by income, and by subject matter (Educational Testing Service 1997). The survey found that the national average for student to computer ratios was 10 to 1, but ranged from about 6 to 1 (Florida, Wyoming, and Alaska) to 16 to 1 (Louisiana). Students at poor or high-minority schools have less access to technology. Also, computer availability varies by age and subject matter. For example, computers were available to about 50% of 13- and 17-year-olds for mathematics, 40% of 9-year-olds for geography, and 33% of 13-year-olds for geography. Although these are critical matters, this article does not focus on implications (see Crampton 1999).

Returning to implementation, in many cases we need further time to evaluate outcomes. For example, how can untenured professors best use their time in developing curriculum materials? The research suggests that for lower-order tasks, educational technology can be effective if implemented well (Cradler and Bridgeforth 1996). In a recent summary of educational technology in the classroom, the Educational Testing Service (ETS) (1997, 34) argues that:

> Rudimentary uses of computers in teaching, e.g., using drill-and-practice software to teach addition and subtraction, appear to be effective and efficient. More pedagogically complex uses of the computer, e.g., using the Internet in small groups to conduct collaborative research, often show inconclusive results, while sometimes offering promising and inviting educational vignettes.

Self-pacing, help tools, and interaction with other students are often cited as benefits. For higher-order tasks, results have been inconclusive but suggestive, with the proviso that it is harder to

assess outcomes. ETS (1997, 38) adds that the "[a]ssessments of the impact of technology are really assessments of instruction enabled by technology, and the outcomes are highly dependent on the quality of the implementation of the instructional design." Of course not all technology usage is equally effective, and how that technology is used is as important as what is used.

In this article the guiding principle of implementation can be summarized as the constructivist pedagogical approach. The constructivist view argues that "knowledge is created by people and influenced by their values and culture" (Scheurman 1998, 6). It is most easily understood when contrasted with behaviorist or information-processing pedagogical approaches. Rather than approaching knowledge as something to be memorized or mastered, it emphasizes the construction of knowledge either individually or socially. Student preconceptions are challenged, they experience reality directly themselves, and they are required to adopt positions and defend them. It is very hands-on, and open-ended inquiry using real data predominates. This pedagogical approach guided the design of the the Bosnian Virtual Fieldtrip (BVF).

STRUCTURE OF THE PAPER

This article focuses on how Web-based materials can best be integrated into the curriculum. A virtual field-trip about Bosnia is used to examine this question. The Bosnian Virtual Fieldtrip[1] has been in use in introductory human geography classes for three years (1995–1997) at George Mason University and Pennsylvania State University. It was initially developed with the aim of connecting American students with people in Sarajevo in order to challenge students' conceptions of reality, especially the simplistic and superficial coverage of the war in Bosnia. When lack of network connectivity in Bosnia thwarted this effort, a virtual field-trip was constructed.

I first discuss the general utility of Web-based materials in the curriculum. Experience with the Web is still scanty, but because the Web is a form of hypertext, we can learn from hypertext systems such as the Intermedia Project, which first used hypertext in an educational environment more than a decade ago. Many of these systems had constructivist components. If these methods are to be adopted within the discipline, some important questions need to be addressed. What are the reasons for adopting Web-based instructional approaches? What are their advantages? How should they be

implemented? What are the implications for students and faculty (particularly untenured faculty)? How can good practice be disseminated?

I then describe the specific goals, content, and outcomes of the BVF, with an explanation of how the field trip relates to general issues of Web usage by situating geographic principles into an ongoing and meaningful real-life situation. The experiences gained here can certainly be disseminated to any equivalent situation using Web-based curriculum materials. For example, in the case of the BVF there were firm geographic reasons for choosing the Bosnian crisis, and teaching geographic principles such as forced migration and political redistricting were a key goal of the project.

In the summary I try to draw together the various implications of using web-based materials in the curriculum. I conclude that if Web-based materials are logically integrated into the curriculum, provide an experience not otherwise available to students, arise out of the instructor's prior knowledge set, and have educational substance, then it is beneficial to use them (at least as a supplement). From the professor's point of view, developing Web resources, if kept at a small scale and if well integrated, are equivalent to preparing a new course. However, it is still not advisable to curtail traditional activities of publishing during the tenure process.

UTILITY OF WEB-BASED CURRICULUM MATERIALS

This section identifies how Web-based materials should best be implemented in the classroom. Because relatively little is known about the usage of Web-based materials in the college curriculum, evidence from educational uses of hypertext will be used instead. The BVF project will be discussed in that context. ⁻

Hypertext can be defined as "non-sequential writing," because users follow links of their own choosing rather than the linear sequence of books (Landow 1992, 4). In practice, hypertext consists of blocks of text and the electronic links between them. Because the user has a large degree of control over the material there is a strong degree of the active hands-on approach of constructivist educators (e.g., Bellan and Scheurman 1998). A hypertext environment (e.g., the Web) is therefore conducive to (but certainly not sufficient for) active learning.

The concept of hypertext long pre-dates its implementation and was first described by Bush (1945). Prototype hypertext systems were developed in the 1960s by Douglas Engelbart and

Theodor Nelson, but it was not until the Brown University Intermedia project (1987–1992) that the full possibilities of hypertext were explored (Landow 1989, Haan et al. 1992). Intermedia consisted of a suite of authoring tools (Interword, a text editor; Interval, a time-line editor; and Interdraw, a graphics editor) along with the Web View, which is a "dynamic graphic concept map that informs the reader by means of labeled icons which documents 'surround' the document one is currently reading" (Landow 1992, 45). These tools helped students (primarily in English departments) to author hypertext spaces based on literary texts.

Landow (1992) cites a number of educational advantages of hypertext, which can usefully serve to frame our discussion of the utility of Web-based curriculum materials.

Problem Solving

One advantage of hypertext's nonlinearity is that it allows the user to be goal directed rather than problem directed. For example, a hypertext system encourages user decision-making—and, presumably, more intellectual engagement—by putting some of the power of the author in the hands of the reader. The reader is not a passive recipient of the author's words, but can participate in the text's construction both by ordering extant text to fit his or her needs and by adding new text. This last point is an extension of a basic hypertext system which was present in Intermedia and some current Web sites, including the BVF.

Research in problem solving has long shown that thinking uses a high degree of association, which can reliably be ordered. These associations emerge in various ways. For example, if asked to name members of the category "bird," people display "prototype effects": research shows that they find it far easier to name "robin" than "owl" (Smith 1988). Associations therefore vary in strength. Many other kinds of mental associations exist, but the important point is that this cognitive process is captured by hypertextual links and is conducive to problem solving in a Web-like environment (Bush 1945).

Accessible Across a Variety of Skill Levels

Although not unique to hypertext, the fact that a variety of materials at different levels of difficulty can easily be linked together, coupled with the fact that one can engage hypertext systems at superficial, intermediate, or advanced levels (what we

might call skimming, browsing, and critically engaged), means that hypertext appeals to people across a wide range of skill levels. Recent work on navigation strategies suggests that it is possible to augment user choice with context-dependent advice on which links to follow. For example, Calvi and De Bra (1997) describe a system of adaptive links where the user sees visual cues consisting of a "red light" against links which are changed to a "green light" when the student is ready to follow them. Variable access implies that the same resource can be reused across a variety of skill levels (e.g., by high school and college students) and by people with a variety of interest levels.

Ease of Integration

Hypertext educational systems can readily be integrated into a diversity of courses by the original developer of the material or by others. For example, Landow (1992, 124) notes that one problem of course development is "that the materials developed, however pioneering or brilliant, rarely transfer to another teacher's course, because they rarely match other teacher's needs." By contrast, a hypertext document, such as a Web site, promotes reuse because it is easy to both select relevant material for the new class, and to reorganize it to fit new priorities or subjects. By implication, this practice also widens the participation of students outside the class in question, since these materials are now available via the Web.

Landow's argument is powerful because it corresponds with the recently reiterated needs for dissemination of good practices in teaching and learning (Healey 1997) and increases student participation as recognized in a major education report from the United Kingdom, the Dearing Report (National Committee of Inquiry into Higher Education [NCIHE] 1997). Recommendation 2 of the Dearing Report is the need for more participation across socioeconomic, gender, and racial categories, and hypertext Web sites are an exciting candidate to achieve such higher participation. The report also recommends that all U.K. students should have access to a networked desktop computer by the year 2000/01 "for learning via a network" (NCIHE 1997, Recommendation 46).

Interdisciplinarity

Landow (1992, 124) claims that hypertext "gives us a far more efficient means than has previously existed of teaching interdisciplinary courses"

because it is possible to link to other material in the Web. For Landow, this amounts to teaching in the "virtual" presence of one's colleagues. In principle this may be so, especially in cognate disciplines where one can assess the nature and quality of the contribution. Indeed, one of the realizations of the Virtual Geography Department (VGD) is that it provides educational materials within geography only, which is already a broad discipline. Using other materials on the Web raises a common objection: the quality of the material is not guaranteed because it is so easy to post materials and because most material never passes a review process. On the other hand, this ease of publication is often an advantage for certain types of materials (e.g., student reports, syllabi, timely information to classes) and a good system of provenance identification can alleviate some problems of quality assessment (e.g., a report from the Bureau of the Census is equally reliable whether in print or on-line). Nevertheless, this is still an area for further research.

THE BOSNIAN VIRTUAL FIELDTRIP

Authorship Phases

The Bosnian Virtual Fieldtrip, conceived by myself and co-authored with Beth Rundstrom (now at Pennsylvania State University), was constructed in four phases. Phase 1 comprised the conception of the project (fall 1994–spring 1995) with the initial goal of connecting introductory human geography students with students in Sarajevo via e-mail or live chat. The aim was to reduce stereotypes students might have of each other, to increase external communication for war-torn Sarajevans, and to learn about other cultures in as direct a manner as possible. As it turned out, the Internet connections between Sarajevo and the outside world were not capable of supporting such direct contacts. Therefore, in Phase 2, which comprised the authorship of two of the three sections, (July–August 1995) the project became one of a "virtual" visit to Sarajevo. The first section introduced visitors to the location of Bosnia in Europe, its size, some of its history, and the physical landscape and climate. The second section took a more detailed look at several key people and places. Phase 3 (January 1996) consisted of a major update to the site to incorporate the outcome of the Dayton Peace Accords, signed during fall of 1995—coincidentally, during the first use of the BVF. Phase 4, which continues, is maintenance and occasional additions to the site. An active discussion area provides a forum

for debate about issues such as U.S. involvement in Bosnia and for general comments left by visitors. The BVF has now been in use for over four years at George Mason University (GMU) and Pennsylvania State University (PSU), as well as at other colleges and K-12 schools.

Target Audience

The different audiences consist of three groups:

1. students in introductory (100 level) cultural geography classes at GMU and PSU, who use the BVF in 25–50% of assigned exercises;

2. the general public, who may use parts of the field trip according to their interests and time (including members of the U.S. military preparing for postings or returning from postings to Bosnia); and

3. students in other classes in the U.S. or abroad who have been assigned exercises out of the field trip for their classes. These classes include geography classes as well as politics, demography, economics, or history and may be at K-12 or college level.

Because of this mix of potential users, a combination of navigation possibilities were incorporated into the site. It was realized early on that large numbers of visitors were likely to be the general public, who need direct access to information, and not students. To meet this need, six discrete collections of data were organized into the following categories: people, maps, sounds (interviews), pictures, help, and feedback. Analysis of server logs and the feedback section have confirmed that since fall 1995 over 90% of visitors are from outside the host university and constitute single visitors rather than groups.

The content of these sections varies widely, with the purpose of exposing users to a variety of formats (e.g., audio, maps, photographs). In a real field-trip, of course, participants have the advantage of direct experience, and the virtual field-trip is not a replacement of this experience. Rather, it is an option for those who cannot have the real experience, who wish to supplement a real visit (e.g., members of the military on a tour of duty), or who wish to learn about the country preparatory to going there (e.g., journalists assigned to a story).

Geographic Goals

The BVF was developed because the Bosnian conflict encapsulated a number of striking geographic principles (Crampton 1996). The most pertinent of these was that the proposed solutions to the conflict evolved from a geographical and cartographic perspective. Maps played a central role in the proposed solutions, as well as the final Dayton Peace Accords, by delineating territory so that Bosnia could be partitioned by ethnicity. This division of space raises important questions of geography. Are the regions appropriate?[2] Are ethnic subdivisions sustainable in the long run? And what is the relationship between these borders and internal migrations, particularly the "right of return" for refugees? In addition, there are important questions of culture and community which have wide international application; for example, whether and how a multicultural society can and should proceed. Finally, Bosnia contains other useful geographic examples of enclaves and exclaves, choke points, transportation links, and so on.

Bearing these issues in mind, we can identify the following major goals of the BVF.

Situate the above geographic concepts in a real and ongoing situation. The basic premise is that using real examples, or learning by doing, is more effective than teaching concepts alone.

Allow in-depth, guided exposure to a complex situation about which students must develop an opinion, rather than skimming large amounts of material, as is typical of introductory overview classes.

Broaden students' exposure to other cultures by looking at differences and similarities to their own. Student perceptions of reality are explicitly challenged so that they are encouraged, with guidance, to construct their own meanings and reflect upon them.

Give a non-Bosnian audience the ability to obtain information about the history and geography of Bosnia (a principle of relevance).

Provide other teachers and professors with a ready-made set of resources and exercises for use in their classes to reduce the resistance to Web-based resources.

Create a new Internet community where messages can be exchanged by observers and locals alike to undermine stereotypes and facilitate communication across borders. This goal speaks to the constructivist agenda of challenging students' conceptions of reality in order to stimulate reflective thinking.

It should be noted that as well as being guided by the constructivist pedagogical approach, these goals also deliberately reflect the advantages of hypertext systems cited by Landow (1992) and discussed above. The BVF is designed in modules so that sections can be focused on without necessarily using the whole set ("ease of integration"). This not only means that the site can be used as much or as little as needed, but that educators in a variety of disciplines (e.g., history, politics, sociology, or K-12 humanities classes) can use the site as well ("interdisciplinary"). Similarly, the BVF can be used by introductory or advanced users ("variety of skill levels") because a variety of link possibilities are embedded into the basic text. Different subsets, when followed, yield different levels of understanding about the topic. Finally, the Web site is embedded with questions and exercises, which the educator can use. Although all questions can be answered from information in the site, most questions require synthesis and application of information to the problem ("problem solving").

The Bosnian Virtual Fieldtrip

UNIS Twin Towers (nicknamed "Momo & Uzeir" for Serbs and Muslims) in Marijin Dvor district, Sarajevo.

Discussion topic:
Should the US be involved in Kosovo?

Latest news!
Last updated: August 25, 1999

● Part I: Background
● Part II: People and Places
● Part III: Dayton and After

[External Links]

Figure 1. Home page of the Bosnian Virtual Fieldtrip, showing the three main modules and the navigation bar at the bottom.

Description of Content

The BVF has three major modules: Background, People and Places, and Dayton and After. The home page (Figure 1) identifies the site and provides a core page for familiarity, as well as giving links to all three modules, late-breaking news from an external site, and the discussion board.

The site plan shows that the BVF can be used either linearly (from page to page as in a book) or the major resource sections (people, maps, pictures, etc.) can be accessed at any time (as in true hypertext). It was important to provide some narrative structure for students to follow, while at the same time allowing access to the resources from any place on the site. The reason for this is that the more the students move through the site, the more relevant information they will find and be able to apply (they are told this), but there should be some closure and structure (see Figure 2). Full linkages from pages are shown only for Part I, Background. For the other two modules the sequence of pages is shown with a brief description of content. Figure 2 also indicates where students encounter compulsory questions (indicated by the letter Q in the bottom right of the box representing the Web page).

As Figure 2 shows, the BVF is fairly large. The Web site comprises almost 50 Web pages (not including posted comments) and dozens of maps, pictures, sounds, and images. A small collection of digital movies has recently been added. Total Web space is approximately 27 megabytes. The comments section has become the largest and, several years after completion, perhaps the most interesting due to its ever-changing and unpredictable nature.

Beginning at the home page, a student can proceed via a link to the start of any of the three modules, or, as indicated by the arrow on the top left of the box, to the resources shown at the bottom of the figure. Logically, a student would start with Part I: Background, then proceed to an introduction to the BVF, visit some help pages, be introduced to concepts about scale and maps, with links to the glossary, to people such as Tito, and so on. At this point they would encounter the first question, which they would answer off-line. A class session is usually devoted to answering the first few questions in small groups and discussing them at the end of the period before the full assignment is attempted individually. This process facilitates reflection on the material and provides a guide through the problem-solving activities.

Each module can be used independently according to how much time is allotted in the class-
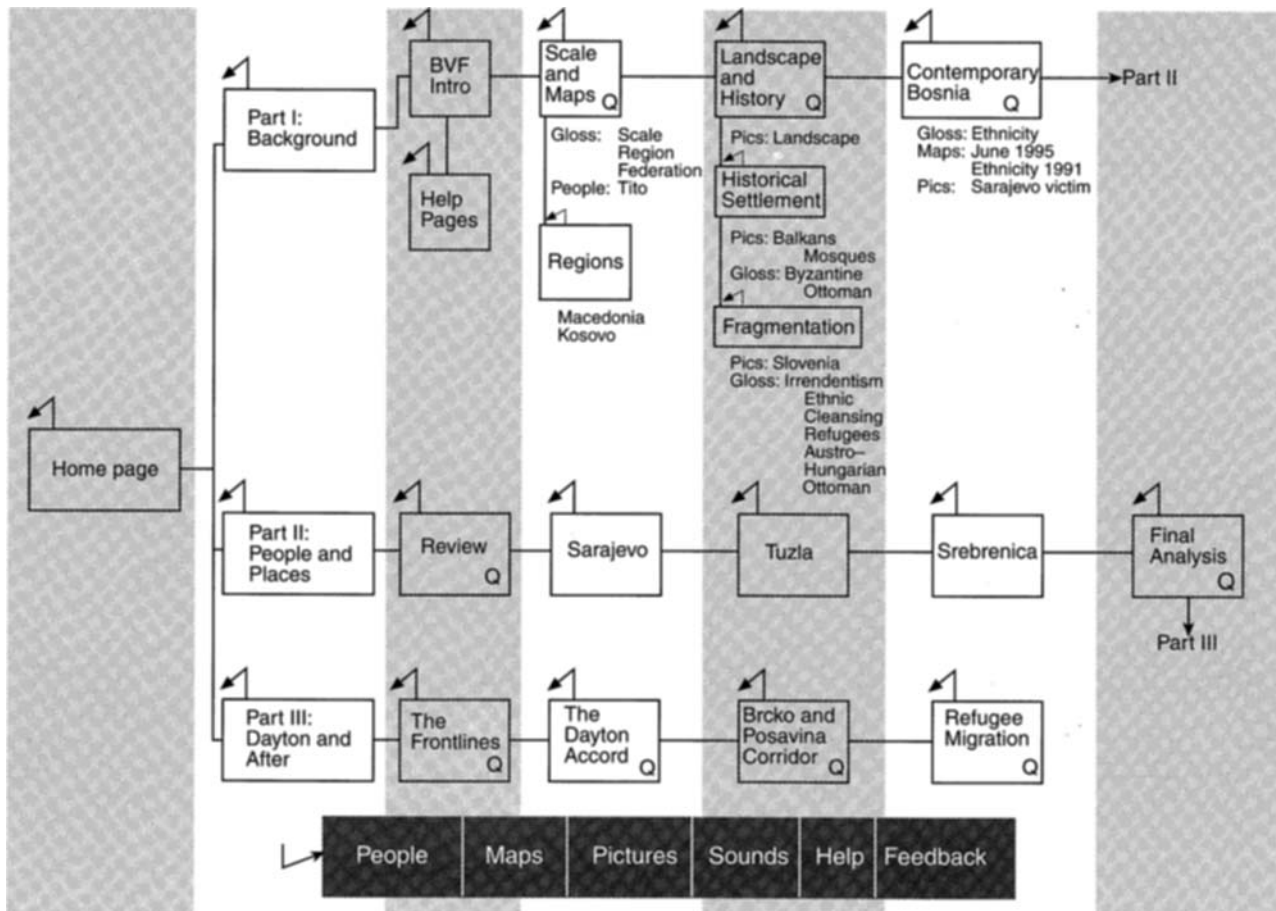
Figure 2. *Site map of the BVF. Full page links are given for Part I (top row) only. The letter* Q *indicates the page has compulsory questions; acute angle arrow indicates a link to resource sections shown in the dark bar across the bottom.*

room. Each module contains approximately six questions which form the minimum usable unit of the BVF. At the end of Part I, for example, students are asked to consider the inevitability of conflict and multiculturalism in the following question:

> We live in a multiethnic country yet we have not experienced the extreme ethnic violence or military conflict and refugee movements as has Bosnia. Or have we? React to this statement in 1–2 pages and use examples and anecdotes to support your opinions and statements.

This is a summary question designed to make the student compare the situation in Bosnia with the history of the U.S. The further purposes of this question are to have the student take a position and be able to defend it by integrating learned information with prior knowledge, and to deflate stereotypes that Bosnia has always had (and will always

have) strife. A deliberate implication of this is that a peace process may be possible, if not easy (this question was written just prior to the Dayton Peace Accords).

The questions posed by the BVF can all be answered by using material presented within the site, but require students to reflect on the information they have discovered. Students are also rewarded for discovering more relevant information by being able to provide richer, more informed answers. In this way a relationship is established between depth of effort and reward.

Although there is a preferred order to the pages in the site within each of the three modules, this is not to say that every page must be visited. These pages have links to deeper levels of resources (e.g., more in-depth discussion of the history of the region, or recent voting outcomes). If, for example, Part I is assigned, the logical sequence of pages is one through five, but each of those five pages provides links to other discussions (see Figure 2). On

the second page, users will read about the history of the region, then the following paragraphs (asterisks mark hyperlinks):

> Historically*, different groups of people have formed disparate settlements in this mountainous region.
>
> **Question 3:** using the specific information you gathered in the previous link, discuss in 2–3 paragraphs the relationship between cultural differences (ethnicity and religion), desire for possession of territory, and conflict.
>
> At times groups have joined together politically; other times they have fragmented along ethnic lines. This fragmentation* due to differences in ethnicity is termed Balkanization, named after the mountains in the Balkan Peninsula. (See the Atlas[3] page 95, 25 degrees East, 42 degrees North).
>
> **Question 4:** using the information in the previous link, explain in 1–2 paragraphs why Serbia is so concerned with Bosnia. In your answer consider population statistics for Bosnia.

Following the "fragmentation" hyperlink leads to a separate page which has 12 more links. Some of these links are to a geographic glossary, which defines terms such as *region, ethnic cleansing*, and the various political parties in Bosnia. At the bottom of every page is a navigation bar, which leads to discrete collections of resources (see Figure 1). The best analogy of this structure-with-choice approach is perhaps with popular computer fantasy, role-playing games such as Myst and Riven, which allow plenty of route choice within the basic framework (including dead ends, loops, and road maps out of the maze).

Through further exploration students can discover more maps, pictures, and information that can enrich their answer, or they can choose to remain at a more superficial level. This factor helps differentiate more able from less able students. Not incidentally, it also teaches them useful study skills for using the Web (or indeed the paper trail of references in technical papers) because after a certain point, diminishing returns are experienced in gathering relevant information. Simply discovering information is insufficient, as students have to think critically about the relevance of what they find.

In parallel to these three sections are a number of resource areas which are accessible from any page on the BVF. Visitors can directly access the material of interest to them (e.g., the map gallery) without having to traverse the rest of the site, while educators may wish to assign only Parts I and II, which they can easily do.

The resource sections include supplemental but important information. Some have their own location with an index page (maps, sounds, pictures, and people) while others are integrated into the site (e.g., the glossary). Because ethnicity is one of the geographic concepts we wished to emphasize in the field trip, a variety of maps were constructed to depict the ethnic distribution of Bosnia before and during the war. Figure 3 shows the BVF map of ethnicity as recorded in the Bosnian census, taken in 1991 before hostilities broke out.

Until another census is carried out it is not possible to directly know the new ethnic distributions in Bosnia, but a reasonable understanding can be acquired by examining the map constructed at the Dayton Accords which followed ethnic lines. Therefore, Part III, Dayton and After, examines the basis for the agreement and ongoing issues of contention. The most important of these is the Posavina Corridor near the town of Brcko in northern Bosnia. This thin strip of territory connects the Eastern and Western portions of Bosnian Serbian Republic, but
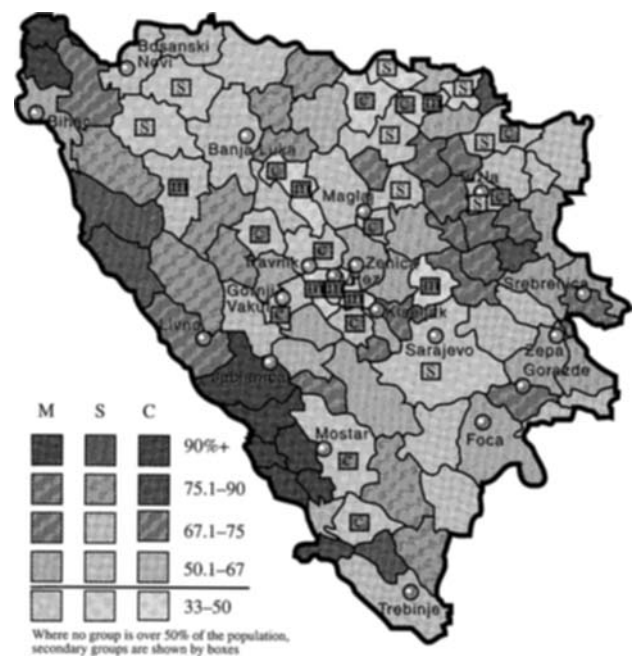

Figure 3. Map of Bosnia ethnicity available on the Web site (*original appears in color*).

is also claimed by the Bosnian Croat-Muslim Federation. Its status is still to be determined. Using our constructivist approach, students assimilate information about Brcko and decide to whom they would allocate it. They adopt a position and have to defend it, but since there are no right or wrong answers they see that knowledge and outcomes are constructed and that they have a role to play in that construction. The real outcome of Brcko is in the hands of an American administrator who is faced with a similar decision. Thus, the BVF approach differs from an information processing approach of education where students master facts about an objective universe.

Students can use this information in one of two ways: either to enrich their discoveries within the site and acquire a more sophisticated experience, or they may be explicitly directed to look at certain maps and pictures (as in Question 4). In general, the maps are referred to explicitly in order to understand and explain while the photographs are used to evoke a sense of place, people, and landscape.

Although the conflict lasted only a few years, significant changes took place in, for example, ethnic location, possession of territory, and involvement by Western governments. The war left its mark on the physical territory and among the peo-

ple. The BVF tries to at least achieve an echo of this by having students compare maps of the borders between 1991 and June 1995 (see Figure 4).[4]

Site Analysis

A site's usage patterns can be examined in a number of ways. Using a relatively little-known feature of some search engines it is possible to analyze how many links other people have made to a site or particular Web page. A site-link analysis was performed on the BVF in order to determine the relative popularity of its pages and if the resource pages were linked as specific points of interest from other sites, as opposed to links to the home page. In addition, an inspection of server user logs was performed to reveal how users access the site. A third form of site analysis determines the pattern of links users follow out of the site (called clickthrus). This analysis is mostly of interest to commercial sites with advertising banners and was not performed here.

Table 1 shows the number of links to the BVF obtained from the search engine Hotbot during June 1988. A separate analysis was performed on another search engine, Infoseek, which confirmed that the majority of links was to the home page (search engines do not index the entire Web and
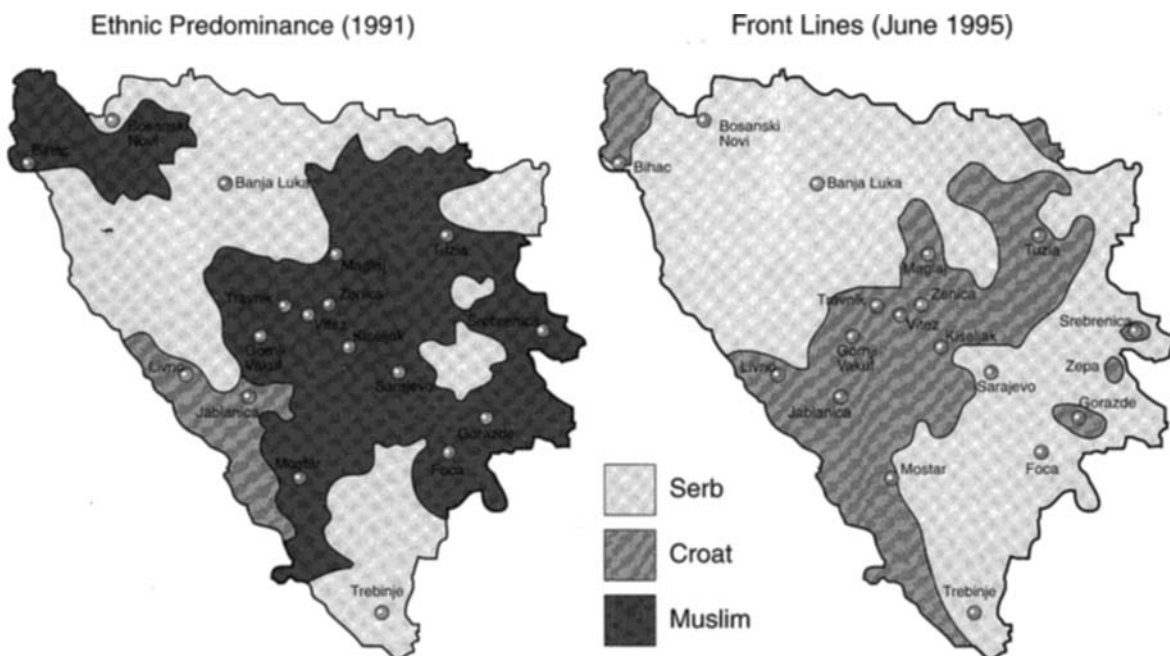
Figure 4. Comparison map of ethnicity borders in 1991 and military front-lines as of June 1995.

may vary in how up-to-date their data are). All figures exclude internal site links within the BVF itself. It should also be noted that figures are approximate and are best used for relative analysis. However, clearly, the vast majority of links made by other people are directly to the home page and not to specific resources. As one goes deeper into the site the number of linkages declines precipitously. This pattern indicates that the importance of the home page as the entry point to the site is critical, and should succinctly summarize the site's purpose as well as provide major signposts for navigation.

Linkages, however, do not tell the whole story. In order to further examine usage patterns, the Web server logs were examined for the periods between September 1, 1997 to February 9, 1998 and April 30, 1988 to May 22, 1998. This period includes the time when the site was in use in the GMU class and a sample from when it was not in specific use. Usage patterns did not vary between these two sampled times, reflecting the fact that most visitors come from outside the class setting. The 15 most visited pages, in ranked order, are shown in Table 2; numbers represent the number of visits per page (see Figure 2 for reference). As with the link analysis, the home page predominates as the most visited page, with all other pages being visited far less often. The deeper into the site one goes the less often pages are visited. Once again, this implies that the home page, and perhaps the first few pages following that, should provide the most critical information. The progression of use is somewhat different from that suggested by the links. The separate resources, especially the glossary and maps pages are heavily visited, and the beginning of each module is also well visited. This pattern strongly suggests that the site is not simply being used linearly,

Table 1. Links to the BVF obtained from the search engine Hotbot for a search performed in June 1998.

Page	Total Links
Home page	339
Maps Resources	21
BVFIntro.html	10
People Resources	5
Further Resources	4
Pictures.html	2
Part1-1.html	1
Geoglossary.html	1
Bosniamenu.html (feedback page)	0
Part2-1.html	0
Total links to BVF	**~390**

but successfully meets its goal of combining structure with freedom to explore.

Outcomes

One desired outcome is to demystify the situation in Bosnia. As it turns out, understanding of Bosnia has been fairly low among the general public and students alike. This has direct implications for foreign policy and international relations, especially in American efforts to sustain a military force in Bosnia post-Dayton and during the conflict to aggressively prevent infractions of UN resolutions.[5] Students in the GMU revisit the BVF at established intervals (e.g., after two weeks) and on these revisits provide markedly more sophisticated answers to the questions posed on the site.

In addition, the BVF has the desired outcome of facilitating and exemplifying geographic concepts to students and the public. I have already mentioned some of the basic concepts such as scale, region, forced migration (refugee movements), and the physical landscape, and to these we should add the process of cartographic partition.[6]

A third desired outcome was to provide a locus for debate in the Internet community about the "right thing to do" about Bosnia. Even experts disagree here. Although I have offered some analysis here and elsewhere (Crampton 1996), the BVF itself does not adopt a strident or especially partisan line. As a measure of this, consider that the feedback discussion section includes messages from Muslims, Croats, *and* Serbs, each complaining that we favored the other side!

The discussion section includes many hundreds

Table 2. The 15 most visited pages, in ranked order, for September 1, 1997 to February 9, 1998 and April 30, 1998 to May 22, 1998 (see Figure 2 for reference).

Home page: 34, 949
BVFIntro.html: 6,819
Geoglossary.html: 5,797
Part2-1.html: 5,470
Maps Resources: 4,705
Part1-1.html: 4,533
Pictures Resources: 4,189
Part1-2.html: 4,107
Bosniamenu.html (feedback page): 3,374
Part3-1.html: 3,237
Part2-2.html: 3,198
Part1-3.html: 3,173
Part2-3.html: 2,617
Part2-4.html: 2,458
Tito Page: 2,287

of messages from the general public debating questions such as whether to send U.S. troops to Bosnia, whether peace will ever exist there, and what they think about the fairness of the Dayton Peace Accords. However, some consequences of opening a discussion section to the public were not anticipated. Because Bosnia has been so tragic, and because feelings run high on all sides, a number of the messages have been abusive and rude. The number of such messages reached a point in the winter of 1997 that the discussion board was closed for 10 months. This caused us to question whether free debate necessarily leads to mutual understanding. Sometimes opening debate only leads to opportunities to insult. The discussion section now is edited to remove any off-topic posts.

More discussion took place during the conflict than after it, but some of the most heated debates took place long after Dayton. For example, one contributor, a self-identified American Serb, responded in January 1997 to comments from another person that the U.S. should not be involved.

> I used to think the same [that U.S. should not be in Bosnia], but I realized something. You have three opposing religions in the former Jugoslavia, right? Muslim: they are tight with the Middle East (Saddam Hussein), Catholic: they are in with most of the West. Orthodox: Russia. If Clinton allows this war to continue, it's a matter of time before faction supporters get involved. It's my opinion it would be a 3rd world war (the 1st one started there, remember?). Then America would be in without choice. Peace makers HAVE to be there....
> A personal note: I still have family there. Some Serbian. Some Croatian. Some dead. I could choose a side. I choose not to.
> If you weren't born on one of these sides (and even if you were), please don't choose one. Please.

Nevertheless, most correspondents take a more partisan line. Here is an example (posted June 1998) of a visitor arguing for equal rights of Serbs to independence.

> First of all, I would also begin by saying that I am also proud of being a Serb, or a Bosnian Serb if you prefer it....
> Myself, like many people in war 91-95 was a refugee, so I do not need anybody, especially US TV consumers, who up until 1991

have never heard of Bosnia, to tell me about the hardships of Bosniaks and barbarity of Serbs.
> I do not intend to keep a historical lesson, as I am aware that the most of the world is sick of it, however I would ask everybody to take a broader look at the problem of the conflict, and not to look at the world from fairy tale angle, i.e. this good and that is evil. There is no such a thing; and if you take a better look at the world you'll see that it is mostly grey.
> I agree it is hard to change picture you have had for years. If Yugoslavia, as multiethnic country couldn't survive, how did the world expect Bosnia to do that?
> Serbs in Bosnia and Croatia have just lost their mother and felt lost and abandoned. They assumed that as a constitutive Nation (under the Yugoslav Constitution, and hence the Constitutions of Croatia and Bosnia-Herzegovina of 1974, which was still in effect and under whose clauses Slovenia and Croatia have claimed their independence) they can also proclaim their (Serbian) independence in areas of Bosnia and Croatia where they had the majority.

Although this posting is well argued, other posters took opposing positions, writing, for example, "...always the same Serbian comments: That the media around the world is lying about Serbs. That your history is so great. That you are not guilty for the war, but the others. How can you be so stupid?" Others were even less polite. In response, other posters chimed in supporting the original comments. Discussions like these can be used in the classroom as resources themselves. As students encounter passionately argued, no-holds-barred, diametrically opposed positions, they are forced to evaluate their own position and to see that multiple viewpoints are possible. Although it is not our intent to say there is no solution to the Bosnian crisis, it is necessary to undercut some of the easy positions one often encounters in the media (of whatever stripe). The point is for students to grapple with a tough, geographical problem, to take their own positions, and be able to defend them.

DISSEMINATION

The United Kingdom's experience of assessing teaching quality in universities by the relevant Higher Education Funding Councils (HEFCs) has

"revealed that there is much good practice taking place in geography [in the U.K.]" (Healey 1997, 104). Healey argues that given this good practice, the assessment procedures can be de-emphasized in favor of further enhancement of quality teaching (e.g., he encourages every department to have a strategic plan in place describing how it intends to improve teaching and learning in the face of declining resources). The situation may be a little different in the U.S. Geography is typically a non-traditional major with few students encountering it before college level. The U.S. has not had a national, mandatory peer assessment similar to the HEFC Teaching Quality Assessment in the U.K., largely because U.S. universities are not centrally funded. Nevertheless, strong efforts are under way to reestablish the position of geography in society, as well as to disseminate good practice. The most prominent assessments have been the National Academy of Sciences (1997) report on *Rediscovering Geography* and *Geography for Life: National Geography Standards 1994* (Geography Education Standards Project 1994). In the United Kingdom, geographers have successfully used the GeographyCal project to disseminate good practice, which is part of the U.K. Consortium for Computer Assisted Learning in Geography.

In the U.S., geographers have developed the VGD. The VGD is a three-year project funded by the National Science Foundation to develop teaching modules (e.g., in human and physical geography, virtual field-trips, spatial technologies such as GIS, spatial statistics, and cartography) and to run summer workshops. The overall goal is to develop enough resources for an entire undergraduate degree in geography on the Web. These resources can then be accessed by any faculty members who need more exercises, background reading, or data for their class. Faculty usually do not need whole classes worth of material, but rather the expertise provided by others, which they can easily integrate into the classroom. As this article has argued, the advantage of the BVF (and the VGD) is modularity, so portions can easily be pulled out as needed. Distributed learning is not, however, unproblematic. Proponents of educational technology have often made extensive claims about the benefits of the technology which too often turn out to be anecdotal or elusive, despite large investments in funding (Healey et al. 1996). It is, therefore, important to be realistic and to acknowledge the very real constraints on computer-aided learning. These include cultural, educational, and technical constraints of

which the latter may actually be the least important (Healey et al. 1996). As Healey et al. (1996) found with the GeographyCal project, however, it is possible to reduce, if not eliminate, these constraints by emphasizing quality, modularity, and distributed development. I would also add that meaning, construction, and active learning are critical.

CONCLUSION

There is no doubt that the contemporary educational experience is undergoing a transition. Whether stimulated by declining units of resource or because of the potential of the Internet for new educational opportunities, faculty are experimenting with all things virtual. Success will be more likely to come however, if materials are well integrated into the classroom, what Landow (1992) calls "ease of integration"; are modular in structure to be flexible enough for a variety of needs, what Landow calls "interdisciplinarity"; are well disseminated, so that expertise is not confined to small numbers of students; and arise out of the instructor's knowledge set and have educational substance. This article argues that educational substance is more likely to be provided by taking a constructivist approach where students encounter issues-based, hands-on material. The metaphor for learning is one of challenging and constructing knowledge about reality rather than learning to deal with or model a set of pre-existing and immutable knowledge. The educational content presented here, the Bosnian Virtual Fieldtrip, was designed to do this by taking a virtual trip to Bosnia in the context of pervasive themes in geography.

These virtual elements of education do, however, have known limitations. They are not meant as a replacement of all other forms of interaction (i.e., a virtual field-course can supplement an actual course, but never substitute for it); they are not (yet) a replacement for traditional scholarship such as peer reviewed publishing; and they take considerable time to develop, perhaps being at least as time consuming as preparing a new course for materials which are only part of a course. If these limitations can be understood, however, there is every likelihood that the Internet and the Web can provide an enriched educational experience for students and faculty alike.

One final posting from early 1997 reminds us of some of the realities of war for participant and observer alike:

Dear People of the World,
The war in Bosnia has been going on for
quite a long time but it is time to stop this.
The people in Bosnia who used to be
friends are now foes. The peace keepers are
Bosnia are doing a great job but the hate
still lives between the creveces [sic] of this
country. I think that the peace keeping is a
great idea but I think that we must do
something more to help this happy country
in this sad state.
Good luck to all the peace keepers, but I
don't think they can do it alone. They need
us to support them.
Sincerely,
[Name provided]
11 years old
Montana, USA

Author's Note: The author wishes to acknowledge Beth Rundstrom
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NOTES

1   http://geog.gmu.edu/projects/bosnia
2   In addition to the subdivision which created Bosnia,
    Dayton produced two major internal regions, one for the
    Serbs and one for the Croat/Muslim Federation, each hav-
    ing their own political representatives.
3   The atlas referred to in the third paragraph is an inexpen-
    sive world atlas from Nystrom Publishers, which can be
    used to supplement the BVF. For those who choose other
    atlases, we have provided the coordinates of the feature.
4   Over the summer preceding the Dayton Peace Accords
    (signed in December 1995) the Serbs lost significant
    chunks of territory (from approximately 70% to 50% of
    Bosnia) due to Croatian offenses in Krajina and in the
    southwest of Bosnia. It was this more than anything else
    that paved the way for the peace agreement to be signed
    (Crampton 1996). Therefore, a relationship exists between
    possession of territory (a geographic phenomenon), ethnic-
    ity (a cultural component), and desire for peace (a political
    process) which can be explored in the BVF.
5   Perhaps the most controversial policy failure in Bosnia
    since the cessation of hostilities has been the inability to
    prosecute the UN indicted war criminals such as the
    nationalist Bosnian Serb leader, Radovan Karadzic, who is
    still at large (and still a political force despite losing his
    official leadership position). To some extent, these "failures
    of will" arise out of the distance of the conflict from
    Washington, the complexity and multitude of people
    involved in Bosnia, and a perception that Europe should
    take a leadership role in the solution.
6   Bosnia today actually consists of two major political
    regions, a Muslim-Croat Federation (51% of the territory),
    and a Serbian Republic (49% of the territory). Within the
    Serbian Republic itself however, there are two sub-regions

which broadly ally to Karadzic (in the southwest near
Serbian headquarters at Pale) and a former deputy of
Karadzic who now opposes him (Biljana Plavsic, who
maintains a power base near Banja Luka in the northwest
of the region). The shape and location of these geographic
regions can be understood by looking at territorial control
during the conflict, the distribution of nationalists near the
war-capital of the Serbs, and the fact that Banja Luka is on
the other "side" of a narrow strip of territory (the Brcko
Corridor) whose control is still disputed by the Serbs and
the Muslim/Croat Federation. Students should be able to
conclude from these factors that (a) it is impossible to fully
understand what occurred in Bosnia without considering
specific geographic factors and (b) the relevance of geogra-
phy in general.

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