

Whither Cartography?

The great “Is cartography dead?” debate that raged a few years ago has been relatively quiet lately, but discussions of certification and accreditation are raising the issue again. Conversations with colleagues, round table seminars at conferences, and perusing journals, have raised in my mind some disturbing issues about cartography’s future.

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Relative Decline in Cartography Classes

In the past 10 years, the number of GIS courses has increased dramatically, and remote sensing has shown a slight increase, but the number of cartography courses has remained relatively stable. The AAG *Guide to Departments* lists program specialties by department. The table below shows the numbers of departments claiming a specialty out of the total number reporting for the past 10 years (AAG *Guide to Programs*).

| | 1991–92 | | 1995–96 | | 2000–01 | |
|----------------|----------|---------|----------|---------|----------|---------|
| | Programs | Percent | Programs | Percent | Programs | Percent |
| Cartography | 160/243 | 66 | 174/250 | 70 | 156/250 | 63 |
| Remote Sensing | 117/243 | 48 | 139/250 | 56 | 143/250 | 57 |
| GIS | 165/243 | 68 | 203/250 | 81 | 223/250 | 89 |

Table 1. Number of departments claiming a specialty out of the total number of departments reporting.

Few would deny that GIS is a powerful and useful tool, and it would be foolish of any geography department not to offer training in it. However, if 89% of programs claim GIS as a program specialty and only 63% of departments offer cartography (as seen for 2000-2001), there is a strong likelihood that many students are receiving little background in the theory of cartography. Thus, while they may do a fine GIS analysis, they may have difficulty presenting their findings effectively through maps.

Curriculum

There are still those who equate cartography with drafting, especially manual drafting, and GIS with computer cartography. They believe that GIS works with data to create maps automatically by computer, while cartography is simply drawing clean lines, and neat lettering and perhaps involves page layout, name placement, and color selection. This shows a woeful ignorance of the nature of both fields. For many of our colleagues, cartography was one course taken two or even three decades ago, before the PC became a ubiquitous fixture in cartography labs. In those courses there was, of necessity, considerable emphasis placed on drafting just as now there is emphasis on the use of particular software packages. To these people, cartography is “old fashioned” and perhaps irrelevant; they feel

that GIS has replaced cartography. Unfortunately, some of these colleagues are administrators and senior faculty and have a major role in designing department curricula, deciding what courses are offered, and what specialties should be hired. Throughout the past 20 years cartographers have periodically published ideal cartography or mapping science curricula, (Dahlberg and Jensen, Dymon, Taylor), but such curricula are irrelevant if geography departments eliminate cartography classes in the mistaken belief that they are "old fashioned." or obsolete. As cartographers retire, will cartography courses be forced to retire because they are seen as the province of the "old guys"?

Community College Programs

Many community colleges are jumping on the GIS bandwagon. GIS is such a hot subject that two year colleges see GIS courses as enrollment magnets. Some two-year colleges are introducing GIS certificate programs that generally require no cartography training. The best of these programs have ties to four-year institutions, specialist instructors, and the advice of GIS specialists, remote sensors, and cartographers. In the worst case scenario, however, the instructor's entire GIS training may have been one intensive workshop sponsored by one of the software manufacturers. A major concern is that students from these training programs will be "black box" operators who only know how to use one software package but do not really know principles of cartography or GIS. This belief is reinforced by use of software manuals rather than a textbook in classes. Are these students destined to be mere button-pushers; the buggy whip makers and key punch operators of the next decade? With limited background, will they be able to make transitions as the fields grow and change? Will they be able to advance in their careers or will they remain low level technicians?

Textbooks

I was told by one editor recently that "cartography can be covered in one chapter of a GIS book", and by another that there would be "a chapter on cartographic design" in his publisher's text, but has this happened? I examined four current introductory GIS textbooks and found little that would be considered cartographic design in them. If one were to base perceptions of the nature of cartography on some current GIS texts, cartography would appear to be map layout and name placement. There are exceptions, such as Keith Clarke's *Getting Started with Geographic Information Systems*, but the average GIS textbook includes little of the cartographic basics of symbol choice, design, or even scale or projections, on the assumption that those topics are covered in cartography textbooks. As they should, GIS texts focus on analysis of data, data structures, database management, and the like, but there is little on presentation; readers are directed to cartography books or the author suggests that a course in cartography might be useful. That is a reasonable suggestion. There is no need to include the contents of an introductory cartography text in an introductory GIS book; the resulting 600 to 800 page book would be truly daunting. But if no cartography course is offered, no guidelines are given in GIS textbooks, and students do not read a cartography book, then what? Where do they learn the basics?

In addition, the quality of GIS textbooks, as with all texts, is spotty. Some have serious inaccuracies. A significant example is a diagram in one textbook that attempts to simplify projection concepts (Heywood, et

al). Unfortunately, in their attempts to simplify, the authors have created a totally inaccurate diagram in which all cylindrical projections are equal area, all azimuthal projections preserve distance, and all conic projections show correct scale. This is worse than having nothing at all on projections.

Software Programs

GIS software programs have tended to focus on only one or two symbols, and all maps made with the program utilizes those symbols. If the software can't produce a symbol easily, if it can only be created with additional programming, then for the user, especially the inexperienced user, it doesn't exist. Thus, the true dot map is rapidly vanishing and the choropleth is used for virtually all quantitative maps, even when it is inappropriate, because it is the easiest to employ. Much the same is true for color. Despite the amount of recent cartographic research on color maps, too many maps are made using software default colors, which results in maps with no color logic, vegetation and land-use maps with 30 supposedly different but impossible to distinguish colors, and choropleth maps with nine shades of one hue. The concepts here are not sophisticated, but for someone with no knowledge of cartographic principles, default options may seem fine.

The result is an increasing number of maps that violate basic principles of cartography and are inaccurate or misleading. In the 1970s a spate of articles was published and papers presented on the problems and dangers of creating maps by computer with no knowledge of cartography. The problem remains. Some of the maps are quite "pretty," even spectacular, and have been featured in advertising documents for software manufacturers, but a basic fact remains: maps are used in decision making, and if poor maps are used, poor decisions result. It isn't fashionable today to talk about map communication, but if maps convey erroneous or misleading information then they are worse than useless, they are dangerous. Mark Monmonier among others has spent 3 decades trying to convey this fact.

I recognize that I am preaching to the choir, but I believe these concerns need more investigation. Essentially, I am pleading for education in the cartographic basics for geographers and GIS professionals. Essays such as this one will not convince administrators, editors, or those with narrow focus GIS training. Further research on these subjects, through theses and dissertations and articles in the more general professional journals needs to be done to educate the educators.

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