

THE TEACHING EXCHANGE

BROWN UNIVERSITY • VOLUME 6 / NUMBER 2 • JANUARY 2002



Digital Multimedia in Classrooms, Labs, and Research

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Multimedia technology has demonstrated its potential to transform every aspect of academic endeavor, from the development and dissemination of research, to classroom communications, and in student work. Our job in technology support services is to facilitate the judicious use of technology, and to make the most appropriate tools available to the campus community. Not every faculty member in every field will or should choose to make use of these tools, and many may find working with multimedia tools a needless distraction from the real business at hand. Others may incorporate new technology in their research, but find no value in using similar techniques in their classrooms. **Students are, however, coming to campus with an increased expectation that multimedia will be used in the presentation of information, and that their own learning experiences will be processed through new media applications.** Many faculty members find that creating multimedia projects whether for classroom use or with wider audiences in mind forces them to reconfigure the approaches they have made to their area of expertise in ways that have interesting and fruitful implications.

Multimedia in Research, Teaching, and Learning

In publication and dissemination of research results, multimedia production allows authors to call into question the need for a single intended audience. While the question of audience remains important when considering any single piece of a multimedia project, one project can serve more than one audience without sacrificing coherence in the way a book, film/video, or public presentation would. Multimedia publications can include material aimed directly at both experts in the field and the general public.

Examples from STG work abound, but perhaps the clearest is the recent *A. & L. Tirocchi Dressmaker's Shop* website, produced in coordination with the RISD Museum Department of Textiles on the occasion of their exhibition of the same name (<http://tirocchi.stg.brown.edu/>). The Tirocchi project was initially conceived as an outreach component of the Museum's exhibition. It was described as a distribution

channel for an eighth-grade social studies curriculum, and a repository of support materials for that curriculum. Very early in the development process, however, the project team decided that other audiences could benefit from having access to material about the exhibition, and the collection that spawned it. The web site now includes — in addition to the curriculum, notes for social studies teachers, a very accessible book-length document about the Tirocchi shop, the sisters who owned and managed it, their employees and clients — curatorial databases, and catalogue essays that make the resource valuable to faculty and graduate students of fashion, art and design, business history, women's studies, and many other fields. The navigational scheme designed for the site makes it easy to make choices from among the options, and guides the audiences to the sections of the site most relevant to them. In addition, because the data was available in all of its detail, examples used in the teaching modules had a built-in authenticity, and student users got a taste of the real world of research in material culture, art history, and other fields.

Professor Massimo Riva's "Decameron Web", and Professor Sheila Bonde's efforts to create an accessible three-dimensional model of the buildings and grounds at the abbey of Saint-Jean-des-Vignes in Soissons, France are also examples of STG sponsored multimedia work that has both research and teaching value. At a university-college like Brown with an emphasis on exploring the way research feeds the classroom experience of both faculty and students, this kind of work has particular resonance.

There are, of course, many classroom uses of multimedia that do not originate as research projects. Most of the projects completed in CS092 (<http://www.cs.brown.edu/courses/cs092/>) are designed exclusively for use in class or laboratory settings. Color Theory, a module based on Joseph Albers's book *Interactions of Color*, makes use of Java Applets to demonstrate the way interactions of different colors can effect the way individual hues are perceived. The module forms the core of a short unit on color theory taught in Professor Roger Mayer's Visual Art 10 course. The unit includes both computer-based exercises and traditional painting assignments. Students explore color with an interactive screen-based lab that allows users to place colors in relationship to each other, and then observe the differences in the way those colors appear to shift. After experimenting with the easily manipulated computer colors, the students create small painted exercises that demonstrate what they have learned.

There is a natural tension introduced into any course designed to incorporate a high-level of student multimedia production. Students entering the course will have various levels of experience with the necessary tools, and learning to use them with enough facility to create clear, compelling, and competent work is difficult and time-consuming. Even a few class periods spent on technology training can significantly detract from the main thematic movement of a course. Most of the courses taught in Brown's Multimedia Lab are in some sense focused on the tools, and the necessary training is naturally incorporated into the curriculum planning. Many make use of lab sessions staffed by undergraduate TA's and multimedia lab staff to provide technology support to the students. Some faculty incorporate optional training sessions arranged with CIS staff to enable their less technologically savvy students to get started with the tools. Teams of students, with previous experience either from courses taken at Brown,

from their high-school work, or from private experimentation, very often undertake multimedia projects.

Multimedia Authoring – Challenges and (our local) Response

Multimedia authoring, whether it is intended to disseminate research, created exclusively for use in instruction, or as a way to judge student learning and understanding, introduces some new pitfalls and exacerbates other well-know ones. As great as the potential is for computer modeling and simulation to illustrate the real world, these techniques also offer the possibility of fostering misapprehension. It is as easy to create a compelling animation—complete with interactive buttons and widgets—that shows a bullet shot from a gun falling more slowly than one dropped directly to earth as to create one that accurately depicts the laws of gravity. That so much of the material experienced on the computer or video screen, whether in game environments or on television and film, is good-looking and logically incoherent is no help — and this is a simplistic example. The use of 'the visible human' project in medical education, the 'virtual fly-lab' in secondary school biology courses, and other educational simulations raise important questions about what experimentation has to do with "real-world experience." No doubt these projects offer an exciting glimpse into a future where students can increasingly be exposed to material which is difficult to illustrate without the time and equipment that make classroom exposure to real-life data impossible. Still, an increased reliance on simulated work in classrooms and labs has potentially dangerous implications.

It has always been difficult to predict what will be lost in these sorts of transitions. The move from slide-rules to electronic calculators did not cause "younger" engineers to lose their grip on basic mathematical operations. It did, however, according to some practitioners trained with the old technology, result in a striking inability to estimate results within an order of magnitude. All too often, multimedia projects are overwhelmed by the technical possibilities of the medium. Graphic design, animation, and attractive sound effects can become ends in themselves, while careful attention to accuracy goes by the wayside. Brown has incubated several important counter-examples, especially CS092, mentioned above, which from its earliest incarnation paired student production teams with teachers and later professors, museum curators, and other content-experts who helped to keep the projects centered in the content. The Scholarly Technology Group also attempts to put multimedia tools at the service of our faculty partners, allowing their vision to dictate the technical solutions, and resisting the inverse effect.

Authoring tools are improving rapidly, and in some cases that improvement results in products that are easier to use. (In other cases 'improvement' results in tools with increased functionality, and correspondingly more complicated user-interfaces.) Desktop video production, for instance, is nearly a reality today, and web-site development tools now make it relatively simple to publish sophisticated web documents. Still, many of the most powerful tools for multimedia are still difficult to master, and require a level of ongoing training and practice that make it unlikely that high-level multimedia production will become a do-it-yourself activity in the near future. Until that time comes, there will be an ongoing need for systems that make strong collaborations between technicians and scholars work well.

Brown has several structures in place to support these kinds of teams at different levels. At the Library, the Center for Digital Initiatives has already begun digitizing collections that are widely used in courses in several departments. The Media Services department of the library has recently opened the Gimon Multimedia Lab where faculty members have access to professional level equipment for digitizing images, sound, and video – a critical first step for many classroom and research oriented multimedia projects. CIS provides training and support for faculty (as well as staff, and students) through the Instructional Technology Center (<http://www.brown.edu/Facilities/CIS/itc/>), the Faculty Liaisons, and a Student Technology Assistantship program. And at STG we coordinate a small program of technology support grants (<http://www.stg.brown.edu/projects/facultygrants/>) as well as running the multimedia labs at the Graduate Center, and the List Art Center (<http://www.stg.brown.edu/mmlab/>). While these programs are only loosely coordinated at present, discussions continue about the best way to organize the university's ongoing academic technology support efforts. Nevertheless, we do have a strong foundation of support for faculty with needs and aspirations across a whole range of possibilities. Support exists for those who need help creating web-based lecture materials and using them in class, or for producing publishable DVDs of research materials.

The team approach to academic multimedia production presents many challenges in institutions that tend to over-emphasize the value of "individual work." The kind of collaboration required goes beyond the model many academics are accustomed to. While there is often a clear division of labor, the interdependencies among the tasks assigned to the content and authoring specialists require tightly orchestrated production schedules and more overhead than is sometimes expected. These challenges should not militate against taking the leap. Before conclusions can be made about the most effective techniques for integrating technology into academic use there is much experimentation to be done. On the technology support side we need adventurous faculty collaborators willing to share both their content expertise, and their experience as effective teachers and communicators.