

# What is SMARTcart?

The computer revolution has impacted virtually every aspect of cartography, including cartographic design education. Whereas cartography used to be the domain of specialists who were trained in design and production, it is now possible for almost anyone to create maps, and in far less time than was required using “traditional,” non-computerized techniques. This development has democratized cartography, allowing more people than ever before to produce maps. It has also resulted in the creation of many poorly-designed maps, created by individuals with insufficient training and experience in cartographic design. Cartographic design education has undergone dramatic changes in the computer era - it has become more software driven, and less theory driven. Software applications that are commonly used to create maps are normally complex and difficult to learn and use, causing students to focus their attention on how to use software, at the expense of learning how to design and create high-quality maps. To make things worse, software applications that are commonly used to create maps are developed without sufficient input from cartographic design experts, and influence the user to create maps based on default options that are built into the applications.

In response to the situation just described, I have created SMARTcart - a simple, easy to use software application that contains “knowledge” of a limited set of cartographic design issues. SMARTcart can help students learn how to apply concepts of cartographic design by allowing them to create simple thematic maps with virtually no software learning curve. The user is forced to make active decisions regarding map design, as SMARTcart has virtually no default options; the user is required to think for him or her self, instead of allowing the software to make important design decisions. Learning is also facilitated by the fact that SMARTcart evaluates the appropriateness of the user’s design decisions, and displays the results in the form of scores. Scores are calculated and displayed in real time, and can reveal general, intermediate, and high levels of detail. The instructor has the ability to determine which level of score is visible, and to alter the manner in which scores are calculated by applying weights to individual rules.

SMARTcart is an expert system at heart. Like most expert systems, SMARTcart consists of a user interface, a database, a knowledge base, and an inference engine. Its knowledge base consists of sixty-five rules of cartographic design. SMARTcart actually has seven separate inference engines that allow it to compare user’s design decisions with established rules and guidelines. In contrast with most cartographic expert systems (forward chaining) that are used to create maps with little input from a user, SMART is a backward-chaining system that requires the user to make all design decisions, and then evaluates the user’s decisions.

SMARTcart is a “proof-of-concept” application. It is fully functional, but lacks the depth of features and content that would be included in software developed for commercial release. For example, SMARTcart is limited to two geographic regions, each with two available themes, and focuses on a limited set of cartographic design issues. Emphasis is on the design and creation of simple thematic maps – choropleth maps in particular. Future versions of SMARTcart will include a greater variety of regions and themes, and will allow the user to work with an expanded set of design issues.

SMARTcart was created in support of my dissertation entitled “Development of an Expert System for Cartographic Design Education,” completed in May 2003, Department of Geography, University of Kansas, Terry A. Slocum, chief advisor. Contents of this web site are Copyright 2003, Hugh H. Howard.

Please direct inquiries to:  
Hugh H. Howard  
[howardh@arc.losrios.edu](mailto:howardh@arc.losrios.edu)