The Teacher

Introducing Instructional Technology to International Relations

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I had just returned to my office, when the phone rang. On the line was a father of a student who an hour earlier had attended the opening session of my Introduction to International Relations course. He was calling to let me know that his daughter had returned from the first class of her college experience so excited that she had phoned him at home. She had just learned about the concept of change in international relations, not through the expected format of a classroom lecture, but through an interactive critical thinking exercise that made use of a computer animation of the European map. The student had commented, "You know I really got it. I understood what the professor was driving at." What was significant about the father's report was that his daughter had focused not on the technology itself, but on the pedagogical impact it had produced. The energetic reaction of this student highlights the promise of instructional technology (I.T.).[1]

The 1995 National Survey of Desktop Computing in Higher Education, a survey involving 650 institutions, reveals a 50% increase over the past academic year in the percentage of college courses using e-mail, advanced computer software, multimedia, and the Internet. The survey's director, Kenneth Green of Claremont Graduate school, notes that "the slow, gradual movement of information technology resources into the curriculum and classroom experience is picking up steam." Despite this increase, the National Survey demonstrates that a gap exists between the actual use of instructional technology and the student demand for it. For example, while only 6% of college courses are currently using World Wide Web (WWW)-based resources for instruction, 76% of the surveyed institutions indicated that "providing Internet/WWW training will be a "very important" computing priority for their campuses over the next three years" (Green 1996, 2).

Background and Goals

As academics attempt to fill this gap, greater focus should be directed toward assessing how the integration of instructional technology into the curriculum can lead to an enhancement of student learning, critical thinking, and research skills. A meaningful dialogue on the pedagogical impact of I.T. in the classroom should expand in earnest (Ball 1995).

In the summer of 1995, I participated in a faculty institute on instructional technology conducted at the University of Cincinnati in order to learn about the emerging classroom use of information technology resources. My previous computing experience, up to that point, amounted primarily to wordprocessing. The one-week symposium left me energized about integrating I.T. into my classes, but also somewhat concerned about my own zeal. I was unsure whether my excitement concerning instructional technology was tied to nothing more than an enthusiasm for modernizing the classroom. While I.T. adds to the tools available for the learning process, I became concerned about whether I.T. offered a true advancement in learning. Is I.T. mere "bells and whistles" or true pedagogical innovation?

This summer experience, therefore, led to a two-track engagement with instructional technology: to develop its use and study its effect. This essay details the introduction of five different forms of instructional technology into a core international relations class. A preliminary assessment of the strengths as well as problems with this form of teaching innovation is also offered based on student surveys and personal observation.

The Multimedia Map

Those teaching international relations over the past few years have been challenged to present and explain the significant change that has occurred since the collapse of the Soviet Union. The first day of my class began previously with a lecture presenting a list of all the new countries that had emerged over the past few years. The challenge was to demonstrate why such change was dramatic and significant in the history of international politics and then offer some competing explanations for why the change had occurred.

Through the aid of a multimedia map program called *Centennia*, I transformed this first day into a critical thinking exercise on the concept of change. *Centennia* contains every map of Europe, North Africa and the Middle East from 1000 to 1996.[2] The map can be put into motion and all political boundary changes are revealed through shifts of colors and the redrawing of borders.

The critical thinking exercise I developed begins with a map of Europe in 1950. Once the program is put into motion, each passing year is recorded on a displayed date counter and each border change that occurred is visually represented. The animation is stopped in 1985 and the

students are asked to describe what happened on the map. In all three classes, after some uneasy rustling of feet, someone offered bravely the answer, "Nothing," to which I responded, "Absolutely correct!" followed with the question, "Why did nothing change?" Again in all three classes, the next answer was the Cold War. I returned to the class the following response, "Before exploring this answer in detail, what are we assuming if we say the Cold War was the reason for the lack of border change?"

I find that many students have trouble recognizing the significance of assumptions within their arguments. This type of critical thinking exercise begins with a statement of fact, asks for an explanation of the fact, and then requires the students to confront the assumptions underlying the explanation.

After some discussion, the students determined their most significant assumption was that the political boundaries of 1950–85 had been imposed by outside forces; in essence the map of Europe during the Cold War had not reflected a "natural state" of political organization. At this point, I set the map animation into motion again. As the years entered the 1990s, the map was transformed into a multitude of new colors and lines. I asked whether the new map reflected the "natural state" of Europe, which prompted a student-driven discussion of what brought about this change and where Europe might be heading. Students pointed out both the fragmenting of Yugoslavia and the integration of Germany, which had been visually displayed by the animation. Set against each other, these two visuals prodded a debate on trends in international relations. As the students grappled with interpreting these two competing images, I prompted the screen to dissolve quickly to a map of central Europe circa 1600. As they witnessed the map divide into small parcels of color representing the myriad of German states and principalities in existence in 1600, most students recognized that the trends of fragmentation and integration they had been discussing had much longer historical roots then they had initially conceived.

In the class surveys, students rated the exercises involving *Centennia* as highly beneficial to their learning process. 80% of the students "agreed" or "strongly agreed" (only 3% disagreed or strongly disagreed) that the map program assisted in their understanding of the concept of change. The visualization was important. One student suggested, "the visual aid made the ideas seem more concrete and less abstract." Another wrote, "[the map program] helped to put things in perspective—could actually see it." The student testimonials were supported by their exam essays. There was an increase in the conceptual use of the ideas of change, fragmentation, and integration from essays written in previous classes.

The strength of I.T. in this case was that it supported a visual presentation of a dynamic concept. The multimedia aspect allowed for the examination of both change and the lack of change. The latter, in fact, may have been the most important effect. Since the students expected something to happen when the map was set in motion, the absence of any change became all the more apparent. The animated time-series nature of *Centennia* demonstrated vividly to students that the lack of an event (in this case border change) may require as much explanation as the occurrence of an event (change after the Cold War). According to one student, the map exercise "provided real demonstrations instead of us having to think about a dynamic process in theory."

The Web and Instruction

For the Introduction to International Relations course, I constructed a personal homepage on the WWW to provide students with four basic elements: background on my training and research, access through e-mail connections, specific web-based assignments, and links to important sites on the web.[3] The primary objective of the homepage was to provide students with access to information I expected them to research throughout the quarter in preparation for a quiz on a contemporary event. I chose the negotia-

tions leading to and the implementation of the Dayton peace accords for Bosnia as the research case. My homepage provided hypertext links to the White House, Defense Department, State Department, NATO, and CNN.

In the class computer survey, 41% of respondents indicated that they had never used the Internet before entering my class. Thus, a large percentage of students required some basic training on e-mailing and using the web, which I offered in three separate sessions outside of regular class time. To help students become familiar with these basic Internet functions, two minor assignments were posted on the web page that had to be completed before moving onto the case research. The first task was simply to e-mail the teaching assistant directly from the homepage. A number of students indicated that this was their first e-mail message ever. The second assignment, due in the middle of the quarter, was to submit a "build-a-lecture" question they wished me to address when discussing the end of the Cold War.

The student response was overwhelmingly positive about the use of the homepage. One student wrote concerning the page, "I had never used the Internet before this class, now I can't stop!" There were approximately 240 students who completed the computer assignments over the three quarters. The homepage was visited 1,208 times. The most oft cited advantage according to the students was enhanced access, both to relevant information and to the professor.

The main instructional advantage gained from using the web for the research assignment was access to primary documentation. Students could find the entire peace accords at the State Department web site and the official objectives and timetables for *Operation Joint Endeavor* at NATO's homepage. They could read entire press briefings rather than the distilled versions they would normally receive reading the next day's newspapers. A number of students commented that they were surprised at how much detail was actually released by the American government and a few began to

compare their own reading of the press briefings with the stories that appeared in the press.[4] All of the students who noted that they were working with primary documents for the first time expressed a higher level of interest in the subject than when they just had read the news on Bosnia. The timeliness of the information was another advantage. Much of the information students were dealing with is the type that would be published eventually by the Government Printing Office (GPO) and arrive at the campus library at a much later date.

Prior to the Internet connection, the draw back of dealing with contemporary events in the classroom had been that the information to which students had access was minimal press accounts. The multitude of resources on the web, particularly governmental, allowed for a more substantive study of the contemporary research case. The web proved to be a research/instructional resource that was both accessible and available. Many students used modems from their dorms or homes to access the course homepage and thus, technically, had twenty-four hour access to relevant information. More significant, however, was that the information was accessible to all of the students simultaneously as opposed to reserve reading which is available to only one student at a time.

The use of e-mail from the homepage as a communication link between professor and student proved more interesting than I originally thought. In the autumn quarter, only 24% of the students indicated that they used e-mail to communicate with me, the teaching assistants, or other professors. In the spring, 94% indicated use of e-mail. In the first class, I had presented e-mail as an alternative to office hours: if the hours were not convenient and an appointment could not be arranged, students could choose to e-mail. In the spring class, I suggested the same, but added that if they just wanted to discuss international relations in general or raise a question about material in class they could e-mail me. Much of the increased traffic raised topics that the particular student did not have an opportunity to raise in class. In a

handful of cases, I maintained a quarter-long discussion with students on topics ranging from the Israeli elections and peace process to Russian democratization to nuclear proliferation. Some of these discussions were held with students that tended to be intimidated by public speaking. E-mail served not only as an additional class management tool, but as an additional learning track for some.

CD-ROM Supplements, Multimedia, and Theory

Given the potential power of multimedia presentations, I searched for CD-ROM based resources that could be integrated into the course syllabus. In the specific area of international relations as well as history, the choices were quite limited in 1996. My personal experience is echoed in the 1995 National Survey which notes that demand for instructional products is ahead of its supply. Most of what is currently available is encyclopedic in nature; that is, comprehensive in scope, but short on detail and geared somewhat for entertainment.

Flagtower's CD-ROM *World War I* was added to enhance a lecture on the interplay of alliance commitments, geography, and military strategy in 1914. The multimedia allowed for maps of the mobilization to be put into motion, again presenting a moving visual representation of a dynamic set of factors. Students attending the presentation again noted that a moving representation of these dynamic forces was powerful. The concepts came "alive."

The main problem with the CD-ROMs that I reviewed was that they were not designed specifically for the classroom and thus tended to be cumbersome. The material had to be presented in the manner in which it was arranged on the CD-ROM. The technology in this case required a significant adjustment in teaching in order to make effective use of it. This experience led me to examine the possibility of creating my own multimedia tailored to the instructional needs of an introduction to international relations class.

The fourth form of instructional technology introduced into the class,

therefore, was a prototype version of a CD-ROM that I decided to create myself. I structure my course around the use of historical cases dating back to the Peloponnesian War to highlight the main theoretical concepts associated with the study of international relations. The presentation of these cases is organized around a levels of analysis (LOA) approach drawn from Kenneth Waltz's *Man, the State and War*. The use of a levels of analysis approach is, of course, supposed to simplify the study of complex international events or phenomena by organizing research around separate sets of variables—individual decision-makers, the domestic components of states, and the systemic distribution of power. While many students employ this conceptual approach effectively, a solid core of students in every class over the past five years have had some difficulty. Consistently, two problems have arisen. Some have had difficulty with the idea that there may not be one answer, but a set of competing explanations that must be judged based on the strength of evidence and assumptions. This reasoning requires a significant departure from the way many have engaged with subjects in primary or secondary school. Others have been confused by the idea that since some assumptions are incompatible with each other, the option of mixing and matching explanations may not be logically sustainable. In the end, some students cannot understand the differences between the levels and the competing arguments they can produce.

I felt that if the conceptual essence of levels of analysis could be presented in a more actively visual manner, perhaps more students could make a connection with it. A visualization of this conceptual framework through the use of instructional technology might capture the students who tended to be visual learners. The mere process of rethinking of the LOA framework in a visual context led to a metaphorical representation that, even without the use of technology, seemed an improvement over the use of traditional lecture and textbook presentations.

The essence of LOA is that the choice of level determines the vari-

ables to be studied, which in turn affects the conclusions drawn. In a visual context, an optical metaphor seems to capture the framework well. I decided to develop a multimedia presentation around three optical devices with which students have all come into contact—magnifying glasses, binoculars, and a telescope. The idea is that selection of optical device impacts what you will see, which likewise affects the descriptions and explanations you will offer.

I developed a main menu screen for the prototype that offered a general research question as its heading—why German aggression in 1939?—under which were icon pictures of the three optical devices corresponding to the three levels of analysis. A click on the magnifying glass (individual level) set a three-dimensional image of a magnifying glass into motion. Suddenly a video clip of Adolf Hitler making a speech appeared. A discussion then ensued about Hitler as a cause of the Second World War. Returning to the main menu, the same research question appeared, but a different device was chosen. Just as the image of something would change dramatically if it were viewed through binoculars than through a magnifying glass, choice of the second level brings up a different set of visual information. On the demo, a click on the binoculars icon began a video clip of domestic rioting in German streets during the late 1930s. In class, this prompted a discussion of how domestic instability can lead to political extremism. The telescope icon representing the systemic level trains the viewer's sight on an 1860 and 1939 map of Europe. Students quickly identified the absence of a Germany in 1860 and discussed how the late rise of Germany upset the distribution of power in Europe.

This "lens of analysis" multimedia presentation demonstrates how analytical tools impact conclusions. The choice of optical device affects what the student sees and thus the likely answer to the research question under consideration. This type of demonstration had the advantage of making a highly theoretical and abstract construct more tangible for students.

The strength of any multimedia program is that it can bring together sound, video, and text. In this case, a more accessible representation of theory was offered than is generally possible through a traditional oral presentation. Since the LOA framework involves competing images, having the ability to physically alter what students see offered a powerful basis for comparison and, according to student reaction, greater understanding.[5]

Powerpoint vs. Overheads

Finally, I made use of computer-generated slides. The software, *Powerpoint*, was used in place of traditional overhead projections. I assumed that the computer projections would provide greater flexibility and clarity in presentation. *Powerpoint* slides allow the presentation of information line-by-line, in blocks, graphically, or with some animation. I primarily used the slides to provide an outline of the course material and to highlight definitions of concepts. The slides were in color and I developed a distinctive border and background to correspond with different topics.

Over 80% of the students surveyed felt the slides were beneficial, while 3% felt they were unhelpful. One student indicated that the slides improved his recall. He wrote, "during exams I was able to picture how information had been presented." The fact that the slides were in color and had a distinctive border corresponding to the topic may have contributed to better recall.

Yet, overall, the survey of students did not provide enough evidence to indicate that the computer slides offered a significant improvement over traditional overheads beyond added "slickness" to the presentations. From a course management perspective, computer slides proved easier to edit and update and thus a more convenient method of presentation.

A large number of the students I surveyed requested copies of the slides. Based on student comments, I have decided to develop a link on my homepage so that the slides would be available on-line for students. In this way, the projection of the outlines during class would be a reference guide to the class discus-

sion, rather than something the students would sit and copy while tuning out the real substance of the class interaction. Posting of the outline on the web will allow for easy editing and unobtrusive updates of slides even after the quarter begins. Given the recent rapidity of change in the international system, the ability to update course material easily is no small advantage.

Bumps in the Road

The major difficulty in my first year of using I.T. was technical rather than pedagogical. On a number of occasions, the projector burnt-out or an Internet connection could not be made. I quickly recognized that it was best to assume that something could go wrong when working with technology. If I planned to use I.T. heavily for a lecture/exercise, I found myself planning an alternative method of presentation as well.

Two important problems arose as students surfed the web for information. First, they had some difficulty in differentiating between official and unofficial web sources. There are a large number of web sites that present biased opinion in the form of authoritative fact. It had to be stressed to the students that they critically assess any web documents they read and attempt to check sources. Second, use of the web raised the problem of information overload. Some students became mere downloaders of information, passive sightseers on a cybertour who became overwhelmed. One student suggested "that more than . . . computer assistance is needed." She is correct.[6]

Students must be given guidance on what to look for and how to assess the relative importance of information. One change I had to make was to place more emphasis on how to manage information retrieval. Use of the web for instruction puts a premium on teaching students to be discriminating researchers.

One unexpected issue concerning the use of e-mail deserves brief mention. Students, especially those that had some experience with e-mail, demonstrated a lower degree of formality than in written class assign-

ments or when speaking in class. E-mail messages had a free-wheeling written communication style. In many cases, students did not sign their messages, but allowed their creative usernames to serve as a point of identification. In addition, some students communicated impressions of the in-class performance of other classmates. Students felt more comfortable making types of statements and presenting thoughts via e-mail that they typically did not make in traditional written assignments or in face-to-face conversations.

Conclusion

"It was visual, therefore memorable." This written comment, provided on one of the student surveys, captures the most significant pedagogical aspect experienced in my first year of adapting instructional technology to my international relations class. The computer map program provided a physical representation of a dynamic concept—change—and my own multimedia demo provided a tangible visualization of an abstract conceptualization. In these two instances, instructional technology created a new path for visual learning, which seemed to capture more students than previous classroom presentations.[7]

The use of the web offers a clear advance in terms of accessing and making available relevant information. The number of sites is increasing at an exponential rate. One estimate suggests that in 1995 there were 22 million web sites and that the Internet itself was doubling in size every three months (*Business Week* 1995). The ability to access more information, however, does not automatically mean an advancement in learning. It was clear in the classes that some students were overwhelmed by the amount of information. They simply went to a site, looked at the page, and hit the print key. After downloading reams of information, they had difficulty discriminating between important and unimportant information. Use of the web for instruction and research will require a shift in focus in terms of the skills we require students to develop. The challenge created by I.T. is how to manage access to

enormous amounts of information. More than ever we need to encourage the development of critically thinking discriminating researchers.

In the final assessment, it is the objective rather than the tool itself that is important. Whether instructional technology affects the learning process in a positive manner will depend on how well it is integrated into a pedagogical plan. A frank, yet troubling comment on one student's survey reinforced this point all too clearly. After indicating approval in the way the technology had been used in this class, the student warned that some may rely on the technology too heavily to the point that the technology could actually separate the teacher and student and "ultimately hamper a student's learning experience." The 1995 National Computing Survey concludes that "growing numbers of college students expect a technology component to their courses" (Green 1995, 1) If we are to provide that component well, a wide dissemination of our increasing professional experience with this new instructional resource must take place.

Notes

1. The course under study in this essay is an introductory level requirement for political science and international affairs majors with an average class size of 100. Typically 30–40% of the class are non-majors. The class was taught in a room equipped with 486/100 mhz computer with 16 megs of ram, which had an Internet connection. An LCD console allowed for display of computer, video disc, VCR, and document camera resources through an overhead three gun color projector. The essay is offered from Professor Harknett's perspective for ease of presentation, but was co-authored.
2. Information about *Centennia* can be found at <http://www.clockwk.com>
3. The homepage is <http://ucaswww.mcm.uc.edu/polisci/harknerj/homerjh.htm>. A directory of political science homepages can be found at <http://u.arizona.edu/~polisci/ps-dir>.
4. Bailey (1995, 722) reports a similar reaction among her students working with on-line presidential press releases. See Frantzich (1995, 728–30) for a classroom exercise involving on-line access to government press releases.
5. The use of the optical metaphor emphasizes the idea of images which is, of course, closer to Waltz's original conceptualization than the term levels. Richard J. Harknett, *Lens of Analysis: A Visual Framework for the*

Study of International Relations is forthcoming as an interactive web-book.
6. Barbara Welling Hall's assessment of e-mail in the classroom concludes in similar fashion. She writes, "... It still takes real rather than virtual minutes and hours to provide students with the time and attention required for active, rather than passive learning" (1995, 14).
7. There was an improvement in overall course grades from when the class was taught without I.T., but I.T.'s effect on this change can not be isolated with any confidence. On average, 75–85% of the students indicated that they "strongly agreed" or "agreed" that each of the five technology components "increased their understanding" of the concepts under consideration. Almost all of the written comments reflected a positive view of the technology's use and its impact on their learning experience.

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