

SERVICE PROJECTS IN THE CARTOGRAPHY CLASSROOM

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Abstract

Cartography courses are good opportunities for students to do work that serves not only their own learning but the needs of others as well. As educational institutions strive to adjust to the changing needs and expectations of society, it will be more and more important for cartography instructors to consider the ways in which student efforts can be channeled to serve the dual purpose of learning and service.

Examples of service products from cartography classes at Michigan State University include many of the color maps produced in Map Production and Design. Students in Map Automation have also initiated two projects. One is a campus map for the visually impaired, a project that has resulted in a new exercise in the Map Production and Design class as well. The second is an initial CD-ROM that demonstrates potential content of a product for use by school children on the Geography of Michigan.

Cartography courses at MSU are far from the first or only ones to incorporate "real projects" into the curriculum. This paper is intended to stimulate discussion of such projects by many ICA participants including non-teaching cartographers, who often have wonderful project ideas and knowledge that is useful to those of us who teach.

1 Introduction

Cartography courses can be a fine environment in which to encourage students to do work that will serve others as well as fulfill the requirements of an assignment. Assignments in introductory courses usually introduce students to mapping methods and require thought and build skill in the area of processing data and information appropriately for maps. There is almost always at least some design creativity and skill as well that is taught through these assignments. At more advanced levels, gathering the information as well as processing it and executing a professional-quality finished product is often required. Various instructors undoubtedly make very different assignments, but, whatever the specific work involved, the students undoubtedly spend considerable time and effort in completing the required work.

Are there ways, then, to channel these monumental efforts such that they result in something useful-beyond artifactual evidence of a student's accomplishments?

Many instructors use the opportunity to link students with outside clients who would benefit from cartographic services but for whatever reason are not likely to seek them out. The students then

perform their assignment by doing a project that someone will use. The many hours of work are turned into something more than completion of an assignment.

I would like to explore this whole notion of having students perform service projects in the context of the classroom and will touch on the following issues: the current academic climate for doing service projects in classrooms, definition related to the concept of service, examples of recent service projects carried out by students at Michigan State University, advantages and problems involved in assigning such projects, issues to consider, and the ways in which we might share ideas about service projects in classrooms.

2 The current climate for service projects

The whole issue of higher education serving the public in more direct ways than simply building an educated population is one that is being raised generally in the United States and probably more broadly as well. In geography, a special committee was formed a few years ago by the Association of American Geographers to participate in a national initiative called the Syracuse University Project on Defining Scholarly Work, and its final report spells out four categories of roles, each of which deserves reward: teaching; research, outreach, and professional citizenship [1]. It is the outreach role that relates very closely to the notion of service projects. The term outreach is a commonly-used one in higher education, especially among what are called the "Land Grant Colleges and Universities (LGCUs)." It would be easy to digress at length to expound upon LGCUs, since my own University is one of them, but suffice it to say that the federal government quite literally granted these institutions tracts of land back in the 1860s and the expectation was that they would serve the public as opposed to educate the elite. They commonly began as agricultural and mechanical arts institutions, and even though many of them are large and complex entities today with solid reputations in basic research as well as applied, there is still a strong philosophical bent toward serving the public and outreach is an often-heard term associated with them.

The term outreach suggests a reaching out beyond the confines of the university, and a significant contribution of the Geography Roles and Rewards Committee was to include outreach *explicitly* as an appropriate role in geography departments and to recognize it *generally*, not as a function only of LGCUs. The sample list of outreach activities did not include students' cartographic service projects, but this sort of activity certainly falls within the spirit of the document, especially when it mentions that the various roles (such as teaching and outreach) "overlap and intermingle;" they "comprise a fuzzy set" [1, p. 6].

Within my own institution there has been a renewed commitment to the "land grant philosophy," and a Task Force recently produced an lengthy report specifically on the outreach component [2]. Again, cartography was not specifically featured, but the report very clearly spelled out a philosophy of serving the needs of the citizenry, primarily of the state in the case of MSU, although attention to national and international public needs is also an important part of the function of the institution. The report also gave attention to the notion of combining teaching, research, and outreach rather than seeing them as separate and independent. The term "multidimensional excellence" is often used at MSU to refer to the meshing of these various roles.

There are many faculty at MSU, including several in my own department (which includes landscape architecture and urban and regional planning as well as geography) who are exemplars of people

giant polar bear (stuffed) and the butterfly exhibit (very much alive in one of the greenhouses).

"Capital Area Humane Society" (Jamie Bradfield). Humane Societies are devoted to kind treatment of animals and elimination of their suffering. A major attraction for the general public is their function as a source of free pets for responsible owners. A relatively recent move and a countryside location, plus the public nature of the organization, made the map an ideal public service project.

4.2 *The Campus Tactile Map Project*¹

A very different service activity was carried out this past year by the graduate class in Map Automation, the Cartography Center, the Map Production and Design class, and other individuals on campus. The project was joint between the Geography Department, the Office of Programs for Handicapper Students (OPHS), and the Department of Counseling Educational Psychology and Special Education (CEPSE).

Our campus, which is several square miles in size and has 40,000 students in total, has about 30 blind students and receives a number of blind visitors each year. There has been considerable effort in the last few years to make the campus more accessible to a wide variety of people regardless of handicap status. This trend is common in colleges and universities and all sorts of other institutions as a result of changing societal attitudes and in response to the Americans with Disabilities Act of 1991. Elevators must be included in any new or remodelled buildings, and ramps, curb cuts, and braille are becoming increasingly common. For the blind user, our campus had a raised image map but it was outdated by many years and was so bulky that without a suitably large table available in the area where it was stored, it was very impractical to use. A dynamic young blind staff person at OPHS approached the Cartography Center and myself as well as CEPSE to see what could be done about producing a new one and making use of some of the new technology available. It was an obviously logical project for this mix of people and could make good use of the input of all three units. The Vice Provost for Computing and Technology and the Associate Provost for Student Academic Support Services at MSU provided us with funds for a part-time assistant in the Cartography Center, for a Tactile Image Enhancer and supply of microcapsule paper, and for three Nomads (computer peripherals with voice capability on which a tactile map is placed; pressing on a raised symbol allows one to hear what the symbol represents).

The graduate students in the Map Automation class (Lauren Anderson, Nathaniel Evans, Catherine Mey, Janet Murray, Christopher Steere, and Michael Youngs) went into the literature to find out as much as they could about the experience of others in designing such maps. They used extensively the materials that have come from the ICA's Commission on Tactile and Low Vision Mapping, and after gleaning needed information and trying a small project to gain some initial experience, they collaboratively developed the first draft of the overall tactile view of campus. They also brainstormed about what should be on a structured series of larger scale sections of campus and came up with lists of questions for OPHS and CEPSE personnel so that we could make good use of our brief meeting times together. We had high hopes of being able to gain experience with

¹ Copies of the overview of campus and other maps from the project are available free of charge to visually impaired MSU students, staff, and visitors. Copies may be obtained by others, subject to availability, at a cost of \$10 each to cover reproduction and mailing costs. Contact the author.

programming of the Nomad, but with a serious delay in availability, that step was left for the Cartography Center assistant and CEPSE personnel. The draft copy of the overall view of campus that the class constructed underwent only minor revisions after it was turned in at the end of the semester. Likewise, the plan for the section maps stood as the blueprint for that part of the project, which was completed several months later.

To extend the reach of the tactile project, an exercise was then built into Map Production and Design, a class that includes upper undergraduates as well as a few graduate students and which had an enrollment of 23 this year. Among the desirable outcomes of the project was to make a broad range of students aware not only of the needs of blind map users but of the technology that allows such maps to be produced. We also wanted to build enough student experience and expertise that there would be further use of the equipment and continued service to blind students on campus and perhaps extending further as well. Including an assignment in Map Production and Design was ideal in at least two ways: designing tactile maps gives good mental exercise in considering user needs, and these maps show how versatile modern technology can be in accommodating special needs. It was useful in another way as well; there were several education students in the class and some may well find use for what they learned if they should have a visually impaired youngster in class.

It was important to package the experience for this class in a much different form than for the graduate students. The instructions had to be as explicit as possible, the maps had to be done individually rather than collectively, and the exercise had to fit into just a few laboratory periods. The Cartography Center assistant compiled a set of symbols that had proved workable with the particular medium we were using, and I constructed a template for use with Aldus (now Macromedia) Freehand®. The template was set up such that an illustration could be drawn that would fit on one legal size sheet of paper (8.5x14") and could be scaled at 145% in the copier machine to fit exactly the size of sheet appropriate for use on a Nomad (A3 size, 297x420 mm). The template had sample symbols that could be cloned and brought into the map area as needed, and the Styles palette had several predefined tactually distinguishable lines and area symbols ready for use. A standard "this side up" symbol was pre-drawn in the appropriate location within the map area, and there was some fine print outside the map area (but that would appear on the 8.5x14" sheet) that would remind students how much to enlarge and how to position the image on the copy machine.

Every student was assigned a different campus building or local feature (park, shopping mall), and base map materials were provided. The student had to select the appropriate features to include, assign reasonable symbols, and execute and print the map. They were then coached through the brief process of copying the map onto the microcapsule paper and feeding it through the Tactile Image Enhancer. The result was a set of 23 tactile maps and the computer files from which students had printed.

Since there was no way of specifying in advance every symbol and every design feature, we looked at these maps as a means of exploring various ways of handling a range of tactile design problems that did not arise with the overall view and section maps of campus. During summer 1995, the students' maps will be examined by one or more blind users and suggestions for revisions will be compiled. The maps will then be returned to the students for their use and demonstration to family

and friends. A revised copy of the file will be retained at MSU and new tactile copies of the maps will be printed up on an as-needed basis.

4.3 The Michigan CD-ROM Project

The Campus Tactile Mapping Project was not the only service project pursued by the graduate class in Map Automation. They also planned out a demonstration project to illustrate what could be done to portray Michigan in CD-ROM format for educating school children about the geography of Michigan. The idea of such a CD-ROM developed over the past several years as inquiries came to the department about whether and when we would produce a new *Atlas of Michigan*, the first edition of which was produced almost 20 year ago [3]. Some of us spent a significant amount of time exploring the possibility of producing a book and CD-ROM combination, but it was soon apparent that not one potential funder would consider the book part, but the CD-ROM *might* be viable. In considering the sorts of things that could be done with a CD-ROM, the project evolved into a potential educational tool as opposed to general reference device, though no final definition has yet been decided and funding is still only a future possibility.

The graduate students chose the Sleeping Bear Dune region, a ecologically fragile, important, and interesting area, as the subject of the demonstration disk, and the Vice Provost for Computing and Technology provided funding. Another collaborative project, it proceeded with only minor input from me. Several of the students took an extra credit the following semester to carry out the planned project. In addition to maps, the project includes a fly-by sequence constructed from DEM data, slide imagery, satellite imagery, text that tells the Sleeping Bear legend, diagrams explaining vegetation and morphology relationships, an animated illustration of the advance and retreat of glaciers in the region, and a short movie featuring a colleague who has done extensive research in the Sleeping Bear Dune area. The material is presented as though it is part of a larger project. Names would be added to the index map as coverage increases, and the various buttons would lead to more and more information about Michigan.

The students deserve considerable credit for their work on this project for several reasons. Not only did they produce a very creditable demonstration project, but it will be a key to obtaining any funding for the larger future project, funding that will not likely benefit them but rather future graduate students who would be hired to carry out the project. Also, it is the school children of Michigan who will be the prime benefactors of the potential future project, and, with one exception, none of the students had children in Michigan schools.

5 Advantages and problems with service projects

Among the advantages of including service projects in classroom work, one stands out above all others. It is the *motivation enhancement* that is involved. There is no doubt that assignments take on a new dimension when someone is going to use the product at the end. The temptation to just let a design problem slide through is simply not there when someone is going to be potentially confused or ill-served.

A closely related advantage is that it helps to make sense of the "input process" involved in mapping. When students come into Map Production and Design, they generally have worked individually on almost every assignment in their student lifetimes, with feedback coming at the

completion of projects and with no responsibility to fix the problems. Few if any real maps would be done in such splendid isolation and no cartographic employee would last long turning in a product and abandoning it, with no responsibility for any improvement until the next project. Students in the class are encouraged not only to talk to some "client" about their map but to seek input from anyone and everyone who might be helpful. Furthermore, the teaching assistant and I are available during lab and office hours and we often do not wait for requests for assistance but sit down beside students we recognize as needing some assistance and ask if they would like some hints for solving some particular design problem. I often tell students that there is no guarantee I will like the results of my suggestions but assure that my advice is "guaranteed; if it doesn't work, I'll offer some more." I think students sometimes feel at first that I am "telling them what to do" and feel that it is almost cheating to get the help. But we talk through some steps to accomplish a particular design goal on *their* map and it often (I would even say most of the time) opens doors within their own creative mind such that they then use what they have learned to do wonderful things that would never occur to the teaching assistant or me. The unifying element in all this is that we are all working toward the common goal of serving someone's need. The assignment will eventually be evaluated, to be sure, but it is not the individual's ability to solve, on his or her own, every design problem that determines the grade but rather the individual's ability to "manage the project," to keep the design focused and to seek and carry out all the advice that is useful and to reject or modify suggestions that do not work. It is a much more realistic experience than one in which individual students must struggle completely on their own with exactly the same input (the assignment sheet).

Another advantage is that sometimes service work leads to funding that is directly useful to the students involved. The acquisition of some equipment, software, and supplies for the tactile and CD-ROM projects is an example. At MSU, it is a positive quality to combine teaching, research, and outreach and we were able to capitalize on that quality to obtain the special funds: Some of the printing costs for the color maps was borne by clients as well, and, given the current budgetary climate, it is unlikely we could have printed them without that support.

Yet another advantage of service projects is that each one teaches us something that we did not plan to learn, or so it seems anyway. We keep from becoming rigid or unpracticed in our mapping skills because every project brings something unexpected.

Finally, there are the connections that are built by the process. Both the students and I have to talk to people outside the class about the projects, and the process puts us in touch with very knowledgeable and enjoyable people and builds a sense of competence. Occasionally, students find that the contact leads to a job opportunity or other advantage as well.

Among the greatest problems that are created is the extra work involved. Theoretically, one should be able to include such service without creating extra work, but I am not convinced that it is possible. In an old-fashioned assignment in which every student works with the same data and same mapping problem, one can predict quite accurately the problems that will arise and offering the assignment in a following year means that any built-in problems can be corrected. Not so when serving specific outside needs. One project needs a lot of text, another needs to avoid it; every set of color selections is different; information is easy to obtain for some, a real challenge for others; and on the list goes. The students put far more work into service projects than they would if all were working on a standard exercise, and there is much more time demanded on the part of the

teaching assistant and instructor, who must react as helpfully as they can to a wide variety of problems. In the case of the tactile project in the Map Production and Design class, to keep the scope sufficiently limited that each student would get a worthwhile experience within the time available, I spent numerous hours preparing the template, trying the entire process with it, compiling the list of projects, and finding base materials for each student. The process was well-worth it, but I could not spend that much time for every class exercise.

A second problem is that one must be considerably more careful about copyright than when making ordinary assignments. In one sense this is an advantage, since we must follow the rules most cartographers must follow and thereby teach more about the real world of cartography. For ordinary assignments (those that will be used only by the student to demonstrate fulfillment of defined requirements), there is little difficulty staying within bounds. With our service projects, however, one recently-produced map had to be redone with different base material when our pursuit of appropriate permission to use a particular source ("just to be safe") resulted in a flat denial, and another map had to be held back from printing when the student was denied permission to use a reproduce a crucial symbol (logo) or reveal locations associated with the depicted subject matter.

Despite the problems, which are not trivial, the advantages of including a service element in a selection of classroom assignments by far makes up for them. It is no accident that the service element has increased in classrooms throughout the university and in higher education in general. Students will be putting in a lot of work in their studies anyway, and some of it might as well be of direct use to someone.

6 Some issues to consider

Some of the issues that inevitably arise in using service projects in classrooms include the following:

The criteria for selecting projects. I leave individual student projects such as the color map fairly open, and students are encouraged to do public or non-public service but are not *required* to do either. We are conscious of the need to avoid the usurping of projects that would otherwise be done by commercial firms. For other service projects, I strongly lean toward the public service variety. We are a state-subsidized institution and there is no problem of propriety if we take on public service projects. Another consideration is cost and the likelihood of being able to obtain funding. In all cases a project must fit the educational goals of the course in which it is included.

Where to look for projects. Students are often the best sources of ideas, but I also watch for possibilities and keep a running list in the planning folder for each course. Keeping alert to ideas is very helpful because they come at all times during the year, not just when students are looking for ideas.

Changes needed in courses to accommodate the projects. Getting the projects started early in the term to accommodate unexpected needs is very important. Most adjustments of course content needed to accommodate such projects have been positive ones.

Monitoring student attitudes. If students are uninterested or resentful of service projects, they will learn little from them. I have observed attitudes in monitoring lab sessions, read all written comments on standard course evaluation forms, and asked supplementary evaluation questions. The worst attitudes toward projects tend to be from those who do *not* make an effort to work with a real "client" and try to fulfill real needs. Collaborative projects have a special problem of monitoring evenness of work load. I will likely build in a periodic individual accomplishment sheet and use a cross-evaluation among the students at the end of the project (which they will know about from the beginning and will help design).

7 Sharing ideas about classroom service projects

I know there are numerous service-oriented projects being carried out in cartographic classrooms, and undoubtedly many papers have described such projects without actually referring to them as service projects. I, for one, would encourage even more colleagues to share their experiences. Both oral and poster presentations are appropriate mechanisms for letting colleagues know about such projects and their outcomes.

Another possibility is the sharing of information in a special session, workshop, or mini-symposium. Participants could describe work, share written assignment materials, and leave not only with expanded ideas but with a head start in developing the written materials inevitably needed for students to carry out new assignments.

Non-teaching cartographers are welcome participants in the dialogue. They often have considerable knowledge that is useful to those who teach, and they undoubtedly have ideas for projects that would be useful to include in the classroom experience.

It would be particularly appropriate and useful to enhance the sharing of information about service projects at this point in the development of higher education because of the favorable atmosphere for such activities. The ways in which we have done things in the past is quickly changing, and I believe that projects of this sort will help to contribute to the continuing health of cartography and related areas.

References

- [1] AAG Special Committee on Faculty Roles and Rewards (John S. Adams and John Mercer, Co-Chairs), 1994. *Reconsidering Faculty Roles and Rewards in Geography*. Published by the Association of American Geographers, Washington, DC, 11 pp.
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