New technology helping foster the 'democratization of cartography'

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Mark Harrower recalls a raging debate in his field in the 1970s, when some geographers worried that commercial map-making software would trigger the demise of cartography.

The argument went like this: "We are screwed, because now anyone without any technical knowledge or artistic skill can make a map."

But rather than sully the field, Harrower says the new technology - combined with the explosion of availability of geospatial information - is fueling one of the most exciting eras in his profession, where map-making has become a populist pursuit.

"One of the themes of my profession right now is the democratization of cartography," Harrower says, adding that the impact is comparable to how bloggers have influenced publishing. "Mapping used to be a job of the elite, the Rand McNallys and National Geographics of the world. Now people are taking it upon themselves to map their passions."

Harrower, an assistant professor of geography at the University of Wisconsin-Madison, is devoted to giving people powerful new tools to improve map-making. Building on his research theme of visualization and animation in cartography, Harrower has created a fleet of public domain software programs that help mapmakers with fundamental tasks such as selecting colors, filtering data, representing change and generalizing lines.

The work all started when he was a graduate student at Penn State University, when he and colleague Cindy Brewer recognized that people needed more help in making good maps. They created a tool called "Color Brewer," which helps simplify the daunting challenge of creating color schemes in maps. Color Brewer - www.colorbrewer.org - helps users find color patterns that make sense visually and also support the nature of the data.

That program has gained enormous popularity since its debut in 2002, averaging about 5,000 visitors per week. Harrower says the software has been used by, among others, architects, publishers, regional planners, federal agencies and a car manufacturer.

Color Brewer was just the beginning for Harrower, who has other research creations available on his Web site, www.geography.wisc.edu/~harrower/ . One is called an "Earth Systems Visualizer," which helps cartographers make use of underutilized features such as temporal focusing and temporal brushing. Essentially, it allows the user to home in on certain subsets of data, while minimizing other data sets, in order to see subtle patterns develop.

"Data filtering is one of the big research areas in cartography right now," Harrower says. "There's way too much data, we're drowning in it. This tool helps strip away excess noise."

Another tool, called "Visual Benchmarks," tackles the challenge of how to represent dynamic change, or, "how does the current state of the phenomenon compare to what is about to happen or what just happened?" That can help mappers better illustrate things like traffic accidents, population growth or crime rates over time.

Harrower sees great potential in his recent development, called "Map Shaper," which deals with the cumbersome and time-consuming need to

generalize and smooth lines on a map. "Generalization is a core part of cartography, but we don't have good tools to do it. This does one thing, it does it very well, and it does it fast."

The unifying theme in Harrower's work is in breaking down some of the essential tasks in making maps, one by one, rather than bundling them into massive software packages. Harrower likens some of the big cartography programs out there to handing a civilian the keys to an F16 fighter jet. They give users thousands of options and little advice on using them.

Harrower very strongly believes in making his inventions free and publicly available, rather than locking them up in an academic journal or a commercial license.

"My focus in the last four years has been on getting my work out to the broadest possible audience," he says. "I'm building tools that can be accessed online - any time, anywhere - that will help people do one small piece of the puzzle."

At stake is not just better-looking maps, but maps that have scientific validity and are true to the information they represent, he says. That is perhaps the flip side of the democratization of cartography, that people need to understand that maps can distort, misrepresent and outright lie.

"Maps have long been criticized as being too powerful," Harrower says. "They look much better than the real world. I will often joke that when someone gets lost, they will blame the world for being wrong, because 'it's right here on the map.'"

Harrower says his cartography tools can help users better discern the accurate from the skewed in their finished products.

"The problem with maps is, even if you get it wrong, your map can still look like a million bucks," he says. "The data underneath can be very inappropriate, but it's hidden underneath a slick-looking map."

Source: University of Wisconsin-Madison