

GIS CERTIFICATION LEAPS FORWARD

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The GIS Certification Institute (GISCI) completed a big step in the improvement of its GIS Professional (GISP) certification process in late 2015, by instituting the Geospatial Core Technical Knowledge Exam. The exam is now a required part of the GISP certification process, and naturally, many questions have arisen regarding its development. This article attempts to answer those questions by briefly discussing the exam development process and future plans.

Exam Purpose

In 2013, after much study and GIS community discussion, the GISCI board decided to add an exam component to the GISP certification process. The goal was to strengthen the certification by providing a more reliable means of assessing geospatial core knowledge. In addition, exams are required for most professional certification programs, and an exam was deemed necessary for GISCI to achieve accreditation for the GISP certification.

The goal was to create an exam that effectively assessed GIS-related knowledge that was applicable across all GIS job categories and sectors, aligned with the GISP certification requirements, and was fair and accessible. In the beginning, there were doubts within the GIS community that this could be done. However, GISCI fully researched professional certification and exam development standards and developed a plan that would follow these standards to create an effective exam.

The Exam Development Process

The exam was created using an exam development process that is standard in the field of professional certification, assessment, and exam development. The foundation of the exam development process is a job analysis. A job analysis is essential for determining the appropriate content for the exam, and it demonstrates and documents that the exam is directly related to GIS jobs. The job analysis was based on a standard methodology and incorporated the input of more than 400 certified GIS professionals, representing a broad spectrum of GIS positions, sectors, and levels of experience.

The exam is based on the Department of Labor's Geospatial Technical Competency Model (GTCM), Tier 4, Geospatial Core Technical Competencies. That is, this information served as a guideline for the breadth of GIS tasks, jobs, and competencies to be included in the job analysis. The exam itself is aimed at the core geospatial technical knowledge common to all GIS jobs, and is required to earn the GISP credential.

The first step in the job analysis was to determine the core GIS tasks and the knowledge, skills, and abilities (KSAs) related to them. Dozens of GIS professionals who directly perform GIS work participated in groups to discuss and develop these lists of tasks and KSAs, cross referencing them to those in the GTCM and the Geographic Information Science and Technology GIS&T Body of Knowledge (GIS&T BoK).

Another group linked the tasks and KSAs, confirming which KSAs were required to successfully perform GIS job tasks. A third group of more than 350 GIS professionals was surveyed to rank the KSAs in terms of relevance to their jobs. Thus, the final list of required common knowledge areas was validated in several ways.

The final product of the job analysis is the exam blueprint. It comprises 44 knowledge areas in six categories, roughly corresponding to the categories in the GTCM Tier 4 and the GIS&T BoK. The results of the job analysis and the blueprint vary somewhat from the GTCM and GIS&T Bok, but mostly in the emphasis or weight of certain knowledge areas. The exam blueprint serves as the framework for the exam questions.

The exam questions, or items, were written specifically to address the identified knowledge areas in the exam blueprint. A team of GIS professionals—again spanning all GIS job categories, sectors, and experience levels—wrote the exam items. They worked together in groups, assuring that all questions were vetted in multiple review and validation activities. The exam material was also researched in a large and varied set of authoritative reference sources. The writing activity and the questions themselves followed standard professional exam development practices. In addition, the process was overseen by a senior GIS professional to assure that the content of the exam questions remained true to the exam blueprint.

The Inaugural Exam was administered to a large group of GISP certification candidates, providing balanced representation across GIS jobs, sectors, and experience levels. The required passing score, or cut score, was determined via an industry-accepted standard setting process, involving psychometric review and validation by a group of senior GIS professionals.

The resultant exam is a sound and valid assessment instrument. In summary, the exam was developed from a detailed job analysis, involving input from GIS professionals directly involved in GIS work; it was not derived from a competency model, existing list of skills, best practice document, or academic curriculum, which is a common misperception. The job analysis and psychometric approach are crucial and validating distinctions for the exam.

Exam Administration

As discussed, the exam addresses the geospatial core technical knowledge applicable across all GIS job categories and sectors. The content follows the Exam Blueprint, with the questions on each exam distributed as follows:

Knowledge Area	Weight
Conceptual Foundations	12%
Cartography and Visualization	14%
GIS Design Aspects and Data Modeling	29%
GIS Analytical Methods	17%
Data Manipulation	15%
Geospatial Data	13%

The exam format is selected-response and comprises approximately 150 questions. (The Exam Preparation Information guide on the GISCI website provides specific information for each exam offering.) A candidate must answer 75% of the exam questions correctly in order to pass.

The exam is offered via Computer Based Testing (CBT) at testing centers across the US and internationally (beginning in 2016). Current plans are to offer the exam twice a year. In 2016 these dates will be in the early summer and late fall and will be announced 2 months before each exam period.

GISCI provides a basic Exam Preparation Information guide on its website. The guide provides a detailed description of the knowledge areas covered on the exam and the types of reference sources where these knowledge areas are discussed. The guide also describes the exam characteristics and testing procedure.

Ongoing Maintenance and Development

Although the exam purpose, content, and structure have been established, like any exam, it will evolve over time.

Continual update and maintenance of the exam is crucial. Although many principles of core geospatial knowledge remain the same, the technology changes rapidly and, therefore, the exam topics and questions content will be maintained on a regular cycle. The set of exam questions will be reviewed and updated annually, adding and replacing questions. In addition, the exam blueprint will be reviewed approximately every three years, revising the knowledge areas and categories as necessary.

The development of exam preparation materials and study guides is underway. The Exam Preparation Information guide on the GISCI website is meant only to provide the exam knowledge content areas, description of the exam structure, and exam application and process information. The need for supplemental study material has long been recognized and the material is expected to develop over time. Such study material would contain discussion of the topics in the knowledge areas, specific reference materials that address those topics, and practice questions, as well as study guidelines.

Exam administration and ongoing content maintenance efforts are significant, and GISCI continues to reinvest in the exam to ensure that the operation and content maintain their integrity.

Integration of the Exam with the Certification Process

The exam tests knowledge; the assessment of experience, education, and contributions to the profession remains part of the portfolio review process. The job analysis performed for the exam development effort also served to validate the portfolio requirements. In particular, the job tasks and required KSAs that emerged from the job analysis were compared to those in the portfolio criteria and found to be in alignment, so the portfolio requirements and criteria remain unchanged.

As of July 1, 2015, all GISP certification applicants are required to pass the exam as well as the portfolio review criteria. Applicants may start the certification process with either component, and have 6 years to complete the application process. Therefore, the exam may be taken at any time (within the exam periods each year), even before the portfolio criteria have been met. Once an individual has earned their certification, they do not take the exam for renewal of their certification.

The certification process is explained fully on the GISCI website.

Conclusion

The launch of the GISCI the Geospatial Core Technical Knowledge Exam has been successful. As intended, the exam has strengthened the GISP certification by providing a more structured and consistent method for assessing GIS-related technical knowledge. In addition, the exam development process served not only to create the exam, but to align GISCI and the GISP certification with professional certification standards. These have evolved significantly since the establishment of GISCI, resulting in standards and requirements that must be met. GISCI is now positioned along with other more mature professional certification programs and on the road to accreditation.

About the Author

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