GIS stands for Geographic Information Systems. It is software for working with digital maps. Since the 1990s, more and more people in business, government, and science have started using GIS to analyze and solve spatial problems. However, the use of GIS in secondary geography education is still very limited. One of the main reasons for its limited use is that little is known about the characteristics of optimal approaches to teaching with GIS. This dissertation focuses on this issue by discussing the outcomes of an Educational Design Research project. In this research project, a GIS-supported geography instruction method was developed via several cycles of designing, testing, and evaluating. The main conclusion of the research project is that GIS holds many opportunities for modern education in which students learn geography by engaging in geographic inquiry. However, there are many requirements for successful implementation of GIS. Students have to learn how to use the software, and have to learn how to analyze spatial problems in a systematic way. In order to design good tasks and coach students in an optimal way, teachers need to be able to reorganize and transform their own geographic subject knowledge and geographic methodological knowledge so that it becomes accessible for students.

This dissertation presents a theoretical framework for geography education with GIS, and practical guidelines for designing and coaching GIS-supported instruction methods.