
Competency Models In Action:

Applying the Geospatial Technology Competency Model to Workforce Development

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Introduction

Geospatial technology is a fast-growing field with diverse applications in the business world. Because of this rapid growth, employers have been unable to identify, recruit, and retain enough qualified workers. Read on to see how industry leaders have used the Geospatial Technology Competency Model (GTCM) to address these issues by promoting geospatial careers, designing and revising curricula, updating certification requirements, and developing models of skill requirements for specific industry roles.

Workforce Challenges in the Geospatial Technology Industry

The shortfall of geospatial technology professionals and trained specialists reflects a number of factors. First, geospatial technology is used in a variety of fields, including surveying and mapping, forestry, and coastal and marine resource management.* Despite its widespread use, there is a lack of public awareness regarding geospatial technology and its related career opportunities. As a result, education and training programs are unable to provide enough graduates to meet market demand. This problem is compounded by the fact that although there are several professional associations, no single organization tracks all relevant geospatial jobs. The geospatial technology industry thus lacks a single source for comprehensive salary and job outlook information.

Furthermore, the skill sets and competencies needed to prepare for career opportunities in geospatial technology were not well defined. Occupations such as surveyors, engineers, drafters and computer technologists all use geospatial technology, but each has its own career and education pathways and credentials. As a result, the industry remained difficult to define and lacked uniform curricula, standards, and credentials.

The GTCM is a resource that provides a common language to inform discussions among employers, educators, economic developers, and public workforce investment professionals as they work to address these issues.

Developing and Launching the Geospatial Technology Competency Model

The GTCM was developed through the Employment and Training Administration (ETA)'s effort to articulate the competencies required for success in economically vital industries. [The GeoTech Center](#), a collaborative effort between colleges, universities, and industry working to

* See the competency model report for a list of industries utilizing geospatial technology: <http://www.careeronestop.org/competencymodel/pyramid.aspx?GEO=Y>, p. 22-23.

expand the geospatial workforce, led the effort to develop a model that depicts both the foundational geospatial competencies, as well as the specific knowledge and skills needed for three geospatial sectors: Positioning and Data Acquisition; Analysis and Modeling; and Software and Application Development.

ETA published the model on the Competency Model Clearinghouse Web site, and issued a news release announcing the model's launch. As industry champion for the model, the GeoTech Center led efforts to publicize and disseminate the GTCM to industry and education partners throughout the country. David DiBiase, mediator of the GeoTech Center's validation workshop, led the development and publication of an article about the model in the [*Journal of the Urban and Regional Information Systems Association*](#) (URISA). Karen Schuckman and Jan Van Sickle, both participants in the model validation process, published an article in [*Professional Surveyor*](#) magazine. Articles about the GTCM have appeared in many trade blogs and discussion boards, and the model has been presented at conferences held by several industry organizations, including URISA, ESRI (a software developer), and the University Consortium for Geographic Information Science (UCGIS).

Using the Model

A variety of organizations have begun using the model to support workforce development efforts such as assessing curriculum, updating accreditation guidelines and certification requirements, skills testing, and building management competencies.

Curriculum Assessment Worksheet

Chris Semerjian, co-principal investigator at the GeoTech Center and Associate Professor of Geography and Geographic Information Systems (GIS) at Gainesville State College, used the GTCM to develop a curriculum gap-analysis worksheet. The worksheet compares a curriculum's educational experiences with the competencies identified in the model, and allows educators to rate how effectively a course addresses a particular competency. While Mr. Semerjian is using the worksheet to evaluate Gainesville State College's GIS certificate program, the worksheet is also being used to bridge the gap between Georgia's technical colleges and the University of Georgia system. GeoTech Center representatives are in discussion with high school, community college, and university education systems in Georgia to coordinate articulation and program development with the GTCM and to develop career pathways. Recognizing the worksheet's value, Mr. Semerjian has shared it with educators across the nation.

In Texas, Austin Community College GIS Department Chair Sean Moran is using the assessment worksheet to compare courses encompassing two certifications and one degree. The goal is to analyze the overall competencies and experience students receive from the program and help standardize the program with repeatable outcomes for performance. Austin Community College is also using the GTCM to inform discussions with faculty and students.

At Front Range Community College in Boulder County, Colorado GIS instructor Dave Skiles used the worksheet to evaluate the ten courses in FRCC's GIS program. Each course was rated on its usefulness in fulfilling the competencies in the GTCM. The output of the analysis

provided information on how the course modules fit together, how courses need to be broadened or deepened in certain areas, and how the courses contribute to the net program competency goals. The analysis is designed to identify what course improvements may be necessary for students to receive a complete geospatial learning experience. The worksheet is also helping instructors understand the relationship between competencies taught in various courses. Furthermore, FRCC has distributed the curriculum worksheet to other colleges in the Colorado Community College System in order to identify areas of overlap and collaboration between programs.

By helping educators analyze how their curricula align with workforce needs in the geospatial industry, the worksheet supports education program assessment, development, and articulation.

United States Geospatial Intelligence Foundation (USGIF) Accreditation Guidelines

USGIF has incorporated the GTCM framework into its latest accreditation guidelines for post-secondary certificate programs in the field. When applying for accreditation, education programs must demonstrate how their courses align with the GTCM to ensure they are teaching the competencies required by industry.

GIS Certification Institute (GISCI) Update

GISCI awards the Geographic Information Systems Professional (GISP) designation to promote competent and ethical practice in the field. Stimulated by the publication of the GTCM and other industry accomplishments, GISCI is planning an update to its certification requirements and procedures. The GISCI Board is also considering the addition of a competency-based examination aligned with the GTCM.

National Geospatial Technology Skills Competition

The GeoTech Center is hosting a skills competition for students studying geospatial technology at two-year community and technical colleges. The competition allows students to demonstrate their expertise in the skills identified in the GTCM. In round one, students will take an online exam with questions based on the GTCM to ensure that the most relevant skills and knowledge are being assessed.

Geospatial Management Competency Model

The Urban and Regional Information Systems Association (URISA) is planning to develop a Geospatial Management Competency Model (GMCM). The GMCM will correspond with Tier 9 of the original GTCM framework, and specifies the core competencies required for geospatial professionals whose work involves supervisory and managerial responsibilities.

Conclusion

Like other emerging industries, geospatial technology faces a variety of workforce challenges. Aligning training programs with the skills required by industry is essential to developing the

necessary pipeline of skilled workers. By providing a framework for industry skill needs, the GTCM is serving as a valuable workforce development resource. With its flexible applications, the GTCM is helping this industry define itself, expand its workforce, and strengthen its education and training infrastructure.

Related Links

Geospatial Technology Competency Model

<http://www.careeronestop.org/competencymodel/pyramid.aspx?GEO=Y>

GeoTech Center

<http://www.geotechcenter.org/>

GeoTech Center – GTCM Page

<http://www.geotechcenter.org/Projects/Research-Projects/Geospatial-Technology-Competency-Model-GTCM2>

United States Geospatial Intelligence Foundation

<http://usgif.org/>

United States Geospatial Intelligence Foundation – Accreditation

<http://usgif.org/education/accreditation>

GIS Certification Institute

<http://www.gisci.org/index.aspx>

National Geospatial Technology Skills Competition

<http://www.geotechcenter.org/Maps-Competitions/Competitions>

Competency Model Clearinghouse

<http://www.careeronestop.org/competencymodel/default.aspx>