IMPROVING LANDSCAPE ARCHITECTURAL PROBLEM SOLVING: INTEGRATING GISCIENCE AND TECHNOLOGY EDUCATIONAL OBJECTIVES IN LANDSCAPE ARCHITECTURE CURRICULA

by

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Abstract

The profession of landscape architecture is involved in understanding, designing and, or, implementing relationships between social and natural systems within a spatial-temporal context as defined in discipline literature and the 2005 Landscape Architecture Body of Knowledge (LABOK) study. The LABOK outlines core competencies of the profession and fundamental body of knowledge expected from graduates of Landscape Architecture Accreditation Board (LAAB) accredited degree programs.

Geographic Information Science (GIScience) is a emerging field aimed at spatial temporal problem solving and has been defined as, "a multi disciplinary research enterprise that addresses the nature of geographic information and the application of geospatial technologies to a basic scientific question" (DiBiase, 5, 2006; Goodchild, 1992). The Geographic Information Science & Technology Body of Knowledge (GIS&TBOK) (DiBiase, 121, 2007) outlines educational objectives for the emerging field of GIScience and serves as the resource for course and curriculum planning for academic and professional programs.

This study investigated where intersections exist between the spatial temporal problem solving discipline of landscape architecture and emerging field of GIScience based on the respective Body of Knowledge studies. The three phased study: 1) determined overlapping relationships between the LABOK and GIS&T BOK, 2) analyzed overlaps for their ability to help first professional degree landscape architecture programs achieve LAAB curriculum accreditation, and 3) employed a case study method to illustrate how overlaps between the LABOK and GIS&T BOK and relevant to LAAB curriculum accreditation requirements influence curricula development at Kansas Sate University.

The study established 887 relationships between the two respective Bodies of Knowledge, of which, 717 were found capable of helping achieve LAAB curriculum accreditation. The study presents key areas of intersection and overlap between LABOK and GIS&T, and provides a framework for integration of GIS&T educational objectives within first professional landscape architecture degree curriculums, in a manner to achieve LAAB curriculum accreditation.

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Chapter 1 – Introduction

Generally, the profession of landscape architecture is involved in understanding, designing and, or, implementing relationships between social and natural systems within a spatial-temporal context. The Landscape Architecture Body of Knowledge Study (LABOK) outlines core competencies of the profession and fundamental body of knowledge expected from graduates of accredited degree programs with a 2003 survey of professionals. The report states (p. 12), "…this information may be used to make curricula determinations, to guide the development of continuing education activities, and to continue strong requirements for licensure through the regulatory bodies." The Landscape Architecture Accreditation Board (LAAB) is the governing body responsible for accreditation requirements in a first professional degree landscape architecture program

Foundational texts (McHarg, 109, 1992; Simonds, 98, 1997) illustrate many of the core areas of knowledge identified in LABOK illuminating connections between social (cultural) and natural systems across scales and through time. Early works are expanded in current literature (Randolph, 110, 2004; Sipes, 119, 2007; 107 Steiner, 2000; Thompson, 86, 1997; Van der Ryn, 108, 2007) on ecological design and planning to include dynamic processes within and between natural and social systems, and reference GIS (Geographic Information Systems) as tools to useful in addressing dynamic spatial temporal challenges. GIS for Landscape Architects (Hanna, 84, 1999), GIS in Site Design (Hanna, 105, 1998), and Digital Land (Sipes, 119, 2007) provide examples of the efficacy of GIS in landscape architectural problem solving.

Like LABOK, the Geographic Information Science & Technology Body of Knowledge (DiBiase, 121, 2007) (GIS&T BOK) outlines educational objectives for a GIScience discipline and serves as a resource for course and curriculum planning for academic and professional programs. The GIS&T BOK contains ten Knowledge Areas, 73 units, 329 topics, and over 1,600 formal educational objectives designed as a basis for comparing educational programs, achieving professional certification, program accreditation, and articulation agreements.

The purpose of this study is to determine overlaps between the LABOK and GIS&T BOK studies, and identify how those relationships can be integrated into a first professional degree program while achieving LAAB curriculum accreditation requirements. The study is

divided into three phases. Phase one is designed to determine the relationship between the LABOK and GIS&T BOK studies. Phase one consists of three stages. Phase 1a comprised the creation and population of a matrix comparing the two BOK studies. Phase 1b involved an analysis of the initial matrix, while phase 1c synthesized the matrix. Phase two of the study analyzes the ability of overlaps determined in phase one to help first professional degree landscape architecture programs achieve LAAB curriculum accreditation. Phase two evaluated the importance of the relationships determined in phase one based on LAAB curriculum accreditation requirements for a first professional landscape architecture degree. Phase three of the study used a case study method to illustrate how overlaps between the LABOK and GIS&T BOK relevant to LAAB curriculum accreditation requirements influence curricula development at Kansas State University.

Chapter 2 - Background

Landscape Architecture

Landscape Architecture is a design profession engaged in understanding and creating dynamic relationships between natural systems, and social systems. (Laurie, 1986) “The profession of landscape architecture is highly diverse in the range of issues faced by contemporary practice” (Williams, 2004, p13). Landscape architects deal with both the changes between and the integration of humans and the natural environment (Booth, 1983). “Landscape architects deal with the increasingly complex relationships between built and natural environment” (ASLA.org, 2008.). The purpose of landscape architecture is to deal with solving spatial temporal problems (Lynch & Hack, 1998). Solving spatial temporal problems is done through the locating of “objects and activities in space and time” (Lynch & Hack, 1998, p1).

The study of landscape architecture begins in a first professional degree educational program. “The first professional degree program is the principal career stage for acquiring an operational base that can later be expanded and refined” (Williams, 2004, p13). An important aspect to the profession of landscape architecture is accreditation. The LAAB is the governing body for evaluating first degree programs. The LAAB “evaluates each program on the basis of its stated objectives and compliance to externally mandated minimum standards” (ASLA.org, 2008). The mission of the LAAB it to “evaluate, advocate for, and advance the quality of education in landscape architectural programs” (ASLA.org, 2008).

Geographic Information Science & Technology (GIS&T)

In 1969, Ian McHarg, a landscape architect, published *Design with Nature* which brought forth a decision making process that involved overlays and overlay analysis (LaGro, 2001). McHarg’s method created individual layers for multiple natural, social, and dynamic elements to use as an evaluation tool for the environment (McHarg, 1969) and overlaid these thematic layers to determine suitability for activities at specific locations.

With innovations in technology, companies began to produce GIS based software systems that expanded on McHarg’s decision making process. Today, “A GIS is a computer system for capturing, storing, querying, analyzing, and displaying geographically referenced data” (Chang, 2006, p1). Over the past 40 years, GIS has evolved and a field emerged coined

GIScience. GIScience is defined as “a multi disciplinary research enterprise that addresses the nature of geographic information and the application of geospatial technologies to a basic scientific question” (DiBiase, 2006, p5; Goodchild, 1992). Geospatial technology is “the specialized set of information technologies that handle georeferenced data” (DiBiase, 2006, p5). GIScience combined with geospatial technology forms Geographic Information Science & Technology (GIS&T) which provides reasoning for the way one approaches and solves an issue.

Landscape Architects and the use of GIS&T

GIS&T offers spatial temporal problem solving methods and tools useful to landscape architects. Karen Hanna, author of *GIS for Landscape Architects*, stated a main advantage of GIS is “the ability to combine complex and disparate information in problem solving” (Hanna, 1998, p107). Geographic Information Science is also a valuable tool for spatial analysis. GIS technology allows for the analysis of complex spatial problems, (LaGro, 2001) and can assist with the management and analysis of spatial temporal data (Randolph, 2004). “GIS is a way to manage and analyze data in an effective and efficient manner” (Hanna, 1999, p1). GIScience & Technology can also be used for multiple types of landscape architecture projects. “GIS is used for site design, visual analysis, comprehensive planning, resource management, and public advocacy” (Hanna, 1999, p3). “LA firms with active GIS programs use them for regional planning, resort planning, park master planning, trails planning, natural resource management, viewshed analysis, and mapping” (Hanna, 1998, p99).

The Landscape Architecture (LA) Body of Knowledge (BOK) (LABOK) Study

The LABOK study was designed to gain insight into the profession of landscape architecture and sought to answer two key questions about the profession (Williams, 2004).

1. What are the core Competencies shared by the profession in general that help define the profession?
2. What is the fundamental body of knowledge that should be expected of all graduates from accredited schools?

“LABOK is a snapshot of the profession’s expectations” (Williams, 2005, p3). The following Table 2.1 summarizes Table 13 of the LABOK Report (Williams, 2004, p15) which outlined the core Knowledge Statements and Competency areas of professional practice required of first professional degree students.

Knowledge Statements	Competencies
I. Landscape Architecture History and Criticism	I. Landscape Architecture History and Criticism
II. Natural and Cultural Systems	II. Natural and Cultural Systems
III. Design and Planning Theories and Methodologies	III. Public Policy and Regulation
IV. Public Policy and Regulation	IV. Design Planning and Management at Various Scales and Application
V. Design Planning and Management at Various Scales and Application	V. Site Design Engineering: Materials, Methods, Technologies, and Applications
VI. Site Design Engineering: Materials, Methods, Technologies, and Applications	VI. Construction Documentation and Administration
VII. Construction Documentation and Administration	VII. Communication
VIII. Communication	VIII. Values and Ethics in Practice
IX. Values and Ethics in Practice	

Table 2.1 Contains Knowledge Statements and Competency domains of the LABOK study.

The LABOK study was a collection of survey results divided into the Knowledge Statements and Competencies listed above, and LABOK authors state "a professional preparation for landscape architecture must include the development of competencies- the ability of aspiring professionals to take learned knowledge and apply is to achieve successful practice" (2005, p20). The LABOK report states, "Knowledge Statements measure what *we know* (Landscape Architects (LA's)), and Competencies deal with what *we do* with what we (LA's) have learned" (Williams, 2005, p2). While the LABOK provided a basic listing of the issues (Knowledge Statements / Competencies) a landscape architect is responsible for and must understand it does not detail how to achieve understanding of these issues. Survey question responses were based on a scale from 0 to 4 for each Knowledge Statement and Competency as outlined in the following Table 2.2.

0	Unnecessary – not required at all
1	Exposure – sufficiently aware of the knowledge to be able to look it up
2	Comprehension – able to discuss the concepts involved
3	Application – able to use the knowledge to solve problems
4	Mastery – able to apply the knowledge to new problems, to integrate information and to create, synthesize, and evaluate solutions

Table 2.2 LABOK survey choices for Command of Knowledge at Time of Degree (Williams, 2004, p7).

Figure (2.1) on the following page depicts a typical result page from the LABOK report. The column "Command of Knowledge at time of Degree" contains results of the LABOK study pertinent to this research. The mean and standard deviation calculations in the LABOK Report for the category "Command of Knowledge at time of Degree" identify which topics of the LABOK survey results were found to be most important for a student to learn in a first professional degree program.

A Knowledge Statement or Competency with a mean of two or higher signifies comprehension of the subject desired at the time of degree completion. A Knowledge Statement or Competency with a standard deviation that would raise the mean above three, would imply a first degree graduate be able to apply subject knowledge in problem solving. A Knowledge Statement or Competency with a standard deviation that would reduce the mean below two would signify a graduate only be exposed to subject matter in a first degree program. An example of a high result Knowledge Statement that can be seen in Figure 2.1 Aesthetic principles of design mean 2.78, standard deviation 0.71.

TABLE A—MEAN RATINGS FOR KNOWLEDGE STATEMENTS

Time of Acquisition: When should this knowledge be primarily learned or attained? 0. Not required at all 1. Before entrance to a university program 2. In a first professional degree university program 3. In a post-professional degree university program 4. In an entry-level employment position 5. In a mid-level employment position 6. In a continuing education program	To what level should the knowledge be acquired at completion of a first professional degree? 0. Unnecessary – not required at all 1. Exposure – sufficiently aware of the knowledge to be able to look it up 2. Comprehension –able to discuss the concepts involved 3. Application – able to use the knowledge to solve problems 4. Mastery – able to apply the knowledge to new problems, to integrate information and to create, synthesize and evaluate solutions	To what level should this knowledge be attained before an individual takes professional responsibility for his or her landscape architectural work? 0. Unnecessary – not required at all 1. Exposure – sufficiently aware of the knowledge to be able to look it up 2. Comprehension –able to discuss the concepts involved 3. Application – able to use the knowledge to solve problems 4. Mastery – able to apply the knowledge to new problems, to integrate information and to create, synthesize and evaluate solutions

		Time of Acquisition		Command of Knowledge at Time of Degree		Command of Knowledge at Time of Professional Responsibility	
		Mean	SD	Mean	SD	Mean	SD
	I. Landscape Architecture History and Criticism						
1.	history of landscape architecture and allied professions	2.00	0.23	2.15	0.69	2.57	0.85
2.	historic preservation principles	2.57	1.13	1.69	0.83	2.27	1.01
	II. Natural and Cultural Systems						
3.	land information sources	2.11	0.50	2.55	0.77	3.33	0.75
4.	patterns of land use and built form	2.12	0.56	2.43	0.76	3.07	0.77
5.	natural site conditions and ecosystems	2.01	0.47	2.76	0.66	3.35	0.67
6.	social and cultural influences on design	2.21	0.70	2.19	0.81	2.78	0.85
7.	regional hazard design considerations	2.57	0.99	2.10	0.87	3.00	0.86
	III. Design and Planning Theories and Methodologies						
8.	creativity and process including design theory and problem-solving strategies	1.95	0.46	2.83	0.64	3.50	0.63
9.	aesthetic principles of design	1.95	0.53	2.78	0.71	3.38	0.68
10.	human factors such as behavior, perception, psychological and sensory response	2.22	0.81	2.33	0.76	2.92	0.79
11.	natural factors such as ecological relationships	2.02	0.58	2.53	0.75	3.14	0.78
12.	relationship between human and natural systems such as resource conservation, habitat restoration and creation, and urban ecology	2.35	0.86	2.36	0.79	3.04	0.81
13.	influence of context on design, planning, and management decisions	2.50	0.98	2.45	0.76	3.24	0.78
14.	research methods including data collection, interpretation, and application of results	2.44	0.91	2.37	0.93	2.91	1.00
15.	therapeutic aspects of design	2.87	1.41	1.66	0.88	2.23	1.04
16.	communication and education methods, including sharing knowledge and evaluating outcomes	2.66	1.29	2.15	0.99	2.78	1.02
	IV. Public Policy and Regulation						
17.	governmental policies and laws that affect the use and development of land	3.00	1.19	1.80	0.85	3.02	0.83
18.	political and regulatory approval processes	3.43	1.22	1.67	0.92	2.98	0.83
19.	land and development economics	3.53	1.46	1.47	0.83	2.43	0.89

Figure 2.1 Typical Results Page from the LABOK study. The highlighted column "Command of Knowledge at Time of Degree" represents the category most relevant to this study and to first professional degree students. Each row represents a Knowledge Statement or Competency. A complete list of all Knowledge Statements and Competencies are found in Appendix A.

The Geographic Information Science and Technology (GIS&T BOK)

The GIS&T BOK was developed as part of the Geographic Information Science and Technology Model Curricula Initiative and contains a "comprehensive inventory of the GIS&T knowledge domain" (DiBiase, 2006, p1). The GIS&T BOK helps "bridge the gap between the GIS&T higher education community, and the practitioners, employees, and clients who populate the various GIS&T professions" (DiBiase, 2006, p7). The GIS&T BOK is an attempt to "specify a comprehensive body of knowledge that defines the GIS&T domain" (DiBiase, 2006, p7). The

GIS&T BOK consists of very detailed points on how to achieve and understand topics of the GIS&T BOK. The topics are divided among units which make up Knowledge Areas.

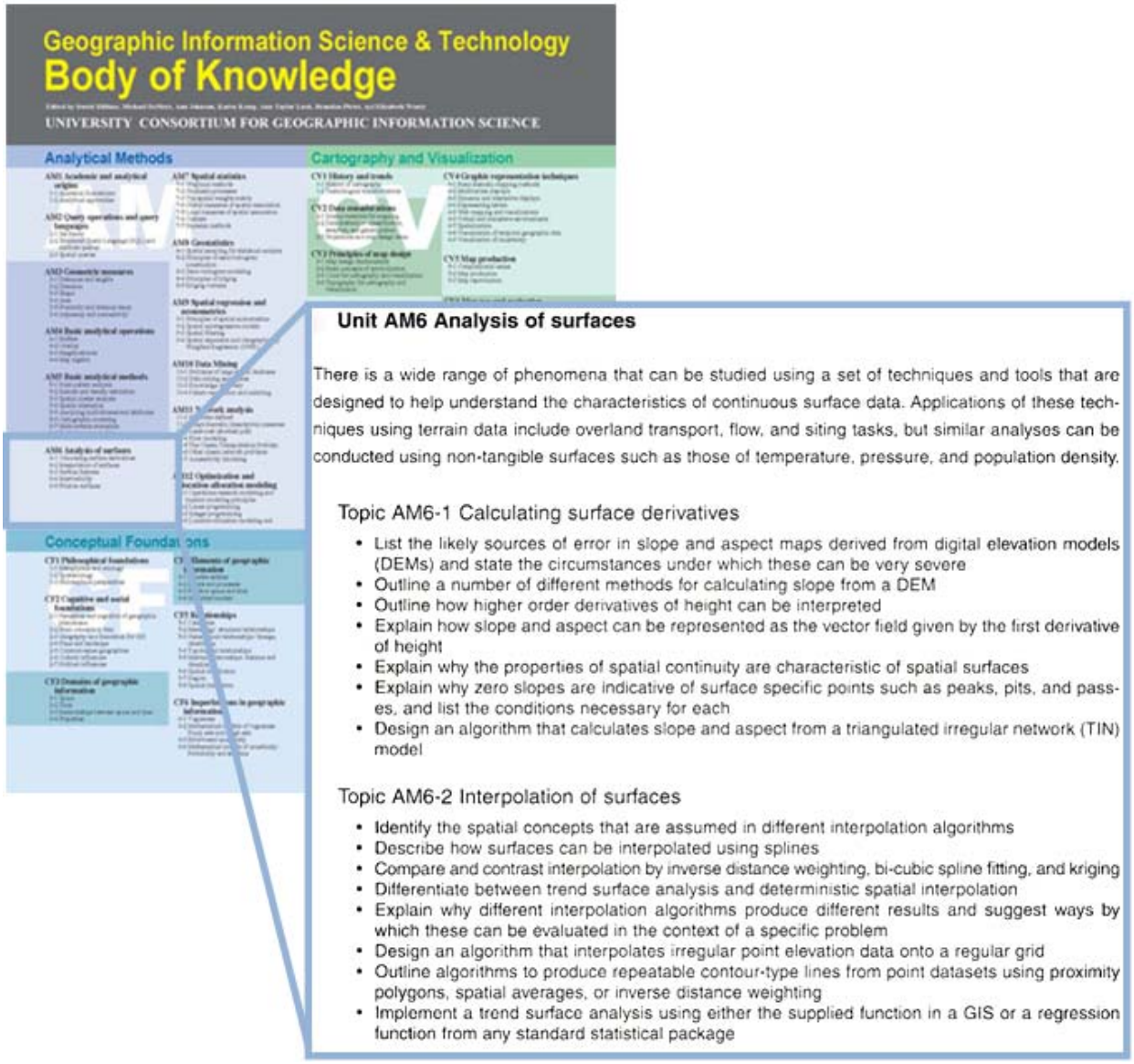


Figure 2.2 GIS&T BOK document cover illustrating Knowledge Areas and sample page from the Analytical Methods Knowledge Area illustrating Unit AM6 Analysis of Surfaces and topics and topical objectives. Each of the 10 Knowledge Areas contains a varying number of units and topics (329 total).

The Relationship between LABOK and GIS&T

The LABOK and GIS&T BOK similarly define professional landscape architecture and GIS&T curricula. Both studies intended to define current and relevant theory, methods and topical areas of the disciplines and provide a framework for student's knowledge of subject matter in the respective professional discipline. Landscape architects as illustrated in the literature are involved in solving spatial temporal problems and GIS&T provides theory, methods and technology useful in solving spatial temporal problems undertaken by landscape architects.

Purpose and Hypothesis

The purpose of this study was to first determine where there are intersections and relationships between the Geographic Information Science and Technology Body of Knowledge (GIS&T BOK) study and the Landscape Architecture Body of Knowledge (LABOK) study and second, illuminate how identified overlaps can be integrated into a first professional degree landscape architecture curriculum. Research aimed to discover relationships between the two BOK studies and pinpoint areas to positively influence the education of a first professional degree landscape architecture student by embedding relevant GIS&T BOK Knowledge Areas, units and topics. Based on the results of the relationship study and LAAB accreditation standards a case study method was used to evaluate the existing integration of GIScience and Technology in the Kansas State University first professional degree program.

The author hypothesizes there are overlaps between the LABOK and GIS&T BOK studies relevant to professional landscape architecture problem solving and essential to training landscape architects in professional degree programs.

Research Questions

1. Where are there intersections or overlap relationships between the LABOK and GIS&T BOK defined Knowledge Areas based on literature supporting the use of GIScience for landscape architects and descriptions of Knowledge Areas found in LABOK and GIS&T BOK?
2. Which of the LABOK Knowledge Statements and Competencies found to contain overlaps with the GIS&T BOK achieve LAAB accreditation standards particularly dealing with computer applications and technology?

3. Is the Kansas State University first professional degree landscape architecture program appropriately integrating GIScience and Technology as a problem solving tool based on LABOK & GIS&T BOK and current literature regarding GIScience in landscape architectural problem solving?

Overview of Research Process

The study was divided into three phases with each phase building upon prior phase results. The first phase dealt directly with the relationship between Landscape Architecture and GIScience and Technology bodies of knowledge. The relationship study of the LABOK and GIS&T BOK is documented and analyzed in a matrix. The second phase incorporates LAAB accreditation standards alongside the LABOK Knowledge Statements and Competencies to indicate relevancy to accreditation of first professional degree landscape architecture programs. The third and final phase compared overlapping LABOK and GIS&T BOK Knowledge Areas found important in LAAB accreditation standards with the learning objectives found in the Kansas State University Tech Module sequence of courses.

Chapter 3 - Methodology

Introduction

The study involved three phases. Phase I was designed to identify where the LABOK and GIS&T BOK intersect. The initial matrix (1a) determined the presence (1) or absence (0) of a relationship between the BOK's. The second matrix (1b) summarized the results of the initial matrix for each of the 10 GIS&T BOK Knowledge Areas and 110 LABOK Knowledge Statements and Competencies. The third matrix (1c) indentified only LABOK Knowledge Statements and Competencies and GIS&T BOK topics that intersected. Phase II examined what LAAB curriculum accreditation requirements are achieved by remaining LABOK topics. This phase concentrated on the LAAB curriculum accreditation requirement *computing applications and other advanced technology*. This information was used to determine which remaining LABOK Knowledge Statements and Competencies achieve (1) or do not achieve (0) the LAAB accreditation requirement *computing applications and other advanced technology.* Phase III evaluated the Kansas State University Tech Module Sequence comparing matrix synthesis results with learning objectives in the Tech Module course syllabi.

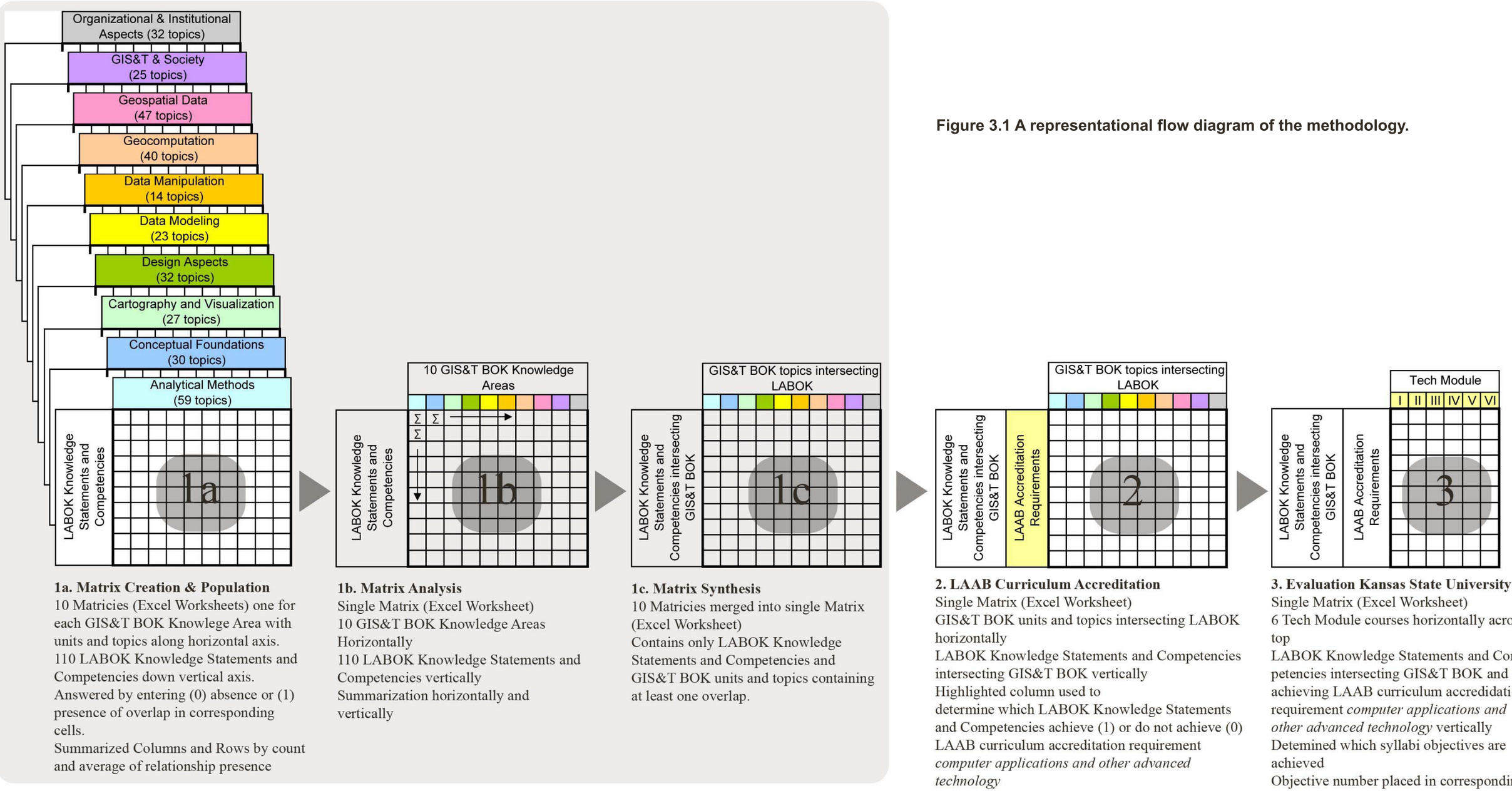


Figure 3.1 A representational flow diagram of the methodology.

1a. Matrix Creation & Population
10 Matricies (Excel Worksheets) one for each GIS&T BOK Knowlege Area with units and topics along horizontal axis.
110 LABOK Knowledge Statements and Competencies down vertical axis.
Answered by entering (0) absence or (1) presence of overlap in corresponding cells.
Summarized Columns and Rows by count and average of relationship presence

1b. Matrix Analysis
Single Matrix (Excel Worksheet)
10 GIS&T BOK Knowledge Areas Horizontally
110 LABOK Knowledge Statements and Competencies vertically
Summarization horizontally and vertically

1c. Matrix Synthesis
10 Matricies merged into single Matrix (Excel Worksheet)
Contains only LABOK Knowledge Statements and Competencies and GIS&T BOK units and topics containing at least one overlap.

2. LAAB Curriculum Accreditation
Single Matrix (Excel Worksheet)
GIS&T BOK units and topics intersecting LABOK horizontally
LABOK Knowledge Statements and Competencies intersecting GIS&T BOK vertically
Highlighted column used to
determine which LABOK Knowledge Statements and Competencies achieve (1) or do not achieve (0)
LAAB curriculum accreditation requirement *computer applications and other advanced technology*

3. Evaluation Kansas State University
Single Matrix (Excel Worksheet)
6 Tech Module courses horizontally across top
LABOK Knowledge Statements and Competencies intersecting GIS&T BOK and achieving LAAB curriculum accredidation requirement *computer applications and other advanced technology* vertically
Detemined which syllabi objectives are achieved
Objective number placed in corresponding cell No objective (0)

Phase 1a. Matrix Creation and Population

Figure 3.2 A simple flow diagram illustrating the sequence of phases. Highlighted is the current phase 1a.

In the first phase a matrix created in Microsoft Excel 2003 documented the answer to research question one aimed at determining overlapping relationships between the LABOK and the GIS&T BOK and served as the basis for subsequent stages of the study. Literature in the domain of landscape architecture indicating relevance or value of GIScience and Technology in landscape architecture problem solving and descriptions provided in both the LABOK Knowledge Statements and Competencies and GIS&T BOK Knowledge Area units and topics were evaluated to determine presence or absence of overlap between LABOK and GIS&T BOK Knowledge Areas. The matrix was constructed with the LABOK Knowledge Statements and Competencies as the vertical or left axis (see Table 2.1 p. 14, Figure 2.1 p. 16, and Appendix A for all 110 knowledge and Competency measures) and the GIS&T BOK Knowledge Areas, units and topics along the horizontal or top axis (see Figure 2.2 p.17 for overview and Appendix B for a list of all 10 Knowledge Areas, units and 329 corresponding topics). In total, the matrix consists of 36,190 cells. Presence of an overlap or intersection was indicated as 1 in the matrix and a lack of overlap was assigned a 0.

The initial design concept, as stated, contained 110 LABOK (Appendix A) Knowledge Statements and Competencies along the left or vertical axis and all 329 GIS&T BOK Knowledge Areas, units and topics (Appendix B) along the top or horizontal axis. Due to a limitation of maximum number of columns (256) in Excel 2003, the matrix was broken into ten separate matrices or Excel worksheets to accommodate the 329 GIS&T topics. Each worksheet contained all 110 LABOK Knowledge Statements and Competencies along the vertical axis and only one GIS&T BOK Knowledge Area and corresponding units along the horizontal axis as illustrated Phase 1a in Figure 3.3.

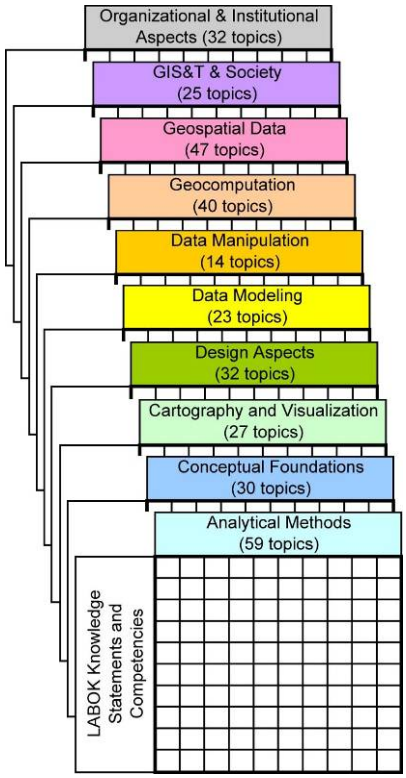


Figure 3.3 Setup for the initial matrix involved ten separate Excel worksheets. Each worksheet contained one GIS&T Knowledge Area and all 110 LABOK Knowledge Statements and Competencies.

As illustrated in Figure 3.3, each of the ten worksheet tabs were named according to the GIS&T BOK Knowledge Area being evaluated. The horizontal or top axis (columns or fields) were organized to match the order and color scheme from the GIS&T BOK cover for each Knowledge Area with cells merged across the top of all corresponding units under each Knowledge Area. Knowledge Area units were designated with two letters representing the Knowledge Area followed by a number representing the corresponding unit. Topics of units were entered by topic title as vertical text under each corresponding merged unit cell. Again all Knowledge Areas, units and topics are found on the front and back cover of the GIS&T BOK, within the text at the start of each unit and also in Appendix B of this document.

Figure 3.4 illustrates a completed portion of the first GIS&T BOK Knowledge Area Analytical Methods and Units AM1, AM2 and AM3 along the top axis and first and second Knowledge Areas of the LABOK along the left axis. Each LABOK Knowledge Statement and Competency were color coded based on their mean. Knowledge Statements and Competencies

with a mean of 2.00 or higher received an orange color. Knowledge Statements and Competencies with a mean between 1.00 and 2.00 received a color of yellow-orange. Knowledge Statements and Competencies with a mean below 1.00 were colored yellow. The color coding of Knowledge Statements and Competencies helped identify the level of relevance to a first degree education.

LABOK						GIS&T BOK										
				Command of Knowledge at time of Degree		Analytical Methods										
						AM1		AM2			AM3					
Knowledge Statement / Competency Division	Domains		Knowledge Statements / Competencies	Mean	Standard Deviation	Academic Foundations	Analytical Approaches	Set Theory	Structured Query & Language	Spatial Queries	Distance & Lengths	Direction	Shape	Area	Proximity & Distance Decay	Adjacency & Connectivity
KNOWLEDGE STATEMENTS	Landscape Architecture History and Criticism	1	history of landscape architecture and allied professions	2.15	0.69	0	0	0	0	0	0	0	0	0	0	0
		2	historic preservation principles	1.69	0.83	0	0	0	0	0	0	0	0	0	1	0
	Natural and Cultural Systems	3	land information sources	2.55	0.77	0	0	0	0	0	0	0	0	0	0	0
		4	patterns of land use and built form	2.43	0.76	1	1	0	0	0	0	0	1	0	1	1
		5	natural site conditions and ecosystems	2.76	0.66	0	1	0	0	0	0	1	0	0	0	0
		6	social and cultural influences on design	2.19	0.81	0	0	0	0	0	0	0	0	0	1	0
		7	regional hazard design considerations	2.1	0.87	0	0	0	0	0	0	0	0	0	0	0
	Design and Planning Theories and Methodologies	8	creativity and process including design theory and problem –solving strategies	2.83	0.64	0	0	0	0	0	0	0	0	0	0	0
		9	aesthetic principles of design	2.78	0.71	0	0	0	0	0	1	1	1	1	0	0
		10	human factors such as behavior, perception, psychological and sensory response	2.33	0.76	0	0	0	0	0	0	0	0	0	1	0
		11	natural factors such as ecological relationships	2.53	0.75	0	1	0	0	0	0	0	0	0	0	1
		12	relationship between human and natural systems such as resource conservation, habitat restoration and creation, and urban ecology	2.36	0.79	1	0	0	0	0	0	0	0	0	1	0
		13	influence of context on design, planning, and management decisions	2.45	0.76	1	0	0	0	0	0	1	0	0	1	0
		14	research methods including data collection, interpretation, and application of results	2.37	0.93	1	0	0	0	0	0	0	0	0	0	0
		15	therapeutic aspects of design	1.66	0.88	0	0	0	0	0	0	1	0	0	0	0
		16	communication and education methods, including sharing knowledge and evaluating outcomes	2.15	0.99	1	0	0	1	0	0	0	0	0	0	0

Figure 3.4 A completed example of the GIS&T Knowledge Area Analytical Methods units AM1, AM2, AM3.

Matrix Population

Population of presence or absence of a relationship between the LABOK and GIS&T BOK in the matrix was based on relevant literature that pertained to a first professional degree program spanning the subjects of Landscape Architecture and GIScience and Technology along with topic objectives found in the GIS&T BOK. Each GIS&T BOK topic contains a varying number of objectives established to achieve topic understanding as illustrated in Figure 2.2. Literature was used as the basis to determine presence of a relationship between the topics. The presence or absence of a relationship was signified by inserting a 1 (presence) or 0 (absence) in the corresponding matrix cell. Inserting a 1 in the cell represented a relevant relationship between the GIS&T BOK topic and the LABOK Knowledge Statement or Competency.

Inserting a 0 in the cell represented no relationship between the topics. The binary answer system was used to more easily manage the large extent of the matrix, and allowed simple summarization of the results. An example of the presence and absence of relationships can be found in Figure 3.4.

Each matrix cell in of each of the ten worksheets (36,190 cells total) was populated using the criteria established above. Upon completion of the matrix sum and averages for each row and column were derived. Summing across rows and columns identified which BOK categories displayed the strongest relationships.

Due to the Microsoft Excel 2003 256 column limit, all 329 columns could not be displayed in a single matrix. Therefore, the results were merged using GIS Raster techniques. Merging the ten worksheets of the initial matrix incorporated the application of GIS into the study. This action demonstrated the versatility of GIS and illustrates the importance of GIS beyond GIS as a spatial visualization tool. Directions for merging results in ESRI's ArcMap GIS program can be found in Appendix D with results illustrated below.

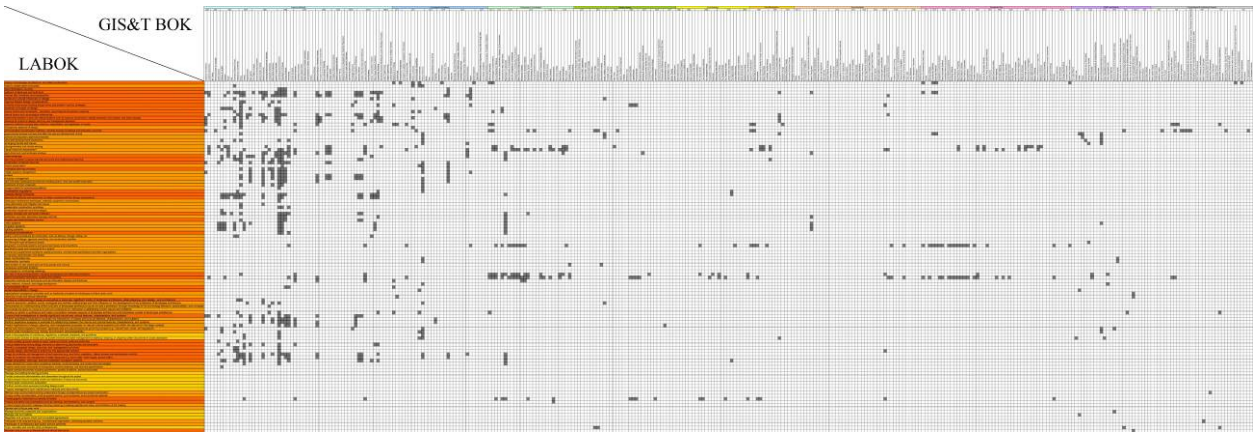


Figure 3.5 The entire matrix after being generated using ArcMap.

Figure 3.5 displays the entire extent of the phase 1a matrix, 36,190 cells. Dark areas represent the presence of a relationship. Blank regions represent the absence of a relationship between LABOK Knowledge Statements and GIS&T BOK topics. Production of the whole matrix revealed patterns and relationships across the entire matrix.

Phase 1b. Matrix Analysis

Figure 3.6 A simple flow diagram illustrating the sequence of phases. Highlighted is the current Phase 1b.

This stage of the study summarized the initial matrix. Summarizing the initial matrix identified LABOK Knowledge Statements and Competencies and GIS&T BOK Knowledge Areas with the presence/absence of a relationship and the strength of that relationship. LABOK Knowledge Areas and Competencies and GIS&T BOK Knowledge Areas with strong positive relationships (multiple categorical overlaps) distinguished areas to be examined for effectively incorporating GIScience into a first professional degree curriculum.

The analysis began with a new Excel worksheet. LABOK Knowledge Statement and Competency information was placed on the vertical axis. Horizontally each of the ten GIS&T BOK Knowledge Areas was labeled as illustrated in Figure 3.7. Corresponding cells in the GIS&T Knowledge Areas and LABOK Knowledge Statements and Competencies containing the summarization information from the previous Phase 1a were placed in a new worksheet. Numeric values represent the count of relationships in each LABOK Knowledge Statement and Competency in a GIS&T BOK Knowledge Area. Each GIS&T BOK Knowledge Area and LABOK Knowledge Statement and Competency were tallied.

LABOK						GIS&T BOK Knowledge Areas										Knowledge Statements and Competency (Horizontal) Sum
Knowledge Statement / Competency Division	Domains		Knowledge Statements / Competencies	Command of Knowledge at time of Degree		AM Sum	CF Sum	CV Sum	DA Sum	DM Sum	DN Sum	GC Sum	GD Sum	GS Sum	OI Sum	
				Mean	Standard Deviation											
KNOWLEDGE STATEMENTS	Landscape Architecture History and Criticism	1	history of landscape architecture and allied professions	2.15	0.69	0	6	2	0	0	0	0	4	0	2	14
		2	historic preservation principles	1.69	0.83	1	3	0	0	0	0	0	0	0	0	4
	Natural and Cultural Systems	3	land information sources	2.55	0.77	3	2	0	0	0	0	0	0	0	0	5
		4	patterns of land use and built form	2.43	0.76	26	2	0	0	0	1	1	3	0	0	33
		5	natural site conditions and ecosystems	2.76	0.66	20	4	0	0	0	0	1	0	0	0	25
		6	social and cultural influences on design	2.19	0.81	4	2	0	1	0	0	0	0	0	0	7
		7	regional hazard design considerations	2.1	0.87	5	0	0	0	0	0	0	0	0	0	5

Figure 3.7 Displays the arrangement of the matrix analysis.

Summarizing the results provided a total count of the overlaps from the initial matrix. This also identified LABOK Knowledge Statements and Competencies that contained no relationship with the GIS&T BOK topics. Six Knowledge Statements and thirteen Competencies from the LABOK did not contain a relationship with the GIS&T BOK.

Phase 1c. Matrix Synthesis

Figure 3.8 A simple flow diagram illustrating the sequence of phases. Highlighted is the current phase 1c.

The third stage of phase one was designed to extract positive results from the initial matrix. The outcome of this stage was used in the following phase. The third matrix was constructed with LABOK Knowledge Statements on the vertical axis and GIS&T BOK Knowledge Areas, unit designations, and topics across the horizontal axis. Only Knowledge Statements and Competencies identified in Phase 1b as containing an overlap were included. Likewise, only GIS&T BOK units and topics that contained overlaps were included. These units and topics were determined by the column sum derived in Phase 1a. To fit the extent of all GIS&T topics into the worksheet, information was transferred into a new worksheet one Knowledge Area at time while removing those with no result before including the following Knowledge Area. The completed matrix contained 170 GIS&T BOK topics and ninety-one LABOK Knowledge Statements/Competencies. Results were then used for the remaining phases.

Phase Two

Figure 3.9 A simple flow diagram illustrating the sequence of phases. Highlighted is the current phase two.

The second phase of the research utilized analysis of overlapping Knowledge Areas and evaluated importance of the overlapping areas based on LAAB curriculum accreditation requirements for a first professional landscape architecture degree. These results were stored in

a third iterative matrix denoting LAAB accreditation importance alongside LABOK Knowledge Statements and Competencies on the left axis. See Figure 3.10 Diagram of phase two.

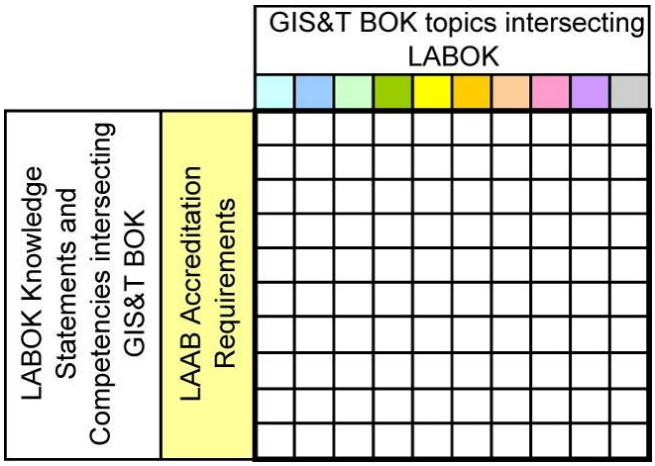


Figure 3.10 A diagram of the matrix arrangement for phase two

LAAB Curriculum Accreditation Integration

The 2005 LAAB Accreditation Standards Procedures state that a curriculum in landscape architecture should include ten professional domains (LAAB, 2005, p13). These domains are:

1) Landscape architectural history and theory*
2) Natural and cultural systems*
3) Design theories, methodologies, and applications*
4) Landscape planning and management at various scales and applications*
5) Site design and construction such as grading, drainage, and circulation*
6) Communication in written, verbal, and visual applications*
7) Plants and ecosystems at various scales and situations*
8) Construction materials, methods, technologies, and applications*
9) Professional practice methods, values, and ethics
10) Computing applications and other advanced technology.

The LABOK study incorporates eight LAAB domains (denoted with asterisk in list above) into the Knowledge Statements and Competencies. The LABOK Knowledge Statements and Competencies provide a framework for comprehension of the LAAB domain. Incorporating principles of LABOK Knowledge Statements and Competencies in a curriculum assists in achieving LAAB accreditation. As denoted the LAAB domain *computing applications and other advanced technology* was not incorporated in the LABOK study. Phase two identified

which LABOK Knowledge Statements and Competencies applied to the domain of *computing applications and other advanced technology.*

Knowledge Statements and Competencies with established relationships to the GIS&T BOK were determined in phase 1a. Those Knowledge Statements and Competencies were then analyzed for their ability to incorporate principles of GIS&T in first professional degree curriculum while achieving LAAB accreditation. This provided a structure for the evaluation of current curriculum incorporations of GIScience.

Using the matrix with results from phase 1c, a column was inserted between the standard deviation column and the first GIS&T BOK topic Academic Foundations as shown in Figure 3.11. The new column was labeled for the LAAB domain *computing applications and other advanced technology.*

LABOK						LAAB	GIS&T BOK			
				Command of Knowledge at time of Degree			Analytical Methods			
							AM1		AM2	
Knowledge Statement / Competency Division	Domains		Knowledge Statements / Competencies	Mean	Standard Deviation	Computing applications and other advanced technology	Academic Foundations	Analytical Approaches	Structured Query & Language	Spatial Queries
Knowledge Statements	Natural and Cultural Systems	3	land information sources	2.55	0.77	1	0	0	0	0
		4	patterns of land use and built form	2.43	0.76	1	1	1	0	0
		5	natural site conditions and ecosystems	2.76	0.66	1	0	1	0	0
		6	social and cultural influences on design	2.19	0.81	1	0	0	0	0
		7	regional hazard design considerations	2.1	0.87	1	0	0	0	0

Figure 3.11 Displays the first Knowledge Statement Domain of the phase two matrix with the column for *computing applications and other advanced technology* highlighted.

Again, literature was consulted along with the GIS&T BOK to determine which LABOK Knowledge Statements and Competencies applied to the domain *computing applications and other advanced technology.* Determination of compatibility depended on the ability of the LABOK Knowledge Statement or Competency to help achieve educational understanding through GIScience. This determination was based on relevant literature examples or utilization of the technology in comprehending the Knowledge Statement or Competency. Knowledge Statements and Competencies deemed appropriate for meeting the LAAB accreditation requirement *computing applications and other advanced technology* received a mark of (1). Knowledge Statements and Competencies determined irrelevant to the LAAB accreditation requirement *computing applications and other advanced technology* received a mark of (0). Knowledge Statements and Competencies that received a (0) were then removed. Removing

rows and columns with no relationship to the LAAB requirement changed the sum of sixteen GIS&T BOK topics to zero which were also removed from the phase two matrix. The resulting matrix contained 33 Knowledge Statements and 16 Competencies with relationships established to 154 GIS&T BOK topics capable of achieving the LAAB curriculum accreditation requirement *computing applications and other advanced technology.* Results were then used in the final phase evaluating the Kansas State University Tech Module Series.

Phase Three

Figure 3.12 A simple flow diagram illustrating the sequence of phases. Highlighted is the current phase three.

The third and final phase of this study employed case study method to illustrate how determined LABOK Knowledge Statements and GIS&T BOK Knowledge Area overlaps also deemed important to LAAB accreditation standards can influence landscape architecture curricula development at Kansas State University. Matrix synthesis results were used to investigate GIScience and Technology Knowledge Area integration in the accredited first professional landscape architecture degree at Kansas State University. The evaluation used learning outcomes defined for the six Landscape Architecture Tech Module sequence courses (LAR 510, LAR 520…LAR 560) to determine the presence or absence of GIS&T BOK relevant content in the sequence, and to recommend improvements to further integrate relevant GIS&T BOK knowledge into the curriculum at Kansas State. See Figure 3.13 Diagram of Phase 3.

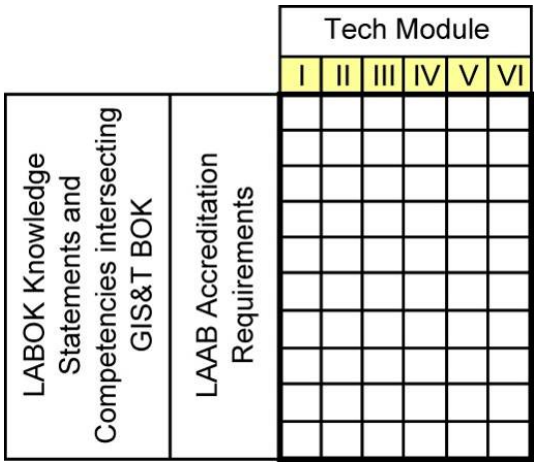


Figure 3.13 A diagram of the matrix construction for phase three.

Evaluation of Kansas State University's Tech Module Series

In 2006, Kansas State University began a six course Tech Module sequence for teaching computer applications. Tech Module course content coincides with landscape architectural problems assigned in parallel semester courses in the first professional degree program. The final phase of this study evaluated the Tech Module sequence at Kansas State comparing matrix synthesis results with learning objectives from the initial Tech Module course syllabi.

Phase three was documented in a new Microsoft Excel 2003 worksheet with LABOK Knowledge Statement and Competency information along the vertical axis. Each Knowledge Statement and Competency was determined in phase two as possible of helping achieve the LAAB curriculum accreditation requirement *computing applications and other advanced technology*. On the horizontal axis six columns were designated for each of the Tech Module courses. An example can be seen in Figure 3.14.

LABOK						LAAB	TECH MODULE					
Knowledge Statement / Competency Division	Domains	Knowledge Statements / Competencies		Command of Knowledge at time of Degree		Computer applications and other advanced technology	I	II	III	IV	V	VI
				Mean	Standard Deviation							
Knowledge Statements	Natural and Cultural Systems	3	land information sources	2.55	0.77	1						
		4	patterns of land use and built form	2.43	0.76	1						
		5	natural site conditions and ecosystems	2.76	0.66	1						
		6	social and cultural influences on design	2.19	0.81	1						
		7	regional hazard design considerations	2.1	0.87	1						

Figure 3.14 Displays the arrangement of the phase three worksheet.

Each Tech Module course syllabus contains learning objectives related to parallel course problems and builds upon learning from prior Tech Modules. Each Tech Module has a varying number of objectives based on semester curriculum requirements. Each Tech Module course contains learning objectives that directly involve GIScience. Prior to evaluating the Tech Module courses it was determined which learning objectives apply to GIScience and Technology and were used in the case study. Objectives determined to incorporate GIScience are illustrated in Table 4.2 found on page 31 in the results section with a complete listing of objectives in Appendix C.

The objectives selected from the Tech Module course syllabi were chosen based on a direct mention of GIScience or contained topics directly related to GIScience as indicated by literature review and GIS&T BOK descriptions. After identifying the objectives that involved GIScience the matrix was populated by placing the number(s) of the objective(s) that applied to the LABOK Knowledge Statement or Competency in the corresponding cell. A number of Tech Modules contained multiple objectives that applied Knowledge Statements and Competencies. Three Knowledge Statements and one Competency did not have any objectives that apply and these can be found on page 30. When no objective relationship was established between the Knowledge Statements/Competencies and Tech Module objectives a (0) was marked in the corresponding cell.

Results identified areas the Kansas State University Tech Module sequence effectively incorporating GIScience into learning objectives and exposed areas where improvements could be made.

Chapter 4 - Results

Introduction

Results of the study focused on the relationship between Landscape Architecture and GIScience for a first professional degree Landscape Architecture student. Results are reported individually for each phase of the study. Phase one results dealt with the relationship between the LABOK and GIS&T BOK. Phase two results concentrated on the use of phase one results to meet LAAB curriculum accreditation. Phase three results comprised the evaluation of the Kansas State University Tech Module sequence.

Phases One: the relationship between the LABOK and the GIS&T BOK

Phase one dealt with the relationship between the LABOK and the GIS&T BOK. The LABOK contained 110 topics. An example of matrix results can be found in Figure 4.1 with complete results of the initial matrix can be found in Appendix E.

LABOK				Command of Knowledge at time of Degree		GIS&T BOK: Analytical Methods																							
						AM1		AM2			AM3						AM4				AM5									
Knowledge Statement / Competency Division	Domains		Knowledge Statements / Competencies	Mean	Standard Deviation	Academic Foundations	Analytical Approaches	Set Theory	Structured Query & Language	Spatial Queries	Distance & Lengths	Direction	Shape	Area	Proximity & Distance Decay	Adjacency & Connectivity	Buffers	Overlay	Neighborhoods	Map Algebra	Point Pattern Analysis	Kernels & Density Estimation	Spatial Cluster Analysis	Spatial Interaction	Analyzing Multidimensional Attributes	Cartographic Modeling	Multi-criteria Evaluation	Spatial Process Models
KNOWLEDGE STATEMENTS	Landscape Architecture History and Criticism	1	history of landscape architecture and allied professions	2.15	0.69	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		2	historic preservation principles	1.69	0.83	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Natural and Cultural Systems	3	land information sources	2.55	0.77	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		4	patterns of land use and built form	2.43	0.76	1	1	0	0	0	0	0	1	0	1	1	1	1	0	0	1	0	1	1	1	0	0	1	
		5	natural site conditions and ecosystems	2.76	0.66	0	1	0	0	0	0	1	0	0	0	0	1	1	0	0	0	0	0	1	1	0	1	1	
		6	social and cultural influences on design	2.19	0.81	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	1	0	0	0	0	
		7	regional hazard design considerations	2.1	0.87	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	1	0	
	Design and Planning Theories and Methodologies	8	creativity and process including design theory and problem -solving strategies	2.83	0.64	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	1	0	0	
		9	aesthetic principles of design	2.78	0.71	0	0	0	0	0	1	1	1	1	0	0	1	0	0	1	0	0	0	0	0	0	0	0	1
		10	human factors such as behavior, perception, psychological and sensory response	2.33	0.76	0	0	0	0	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	1
		11	natural factors such as ecological relationships	2.53	0.75	0	1	0	0	0	0	0	0	0	0	1	1	0	1	1	0	0	1	1	0	0	0	1	
		12	relationship between human and natural systems such as resource conservation, habitat restoration and creation, and urban ecology	2.36	0.79	1	0	0	0	0	0	0	0	0	1	0	1	0	1	0	0	0	0	1	1	0	0	1	
		13	influence of context on design, planning, and management decisions	2.45	0.76	1	0	0	0	0	0	1	0	0	1	0	1	0	0	0	0	0	0	1	0	0	0	1	
		14	research methods including data collection, interpretation, and application of results	2.37	0.93	1	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	
		15	therapeutic aspects of design	1.66	0.88	0	0	0	0	0	0	1	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	
		16	communication and education methods, including sharing knowledge and evaluating outcomes	2.15	0.99	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	

Figure 4.1 A portion of the completed phase 1a matrix. Represented are the first sixteen LABOK Knowledge Statements with overlaps to topics in the GIS&T BOK Knowledge Area Analytical Methods (AM) units AM1-AM5 (23 topics). Areas that demonstrated overlap received a mark of (1) are highlighted.

The matrix analysis filtered results of the initial matrix to identify relationships. An example of the matrix analysis can be found in Figure 3.7. Complete results of the matrix analysis can be found in Appendix F. Of the 110 LABOK Knowledge Statements and Competencies, 19 did not overlap with GIS&T BOK topics. Of the 329 GIS&T BOK topics 170 were found to overlap with LABOK Knowledge Statements and Competencies eliminating 159 GIS&T BOK topics determined to have no presence of overlap to the LABOK Knowledge Statements and Competencies. In total, the initial matrix contained 887 overlaps between LABOK Knowledge Statements (703) and Competencies (184) and GIS&T BOK topics. LABOK Knowledge Statements and Competencies overlapped between one and fifty-five times with individual GIS&T BOK topics. Figure 4.2 demonstrates the distribution of overlaps between LABOK categories and GIS&T topics in the initial matrix results.

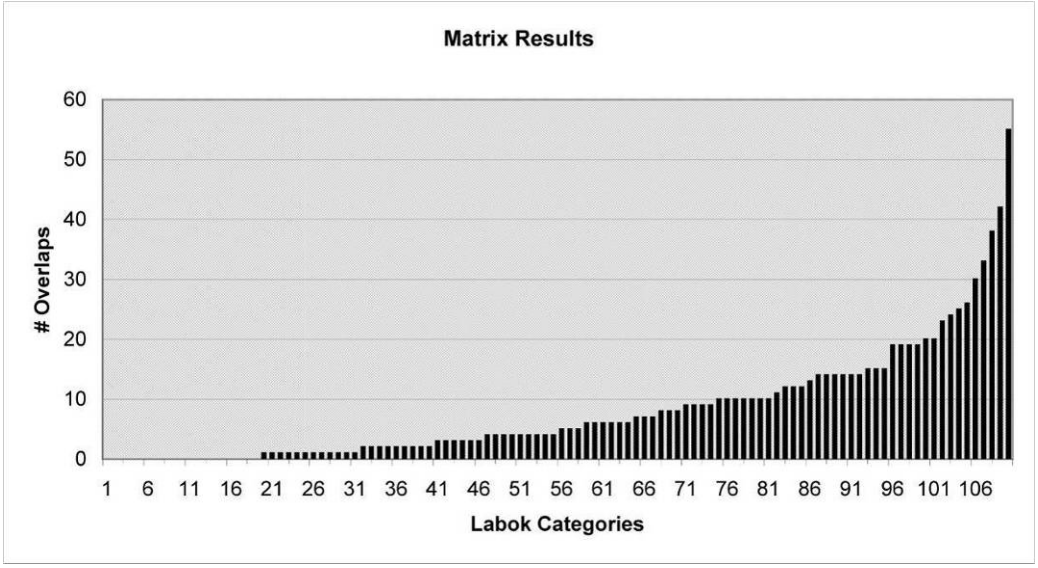


Figure 4.2 Overlap distributions between LABOK Knowledge Statements and Competencies with GIS&T BOK topics. The 110 LABOK Knowledge Statements and Competencies reside on the horizontal axis based on amount of relationships with GIS&T BOK topics. The vertical axis represents number of GIS&T BOK overlaps.

In Figure 4.2 the highest overlapping LABOK Knowledge Statements and Competencies are located on the right. The Knowledge Statement with the most GIS&T BOK topic overlaps was Graphic presentation techniques, systems & symbols. This LABOK Knowledge Statement, with a high mean of 2.71 (LABOK Report), contained 55 overlaps with GIS&T BOK topics.

This Knowledge Statement established relationships within each of the ten GIS&T Knowledge Areas. The strong relationship between Graphic presentation techniques, systems, & symbols and GIS&T BOK topics could be based on both disciplines using graphics as a visual communication and assessment tool for problem solving. Other LABOK Knowledge Statements and Competencies with strong relationships to the GIS&T BOK include: Visual resource assessment mean 1.91 (LABOK), 42 overlaps, Geographic coordinate systems and layout techniques mean 1.90 (LABOK), 38 overlaps, Patterns of landuse and built form mean 2.43 (LABOK), 33 overlaps, and Photogrammetry and remote sensing mean 1.47 (LABOK), 30 overlaps. Each of these LABOK Knowledge Statements and Competencies demonstrated strong visual linear relationships across the matrix.

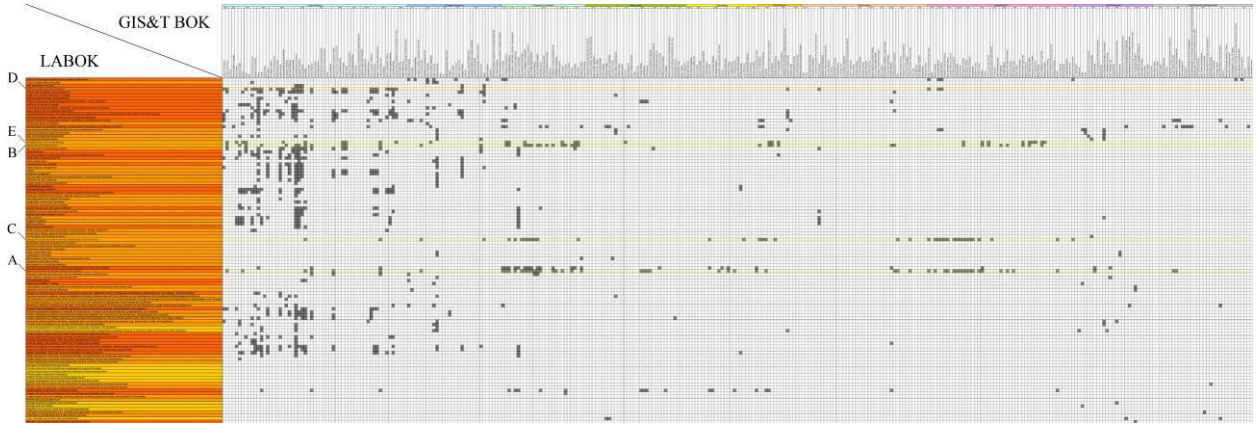


Figure 4.3 Highlights the LABOK Knowledge Statements and Competencies that exhibited the strongest relationships to the GIS&T BOK. A) Graphic presentation techniques, systems, & symbols B) Visual resource assessment C) Geographic coordinate systems and layout techniques D) Patterns of landuse and built form E) Photogrammetry and remote sensing

According to Figure 2.2 each of these Knowledge Statements and Competencies require comprehension or application from a first professional degree graduate. This provides the first evidence of the value of GIScience and Technology to a first professional degree program.

Of the ninety-one LABOK Knowledge Statements (62) and Competencies (29) with at least one overlap to GIS&T BOK topics, forty Knowledge Statements/Competencies contained a mean of 2.00 (LABOK) or greater. These are the Knowledge Statements and Competencies of most importance to a first professional Landscape Architecture degree education. Forty-six of the

Knowledge Statements and Competencies had a mean between 1.00 and 2.00 (LABOK) signifying comprehension is expected upon graduation of a first professional degree. Five Competencies with a mean below 1.00 (LABOK) or would only require exposure from a graduate contained overlaps.

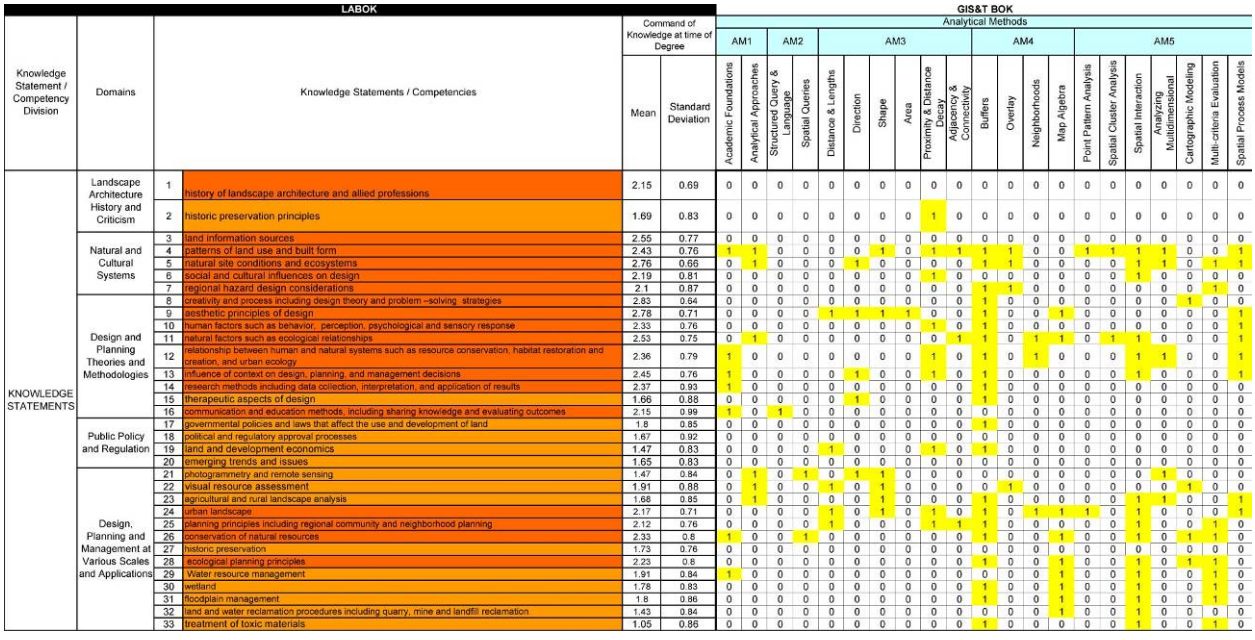
Every Knowledge Statement and Competency in the LABOK with a mean above 2.00 (LABOK) contained least one overlap with GIS&T BOK topics. This demonstrated every Knowledge Statement and Competency considered to be comprehendible by a first degree graduate can in some way incorporate GIScience and Technology as a learning tool. Twenty-one of the Knowledge Statements and Competencies contained a mean with standard deviation that would imply a graduate "be able to use the knowledge to solve problems" (Williams, 2004, p7). Twelve of fifty-eight Knowledge Statements and Competencies with a mean between 1.00 and 2.00 (LABOK) did not contain overlaps with GIS&T BOK topics. Seven of twelve Knowledge Statements and Competencies with a mean below 1.00 (LABOK) did not have a relationship to GIS&T BOK topics. Results showed ninety-one of 110 LABOK topics are able to utilize GIScience and Technology as an educational tool while helping students comprehend the fundamentals of Landscape Architecture.

The largest GIS&T BOK Knowledge Area with 59 topics was *Analytical Methods.* This Knowledge Area demonstrated the strongest relationship to LABOK Knowledge Statements and Competencies. Topics of the *Analytical Methods* Knowledge Area comprised 500 overlapping results. The large number of results could be attributed to the *Analytical Methods* Knowledge Area "encompassing a wide variety of operations whose objective is to derive analytical results" (DiBiase, 2006, p43). The *Analytical Methods* Knowledge Area was also the largest Knowledge Area with more topics than any other Knowledge Area. Divisions in the *Analytical Methods* section such as AM3 Geometric Measures, AM4 Basic Analytical Methods, and AM6 Analysis of Surfaces contain topics that parallel fundamentals of Landscape Architecture. Other GIS&T BOK Knowledge Areas contained between 17 and 98 overlaps. Relationship distribution can be found in table 4.1 on the following page.

Knowledge Area	# of Topics in Knowledge Area	# of relationships within Knowledge Area
Analytical Methods (AM)	59	500
Conceptual Foundations (CF)	30	89
Cartography & Visualization (CV)	27	98
Design Aspects (DA)	32	25
Data Modeling (DM)	23	17
Data Manipulation (DN)	14	26
Geocomputation (GC)	40	19
Geospatial Data (GD)	47	62
GIS&T & Society (GS)	25	31
Organizational & Institutional Aspects (OI)	32	20

Table 4.1 Distribution of the matrix overlaps by GIS&T BOK Knowledge Areas.

Based on relationship distribution there are LABOK topic(s) that relate to each of the ten GIS&T BOK Knowledge Areas. An example of the matrix synthesis can be seen in Figure 4.4. Completed matrix synthesis results can be found in Appendix G.



LABOK				Command of Knowledge at time of Degree		GIS&T BOK: Analytical Methods																		
						AM1	AM2	AM3						AM4				AM5						
Knowledge Statement / Competency Division	Domains		Knowledge Statements / Competencies	Mean	Standard Deviation	Academic Foundations	Analytical Approaches	Structured Query & Language	Spatial Queries	Distance & Lengths	Direction	Shape	Area	Proximity & Distance Decay	Adjacency & Connectivity	Buffers	Overlay	Neighborhoods	Map Algebra	Point Pattern Analysis	Spatial Cluster Analysis	Spatial Interaction	Analyzing Multidimensional	Cartographic Modeling	Multi-criteria Evaluation	Spatial Process Models
KNOWLEDGE STATEMENTS	Landscape Architecture History and Criticism	1	history of landscape architecture and allied professions	2.15	0.69	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		2	historic preservation principles	1.69	0.83	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0
	Natural and Cultural Systems	3	land information sources	2.55	0.77	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		4	patterns of land use and built form	2.43	0.76	1	1	0	0	0	0	1	0	1	1	1	1	0	0	1	1	1	1	0	0	1
		5	natural site conditions and ecosystems	2.76	0.66	0	1	0	0	0	1	0	0	0	0	1	1	0	0	0	0	1	1	0	1	1
		6	social and cultural influences on design	2.19	0.81	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	1	0	0	0	0
		7	regional hazard design considerations	2.1	0.87	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	1	0
	Design and Planning Theories and Methodologies	8	creativity and process including design theory and problem –solving strategies	2.83	0.64	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	1	0	0
		9	aesthetic principles of design	2.78	0.71	0	0	0	0	1	1	1	1	0	0	1	0	0	1	0	0	0	0	0	0	1
		10	human factors such as behavior, perception, psychological and sensory response	2.33	0.76	0	0	0	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	0	0	1
		11	natural factors such as ecological relationships	2.53	0.75	0	1	0	0	0	0	0	0	0	1	1	0	1	1	0	1	1	0	0	0	1
		12	relationship between human and natural systems such as resource conservation, habitat restoration and creation, and urban ecology	2.36	0.79	1	0	0	0	0	0	0	0	1	0	1	0	1	0	0	0	1	1	0	0	1
		13	influence of context on design, planning, and management decisions	2.45	0.76	1	0	0	0	0	1	0	0	1	0	1	0	0	0	0	0	1	0	0	0	1
		14	research methods including data collection, interpretation, and application of results	2.37	0.93	1	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0
		15	therapeutic aspects of design	1.66	0.88	0	0	0	0	0	1	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0
		16	communication and education methods, including sharing knowledge and evaluating outcomes	2.15	0.99	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Public Policy and Regulation	17	governmental policies and laws that affect the use and development of land	1.8	0.85	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0
		18	political and regulatory approval processes	1.67	0.92	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		19	land and development economics	1.47	0.83	0	0	0	0	1	0	0	0	1	0	1	0	0	0	0	0	0	0	0	0	0
		20	emerging trends and issues	1.65	0.83	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Design, Planning and Management at Various Scales and Applications	21	photogrammetry and remote sensing	1.47	0.84	0	1	0	1	0	1	1	0	0	0	0	0	0	0	0	0	0	1	0	0	0
		22	visual resource assessment	1.91	0.88	0	1	0	0	1	0	1	0	0	0	0	1	0	0	0	0	0	0	1	0	0
		23	agricultural and rural landscape analysis	1.66	0.85	0	1	0	0	0	0	1	0	0	0	1	0	0	0	0	0	1	1	0	0	1
		24	urban landscape	2.17	0.71	0	0	0	0	1	0	1	0	1	0	1	1	1	0	1	0	1	0	0	0	1
		25	planning principles including regional community and neighborhood planning	2.12	0.76	0	0	0	0	1	0	0	0	1	1	1	0	0	0	0	0	1	0	0	1	0
		26	conservation of natural resources	2.33	0.8	1	0	0	1	0	0	0	0	0	0	1	0	0	1	0	0	1	0	1	1	0
		27	historic preservation	1.73	0.76	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		28	ecological planning principles	2.23	0.8	0	0	0	0	0	0	0	0	0	0	1	0	0	1	0	0	1	0	1	1	0
		29	Water resource management	1.91	0.84	1	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	0	0	1	0
		30	wetland	1.78	0.83	0	0	0	0	0	0	0	0	0	0	1	0	0	1	0	0	1	0	0	1	0
		31	floodplain management	1.8	0.86	0	0	0	0	0	0	0	0	0	0	1	0	0	1	0	0	1	0	0	1	0
		32	land and water reclamation procedures including quarry, mine and landfill reclamation	1.43	0.84	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	0	0	0	0
		33	treatment of toxic materials	1.05	0.86	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	1	0	0	1	0

Figure 4.4 A sample of the matrix synthesis. Represented are the first 33 LABOK Knowledge Statements and 21 GIS&T BOK topics that contained relationships. Highlighted are the areas of overlap.

Phases Two: LAAB curriculum accreditation requirements

As indicated in the methodology, phase two of the study dealt only with areas of LABOK and GIS&T BOK determined to overlap. Phase two analyzed the remaining topics, those with a presence indicated by 1, for their ability to meet *computing applications and other advanced technology* a LAAB curriculum accreditation requirement. An example of phase two can be seen in Figure 4.5. Completed results can be found in appendix H.

LABOK						LAAB	GIS&T BOK															
				Command of Knowledge at time of Degree			Analytical Methods															
							AM1		AM2		AM3							AM4				
Knowledge Statement / Competency Division	Domains		Knowledge Statements / Competencies	Mean	Standard Deviation	Computing applications and other advanced technology	Academic Foundations	Analytical Approaches	Structured Query & Language	Spatial Queries	Distance & Lengths	Direction	Shape	Area	Proximity & Distance Decay	Adjacency & Connectivity	Buffers	Overlay	Neighborhoods	Map Algebra
Knowledge Statements	Natural and Cultural Systems	3	land information sources	2.55	0.77	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		4	patterns of land use and built form	2.43	0.76	1	1	1	0	0	0	0	1	0	1	1	1	1	0	0
		5	natural site conditions and ecosystems	2.76	0.66	1	0	1	0	0	0	1	0	0	0	0	1	1	0	0
		6	social and cultural influences on design	2.19	0.81	1	0	0	0	0	0	0	0	0	1	0	0	0	0	0
		7	regional hazard design considerations	2.1	0.87	1	0	0	0	0	0	0	0	0	0	0	1	1	0	0
	Design and Planning Theories and Methodologies	8	creativity and process including design theory and problem –solving strategies	2.83	0.64	1	0	0	0	0	0	0	0	0	0	0	1	0	0	0
		10	human factors such as behavior, perception, psychological and sensory response	2.33	0.76	1	0	0	0	0	0	0	0	0	1	0	1	0	0	0
		11	natural factors such as ecological relationships	2.53	0.75	1	0	1	0	0	0	0	0	0	0	1	1	0	1	1
		12	relationship between human and natural systems such as resource conservation, habitat restoration and creation, and urban ecology	2.36	0.79	1	1	0	0	0	0	0	0	0	1	0	1	0	1	0
		13	influence of context on design, planning, and management decisions	2.45	0.76	1	1	0	0	0	0	1	0	0	1	0	1	0	0	0
		14	research methods including data collection, interpretation, and application of results	2.37	0.93	1	1	0	0	0	0	0	0	0	0	0	1	0	0	0
		16	communication and education methods, including sharing knowledge and evaluating outcomes	2.15	0.99	1	1	0	1	0	0	0	0	0	0	0	0	0	0	0
	Public Policy and Regulation	17	governmental policies and laws that affect the use and development of land	1.8	0.85	1	0	0	0	0	0	0	0	0	0	0	1	0	0	0
	Design, Planning and Management at Various Scales and Applications	21	photogrammetry and remote sensing	1.47	0.84	1	0	1	0	1	0	1	1	0	0	0	0	0	0	0
		22	visual resource assessment	1.91	0.88	1	0	1	0	0	1	0	1	0	0	0	0	1	0	0
		23	agricultural and rural landscape analysis	1.68	0.85	1	0	1	0	0	0	0	1	0	0	0	1	0	0	0
		24	urban landscape	2.17	0.71	1	0	0	0	0	1	0	1	0	1	0	1	0	1	1
		25	planning principles including regional community and neighborhood planning	2.12	0.76	1	0	0	0	0	1	0	0	0	1	1	1	0	0	0
		26	conservation of natural resources	2.33	0.8	1	1	0	0	1	0	0	0	0	0	0	1	0	0	1
		28	ecological planning principles	2.23	0.8	1	0	0	0	0	0	0	0	0	0	0	1	0	0	1
		29	Water resource management	1.91	0.84	1	1	0	0	0	0	0	0	0	0	0	0	0	0	1
		31	floodplain management	1.8	0.86	1	0	0	0	0	0	0	0	0	0	0	1	0	0	1

Figure 4.5 An example of completed phase two results. The grey column identifies LABOK Knowledge Statements and Competencies are capable of achieving *computing applications and other advanced technology* as a LAAB curriculum accreditation requirement.

Identifying Knowledge Statements and Competencies that fall into the LAAB domain of *computing applications and other advanced technology* determined possible curriculum integration points for incorporating GIScience while achieving LAAB curriculum accreditation. Phase one determined ninety-one LABOK Knowledge Statements and Competencies overlapped GIS&T BOK topics. Of the ninety-one Knowledge Statements and Competencies, forty-nine were found to incorporate *computing applications and other advanced technology*. Of the Forty-nine LABOK Knowledge Statements and Competencies thirty-two contained a mean of 2.00 (LABOK) or greater. Seventeen Knowledge Statements/Competencies had a mean between 1.00 (LABOK) and 2.00 (LABOK), and zero had a mean below 1.00 (LABOK). Thirty-three of the forty-nine Knowledge Statements and Competencies overlapped with ten or more GIS&T BOK topics. Of all LABOK Knowledge Statements and Competencies containing ten or more overlaps

only three were found not to fall into the domain of *computing applications and other advanced technology*. Those three topics were Wetland with fourteen overlaps, History of Landscape Architecture and allied professions with fourteen overlaps, and Aesthetic principles of design fourteen overlaps. Results established the LABOK Knowledge Statements and Competencies with the strongest relationships to GIS&T BOK topics are also those most capable of achieving the LAAB curriculum accreditation requirement *computing applications and other advanced technology*.

Of the 170 GIS&T topics determined to have a relationship with LABOK Knowledge Statements and Competencies, 154 were related to the forty-nine Knowledge Statements and Competencies identified in phase two. These 154 GIS&T topics covered each of the ten GIS&T BOK Knowledge Areas implying a broad spectrum of GIScience and Technology topics are beneficial to a first professional landscape architecture degree. Of the 887 relationships determined between the LABOK and GIS&T BOK, 717 were contained within the forty-nine LABOK Knowledge Statements and Competencies focused on in phase two. The other 170 matrix overlaps were distributed among the sixty-one LABOK Knowledge Statements and Competencies eliminated in phase two.

The GIS&T BOK topics remaining in phase two covered eight of the original LABOK Knowledge Statements and six of the eight Competency domains. The only LABOK domain without a Knowledge Statement in phase two was Landscape Architecture History and Criticism. Two LABOK Competency domains were without Competencies in phase two 1) Landscape Architecture History and Criticism and 2) Values and Ethics in Practice. Phase two results showed highest valued Knowledge Statements and Competencies of a first professional degree were capable of utilizing GIScience to achieve LAAB curriculum accreditation in both *computing applications and other advanced technology* and a second LAAB curriculum accreditation requirement from the Knowledge Statements/Competencies.

Phase Three: evaluating the Kansas State University Tech Module sequence

Phase three used results from previous phases along with objectives from the six Kansas State University Tech Module courses to evaluate incorporation of GIScience and Technology in the first professional degree program at Kansas State University. Table 4.2 provides an example of Tech Module objectives. A complete listing of Tech module objectives can be found in Appendix C.

Tech Module	Objective
I	6. To introduce and utilize GIScience data, technology, applications and methods—including GIS (ESRI ArcGIS), Thematic Mapping, and Remote Sensing—to create a developable land summary map at a variety of scales and 3D Fly Through of a landscape.
II	4. To learn effective coalescence and implementation of digital tools used to communicate existing and proposed landscape features for site scale landscape projects.
IV	7. To introduce the basic elements of landscape surveying including terms and methods for measurement systems, profile leveling, topographic and site surveying.

Table 4.2 An example of objectives from Tech Module course syllabi. The left column refers to the course. The right column refers to the objective of that course.

The evaluation queried LABOK Knowledge Statements and Competencies, GIS&T BOK topics, and course syllabi objectives. The final phase determined the extent of GIScience and Technology integration in the Tech Module courses which are the curriculum foundation for teaching computer applications and technology.

LABOK						LAAB	TECH MODULE						# Tech Module Courses with Objectives Incorporating LABOK Accreditation Knowledge Statements or Competencies
Knowledge Statement / Competency Division	Domains		Knowledge Statements / Competencies	Command of Knowledge at time of Degree		Computer applications and other advanced technology							
				Mean	Standard Deviation		I	II	III	IV	V	VI	
Knowledge Statements	Natural and Cultural Systems	3	land information sources	2.55	0.77	1	0	0	0	0	0	0	0
		4	patterns of land use and built form	2.43	0.76	1	2,3,4,6	2,3,4,6	2	2,3,4	2	4	6
		5	natural site conditions and ecosystems	2.76	0.66	1	2,4	2,4,5	2	2,4,5	2	1	6
		6	social and cultural influences on design	2.19	0.81	1	3	0	0	0	2	0	2
		7	regional hazard design considerations	2.1	0.87	1	0	0	0	0	0	0	0
	Design and Planning Theories and Methodologies	8	creativity and process including design theory and problem –solving strategies	2.83	0.64	1	1,5	1,5	2	1,5	2	0	5
		10	human factors such as behavior, perception, psychological and sensory response	2.33	0.76	1	2,3,4	2,3,4	0	2,3,4	2	4	5
		11	natural factors such as ecological relationships	2.53	0.75	1	5	5	2	5	2	0	5
		12	relationship between human and natural systems such as resource conservation, habitat restoration and creation, and urban ecology	2.36	0.79	1	2,4,5	2,4,5	0	2,4,5	2	1	5
		13	influence of context on design, planning, and management decisions	2.45	0.76	1	4,5	4,5	2	4,5	2	0	5
		14	research methods including data collection, interpretation, and application of results	2.37	0.93	1	5	5	0	5	0	1	4
		16	communication and education methods, including sharing knowledge and evaluating outcomes	2.15	0.99	1	1,2,3	1,2,3,4	1	1,2,3,4	1	4	6
	Public Policy and Regulation	17	governmental policies and laws that affect the use and development of land	1.8	0.85	1	4	4	0	4	2	0	4
	Design, Planning and Management at Various Scales and Applications	21	photogrammetry and remote sensing	1.47	0.84	1	3,5	3,4,6,8	1	3,4,7	1	1	6
		22	visual resource assessment	1.91	0.88	1	1,4,5	1,3,5,8	1,3	1,3,5,7	1	1,4	6
		23	agricultural and rural landscape analysis	1.68	0.85	1	5	5	0	5	1	0	4
		24	urban landscape	2.17	0.71	1	0	4	2	4	2	0	4
		25	planning principles including regional community and neighborhood planning	2.12	0.76	1	0	4	0	4	2	0	3
		26	conservation of natural resources	2.33	0.8	1	0	6	0	0	0	0	1
		28	ecological planning principles	2.23	0.8	1	0	6	2	0	0	0	2
		29	Water resource management	1.91	0.84	1	0	6	2	0	0	0	2
		31	floodplain management	1.8	0.86	1	0	6	0	0	0	0	1

Figure 4.6 An example of phase three results.

This phase identified strengths and weaknesses of the Tech Module sequence, pertaining to GIScience. Completed results of phase three can be found in Appendix I. The evaluation only used the forty-nine LABOK Knowledge Statements and Competencies found to relate to the LAAB curriculum accreditation requirement *computing applications and other advanced technology*. As noted in the previous section, upon completion of a first professional degree a student should have at least exposure if not comprehension of each Knowledge Statement and Competency.

Based on objectives for the six courses in the Tech Module sequence, only three Knowledge Statements and one Competency identified in phase two were not incorporated into at least one course. They are 1) Land information sources, 2) Regional hazard design considerations, 3) Roadway design principles, and 4) Maintain clear communication among collaborators through correspondence and project coordination. Many Knowledge Statements and Competencies appeared in multiple courses. Eight LABOK Knowledge Statements and One LABOK Competency were met in all six Tech Module courses. Five LABOK Knowledge Statements were incorporated in five Tech Module courses. Four Knowledge Statements and two Competencies were incorporated into four courses. Nine Competencies and two Knowledge statements were found in three courses. Five Knowledge Statements and two Competencies appeared in two courses. Five Knowledge Statements and one Competency appeared in one Tech Module based on objectives. .

Many Knowledge Statements and Competencies were covered by multiple objectives for a single Tech Module course. Tech Module courses I, II, and IV exhibited the strongest relationship to GIScience. Based on course objectives these courses best incorporated LABOK Knowledge Statements and Competencies. These courses had seven to eight objectives. Tech Modules III and V had fewer objectives and therefore have less opportunity for objectives to apply to LABOK Knowledge Statements and Competencies. At the time of this study the Tech Module VI course had not been taught and objectives were based on proposed learning objectives.

Based on information provided in the Tech Module syllabi it is not known how GIScience and Technology is incorporated. Material covered in the courses varies each semester due to integration with parallel course projects which provides new opportunities for utilizing GIScience and Technology each time a course is taught. Using GIS&T BOK topics identified in phase one, the Kansas State program can assess how the tech module sequence can employ GIScience and Technology to meet Tech Module objectives in a manner that helps achieve LAAB curriculum accreditation.

In summary, this study identified 887 overlaps between 91 (of the 110) LABOK Knowledge Statements / Competencies and 170 (of 329) topics of the GIS&T BOK. Of the 887 overlaps between the BOK's, 717 were contained in forty-nine Knowledge Statements / Competencies that met the LAAB curriculum accreditation requirement *computing applications and other advanced technology*. The findings of this study indicate the domains of the LABOK study found to contain relationships to the GIS&T BOK and also where these overlaps can be used to help achieve LAAB curriculum accreditation. Results provide a basis for the assessment and integration of GIScience and Technology in first professional degree landscape architecture programs. Using Phase 1 and 2 results of this study, the Kansas State University Tech Module sequence of courses were evaluated in a case study which identified strengths and weaknesses of the use of GIScience and Technology.

Chapter 5 - Conclusions

Phase one of the study answered research question one: Where are there intersections or overlap relationships between the LABOK and GIS&T BOK defined Knowledge Areas based on literature supporting the use of GIScience for landscape architects and descriptions of Knowledge Areas found in LABOK and GIS&T BOK? Literature review indicated a relationship between the two Bodies of Knowledge and Phase one identified 887 relationships between topics of the GIS&T BOK and LABOK Knowledge Statements and Competencies. The strength of the relationship between GIS&T and LABOK was demonstrated with relationships established in each of the ten GIS&T BOK Knowledge Areas, and each LABOK Knowledge Statement and Competency domain. The relationships established in this study between the two bodies of knowledge illustrate the breadth of connections between GIS&T and a first professional degree in landscape architecture.

The second research question asked: Which of the LABOK Knowledge Statements and Competencies found to contain overlaps with the GIS&T BOK achieve LAAB accreditation standards particularly dealing with computer applications and technology? Phase two established that GIS&T BOK topics can be used to help meet LAAB curriculum requirements particularly the domain *computing applications and other advanced technology*. Forty-nine of the ninety-one LABOK Knowledge Statements, with an established relationship to GIS&T, were found capable of meeting the LAAB curriculum requirement *computing applications and other advanced technology*.

Achieving LAAB curriculum standards is essential to any institution offering a first professional degree. Incorporating the GIS&T BOK topics identified in this study in a first professional landscape architecture curriculum as problem solving methods and tools can help meet at least the LAAB requirement of *computing applications and other advanced technology.* Great potential exists to achieve additional curriculum requirements and LAAB standards especially in programs that integrate parallel courses with technology courses as is the case at Kansas State. Results of phase two can be used for the evaluation of use or incorporation of GIS&T in a first professional degree program to help achieve LAAB curriculum accreditation as illustrated in Phase 3 of this study.

Phase three provided an evaluation of the integration of GIS&T in the first professional degree landscape architecture program at Kansas State University. The program's six course Tech Module sequence aims to teach technologies appropriate to spatial temporal problem solving requirements in parallel studio and construction courses. The Tech Module courses are designed to enforce and supplement material from corresponding courses while incorporating technological theories and methods. Research question three sought to answer if the Kansas State University first professional degree landscape architecture program was appropriately integrating GIS&T as a problem solving tool based on LABOK, GIS&T BOK, LAAB standards and literature regarding GIScience in landscape architectural problem solving.

Based on the Tech Module syllabi the Kansas State program incorporates GIScience into the curriculum. Comparing Tech Module course objectives with phase two results revealed many strengths and a few weaknesses in integration of GIScience and Technology. Forty-five of the forty-nine Knowledge Statements and Competencies from phase two were incorporated into the Tech Module courses. The Knowledge Statements and Competencies that were not present are1) Land information sources, 2) Regional hazard design considerations, 3) Roadway design principles, and 4) Maintain clear communication among collaborators through correspondence and project coordination. These are areas Kansas State University can improve integration of GIS&T in the current Tech Module sequence. The Kansas State University first degree program should incorporate principles of the four Knowledge Statements and Competencies into learning objectives using the GIS&T BOK topics to refine assessment measures. Nine LABOK Knowledge Statements/Competencies were exhibited in objectives of all six tech module courses (listed):

1. Patterns of Land use and built form
2. Natural site conditions and ecosystems
3. Communication and education methods, including sharing knowledge and evaluating outcomes
4. Photogrammetry and remote sensing
5. Visual resource assessment
6. Geographic coordinate systems and layout techniques and conventions
7. The roles of visual communication including photographic and video documentation
8. Graphic presentation techniques, systems and symbols

9. Create graphic materials in a variety of media

Each of the nine Knowledge Statements and Competencies relate directly to or utilize a fundamental GIS&T component. The Kansas State University Tech Module sequence displayed a strong incorporation of GIScience and Technology based on course objectives.

Results of this study provide evidence of a relationship between GIS&T and landscape architecture. The connections between GIS&T and landscape architecture represent problem solving methods and tools for a landscape architect. Approaching landscape architectural problems with the aid of GIS&T provides the opportunity for making more informed spatial temporal decisions, speaks to LABOK knowledge and competency areas and meets LAAB accreditation standards. Incorporating GIS&T into landscape architectural problem solving also presents a means of assessment and presentation of materials. The GIS&T BOK topics provide additional detailed text capable of informing how and what should be assessed when dealing with a spatial temporal problem and relevant learning objectives for defined problems in parallel and Tech Module courses.

Results established 887 relationships between the GIS&T BOK and the LABOK. These relationships provide the basis for utilizing GIS&T in landscape architecture. Each GIS&T BOK topic that overlapped with LABOK Knowledge Statements and Competencies contains objectives for achieving understanding of the topic. The objectives for GIS&T BOK topics provide a guide for content and assessment required for understanding of each GIS&T BOK topic included in learning objectives and defined spatial temporal problems. Incorporating these objectives into landscape architecture curricula not only integrates GIS&T, but also provides alternative methods and tools to approaching problem solving. Individuals can use GIS&T BOK topic objectives to incorporate GIS&T as a problem solving tool or as an assessment tool for existing use of GIS&T. Landscape Architecture programs can use results to incorporate GIS&T or evaluate existing use of GIS&T in a first degree program.

Limitations and Future Research

The study was limited by the lack of detail in the LABOK Study. The LABOK study contains only a list of Knowledge Statements and Competencies a landscape architect should be knowledgeable of. The LABOK presents no objectives on how to achieve understanding of the Knowledge Statements and Competencies. A clear outline on how to comprehend LABOK

Knowledge Statements and Competencies would allow a more in depth comparison with the objectives laid out for GIS&T topics.

A second limitation of the study exists in the initial matrix. The initial matrix was used to determine the presence and absence of overlaps between the LABOK and GIS&T BOK. The matrix was populated using a binary coding system to determine presence or absence of overlap between categories of the respective bodies of knowledge. While the binary system served the purpose of identifying overlaps, it minimized the ability to run statistical models on results and identify correlations beyond the count and visual analysis presented here.

A third limitation exists in this study as the results are based on a single observer and the author anticipates varying results depending on educational background and experience of others using the same methods especially given the fact the author completed all necessary courses for a first professional graduate degree in Landscape Architecture and a Graduate Certificate in GIS both at Kansas State University while conducting this study.

Future research could involve multiple participants in a survey approach to overlap delineation to remove bias and creating a database capable of storing and querying relationships to quickly find appropriate GIS&T topic detailed text useful in curricula and course planning, design and assessment. A searchable database would also provide a more efficient manner of storing matrix data and allow retrieval of queried information much faster. A second opportunity for future reseach would be to devise a more descriptive coding system for populating the matrix. A scaled or weighted system could incorporate relationship significance to identify strength of relationship between the LABOK and GIS&T BOK categories and allow for experimental design options for different types of analysis. Additional research questions could consider how GIScience and Technology topics are being integrated into first professional degree programs in many programs for comparative analysis, whether learning objectives of other LAAB accredited first professional degree programs utilize GIScience and Technology, and how GIScience and Technology topic integration could aid first professional landscape architects in achieving both landscape architectural and Geographic Information Science professional credentials.

In conclusion, landscape architecture is a profession that reflects natural, social, and cultural systems and the relationships between those systems and Geographic Information Science and Technology are integral in understanding and solving such spatial temporal dilemmas. As hypothesized, significant overlaps exist between the LABOK and GIS&T BOK

studies relevant to professional landscape architecture problem solving and essential to training landscape architects in professional degree programs. This study identifies critical relationships between the LABOK and GIS&T BOK, and the detailed topic text of the GIS&T overlapping categories can truly benefit the development of curricula, courses and assignments which provide essential methods and tools for understanding complex spatial temporal phenomena in natural and human systems studied and designed by landscape architects.

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Appendix A - LABOK Knowledge Statements and Competencies

Knowledge Statements

Landscape Architecture History and Criticism

1 history of landscape architecture and allied professions
2 historic preservation principles

Natural and Cultural Systems

3 land information sources
4 patterns of land use and built form
5 natural site conditions and ecosystems
6 social and cultural influences on design
7 regional hazard design considerations

Design and Planning Theories and Methodologies

8 creativity and process including design theory and problem –solving strategies
9 aesthetic principles of design
10 human factors such as behavior, perception, psychological and sensory response
11 natural factors such as ecological relationships
12 relationship between human and natural systems such as resource conservation, habitat restoration and creation, and urban ecology
13 influence of context on design, planning, and management decisions
14 research methods including data collection, interpretation, and application of results
15 therapeutic aspects of design
16 communication and education methods, including sharing knowledge and evaluating outcomes

Public Policy and Regulation

17 governmental policies and laws that affect the use and development of land
18 political and regulatory approval processes
19 land and development economics
20 emerging trends and issues

Design, Planning and Management at Various Scales and Applications

21 photogrammetry and remote sensing
22 visual resource assessment
23 agricultural and rural landscape analysis
24 urban landscape
25 planning principles including regional community and neighborhood planning
26 conservation of natural resources
27 historic preservation
28 ecological planning principles
29 Water resource management
30 wetland
31 floodplain management
32 land and water reclamation procedures including quarry, mine and landfill reclamation
33 treatment of toxic materials

Site Design and Engineering: Materials, Methods, Technologies and Applications

34 design needs for special populations
35 accessibility regulations
36 roadway design principles
37 elements of vehicular and pedestrian circulation systems and their design requirements
38 landscape maintenance techniques, materials, equipment, and practices
39 noise attenuation and mitigation techniques
40 sustainable construction practices
41 construction equipment and technologies
42 grading, drainage and stormwater treatment
43 biofiltration and other alternative drainage methods
44 erosion and sedimentation control
45 utility systems
46 Irrigation systems
47 lighting systems
48 structural considerations

Construction Documentation and Administration

49 quality control procedures for construction, such as delivery, storage, testing, etc.
50 sequencing of design, approval, permitting, and construction activities
51 the life-cycle cost-analysis process
52 geographic coordinate systems and layout techniques and conventions
53 specification types and components for a project
54 general and supplemental conditions, special provisions, and technical specifications and their organizations
55 construction administration and details
56 basic construction law
57 construction contracts

Communication

58 determination of user values such as focus groups and surveys
59 consensus and team building
60 techniques for conducting meetings
61 the roles of visual communication, including photographic and video documentation
62 graphic presentation techniques, systems and symbols
63 interpretive methods and techniques such as information displays and brochures
64 public relations, outreach, and image development

Values and Ethics in Practice

65 environmental ethics
66 social responsibility in design
67 organizational management principles such as leadership principles and landscape architect career cycle
68 resolving moral and ethical dilemmas

Competencies

Landscape Architecture History & Criticism

69 Develop an understanding of design as exemplified by historically significant works of landscape architecture, urban planning, civic design, and architecture

70 Examine economic, political, social, ecological and esthetic relationships and their influence on the development of the profession of landscape architecture

71 Demonstrate an understanding of the evolution of landscape architecture as an art and a profession through knowledge of its terminology, literature, personalities, and concepts

72 Demonstrate the ability to critique prior work and understand the relevance in addressing current issues and problems

73 Develop an ability to synthesize and make connections between aspects of landscape architecture and disciplines outside of landscape architecture

74 Conduct field investigations to identify significant natural and cultural features, characteristics, and systems

75 Perform quantitative analyses to evaluate the interactions of natural and cultural features, characteristics, and systems

76 Perform qualitative analyses to evaluate the relationship between the natural and cultural features, characteristics, and systems

77 Predict implications of design, planning, and management proposals on natural cultural systems both within the site and in the larger context

Public Policy and Regulation

78 Identify and collect regulatory information, applicable data and required approvals governing a project (e.g., relevant laws, codes, and regulations)

79 Confirm code compliance (e.g. zoning, environment, and accessibility)

80 Assist in the preparation of ordinances, regulations, covenants, standards, and guidelines

81 Influence public policies on areas such as growth and land and water management by testifying, lobbying, or preparing written documents for public distribution

Design, Planning, and Management at Various Scales and Applications

82 Develop a design program based on users' needs and clients' goals and resources

83 Analyze relationships among design elements by determining opportunities and constraints

84 Develop conceptual design, planning, and management solutions

85 Evaluate design alternatives to determine the appropriate solution

Site Design and Engineering: Materials, Methods, Technologies and Applications

86 Design for protection and management of land resources (e.g. land forms, vegetation, habitat, erosion and sedimentation control)

87 Design for protection and management of water resources (e.g. storm water, water supply, ground water)

88 Design pedestrian, vehicular, and non-motorized circulation systems

89 Design elements for construction considering materials, structural issues, and construction technologies

Construction Documentation and Administration

90 Prepare construction documents including plans, working drawings, and technical specifications

91 Prepare contract documents including agreements, general conditions, and bid documents

92 Manage the bidding/tendering process
93 Provide construction administration and observation throughout the project
94 Conduct project closure including review and distribution of close-out documents
95 Perform post construction evaluation
96 Perform construction services including design-build
97 Prepare management and maintenance manuals and documents

Communication

98 Maintain clear communication among collaborators through correspondence and project coordination
99 Develop written documentation, such as projects reports, grant proposals, and promotional materials
100 Create graphic materials in a variety of media
101 Prepare and deliver oral presentations such as meetings, demonstrations, and outreach
102 Conduct project and public meetings including preparing of meeting agendas and notes, and facilitation of the meeting
103 Review and critique peer work

Values and Ethics in Practice

104 Manage business practices and organizations
105 Manage risk and liability
106 Negotiate and prepare client and consultant agreements
107 Participate in life-long learning (e.g., a professional organization, continuing education activities)
108 Participate in professional and public service activities
109 Train, educate and mentor other professionals
110 Maintain and promote professional and ethical standards

Appendix B - GIS&T BOK Knowledge Areas, Units, Topics

Analytical Methods

AM1 - Academic and analytical origins
- Academic Foundations
- Analytical Approaches

AM2 - Query operations and query language
- Set Theory
- Structured Query & Language
- Spatial Queries

AM3 - Geometric measures
- Distance & Lengths
- Direction
- Shape
- Area
- Proximity & Distance Decay
- Adjacency & Connectivity

AM4 - Basic analytical operations
- Buffers
- Overlay
- Neighborhoods
- Map Algebra

AM5 - Basic analytical methods
- Point Pattern Analysis
- Kernels & Density Estimation
- Spatial Cluster Analysis
- Spatial Interaction
- Analyzing Multidimensional Attributes
- Cartographic Modeling
- Multi-criteria Evaluation
- Spatial Process Models

AM6 - Analysis of surfaces
- Calculating Surface Derivitaves
- Interprtation of Surfaces
- Surface Features
- Intervisibility
- Friction Surfaces

AM7 - Spatial Statistics
- Graphical Methods
- Stochastic Processes
- Spatial Weights Matrix
- Global Measures of Spatial Association
- Local Measures of Spatial Association
- Outliers
- Bayesian Methods

AM8 - Geostatistics
- Spatial Sampling for Statistical Analysis
- Principles of Semi-variogram Construction
- Semi-variogram Modeling
- Principles of Kriging
- Kriging Variants

AM9 - Spatial Regression and Econometrics
- Principles of Spatial Econometrics
- Spatial Autoregression Models
- Spatial Filtering
- Spatial Expansion & Geographically Weighted Regression

AM10 - Data Mining
- Problems of Large Spatial Databases
- Data Mining Approaches
- Knowledge Discovery
- Pattern Recognition & Matching

AM11 - Network Analysis
- Networks Defined
- Graphic Theoretic (descriptive) Measures
- Least-cost (shortest) Path
- Flow Modeling
- Classic Transportation Problem
- Other Classic Network Problems
- Accessibility Modeling

AM12 - Optimization and location-allocation Modeling
- Operations Research Modeling & Location Modelign Principles
- Linear Programming
- Integer Programming

Conceptual Foundations

CF1 - Philisophical foundations
- Metaphysics & Ontology
- Epistomology
- Philosophical Perspectives

CF2 - Cognitive and social foundations
- Perception & Cognition of geographic Phenomena
- From Concepts to Data
- Geography as a Foundation for GIS
- Place & Landscape
- Common-sense Geographies
- Cultural Influences
- Political Influences

CF3 - Domains of geographic information
- Space
- Time
- Relationship between Space &Time
- Properties

CF4 - Elements of geographic information
- Discrete Entities
- Events & Processes
- Fields in Space & Time
- Integrated Models

CF5 - Relationships
- Categories
- Mereology: Structural Relationships
- Geneological Relationships: Lineage, Inheretance
- Topological Relationships
- Metrical Relationships: Distance & Direction
- Spatial Distribution
- Region
- Spatial Integration

CF6 - Imperfections in geographic information
- Vagueness
- Mathematical Models of Vagueness: Fuzzy Sets & Rough Sets
- Error-based Uncertainty
- Mathematical Models of Uncertainty: Probablility & Statistics

Cartography & Visualization

CV1 - History and trends
- History of Cartography
- Technological Trarnsformations

CV2 - Data considerations
- Source materials for mapping
- Data abstraction: classification,selection,and generalization
- Projection as a map design

CV3 - Principles of map design
- Map design fundamentals
- Basic concepts of symbolization
- Typography for caartography and visualization

CV4 - Graphic representation techniques
- Basic thematic mapping methods
- Multivariate deisplays
- Dynamic and interactive displays
- Representing terrain
- Web mapping and visualizations
- Virtual and immersive environments
- Spatialization
- Visualization of temporal geographic data
- Visualization of uncertainty

CV5 - Map production
- Computational issues
- Map production
- Map reproduction

CV6 - Map use and evaluation
- The power of maps
- Map reading
- Map interpretation
- Map analysis
- Evaluation and testing
- Impact of uncertainty

Design Aspects

DA1 - The Scope of GIS&T system design
- Using models to represent information and processes
- Components of models: data,structures,procedures
- The scope of GIS&T applications
- The scope of GIS&T design
- The process of GIS&T design

DA2 - Project definition
- Problem definition
- Planning for design
- Application/user assessment
- Requirements analysis
- Social,political, and cultural issues

DA3 - Resource planning
- Feasibility analysis
- Software systems
- Data costs
- Labor and mangement
- Capital: facilities and equipment
- Funding

DA4 - Database design
- Modeling tools
- Conceptual models
- Logical models
- Physical models

DA5 - Analysis design
- Recognizing analytical components
- Identifying and designing analytical procedures
- Coupling scientific models with GIS
- Formalizing a procedure design

DA6 - Application design
- Workflow analysis and design
- User interfaces
- Development environments for geospatial applications
- Computer-Aided software Engineering (CASE) tools

DA7 - System implementation
- Implementation planning
- Implementation tasks
- System testin
- System deployment

Data Modeling

DM1 - Basic storage and retrieval structures
- Basic data structures
- Data retrieval strategies

DM2 - Database management systems
- Coevolution of DBMS and GIS
- Relational DBMS
- Object-oriented DBMS
- Extensions of the relational model

DM3 - Tessellation data models
- Grid representations
- The raster model
- Grid compression methods
- The hexagonal model
- The Triangulated Irregular Network (TIN) model
- Resolution
- Hierarchial data model

DM4 - Vector and object data models
- Geometric primitives
- The spaghetti model
- The topological model
- Classic vector data models
- The network model
- Linear referencing
- Object-based spatial databases

DM5 Modeling 3D,uncertain,and temporal phenomena
- Spatio-temporal GIS
- Modeling uncertainty
- Modeling three-dimensional entities

Data Manipulation

DN1 - Representation transformation
Impacts of transformations
Data model and format conversion
Interpolation
Vector-to-raster and raster-tovictor conversions
Raster resampling
Coordinate transformations

DN2 - Generalization and aggregation
Scale and generalization
Point,line, and area genrerlization
Classification and rransformation of attribute measurement levels
Aggregation of spatial entities

DN3 - Transaction management
Database change
Modeling database change
Reconciling database change
Managing versioned geospatial databases

Geocomputation

GC1 - Emergence of geocomputation
Origins
Trends

GC2 - Computational aspects and neurocomputing
High performance computing
Computational intelligence
Non-linearity relationships and non-Gaussian distributions
Pattern recognition
Geospatial data classification
Multi-layer feed-forward neutral networks
Space-scale algorithms
Rule learning
Neural network schemes

GC3 - Cellular Automata (CA)
CA Model Structure
CA Transition Rule
CA simulation and calibration
Integration of CA and other geocomputation methods
Typical CA applications

GC4 - Heuristics
Greedy heuristics
Interchange heuristics
Interchange with probability
Simulated annealing
Lagrangian relaxation

GC5 - Genetic algorithmus (GA)
GA and global solutions
Genetic algorithms and artificial genomes

GC6 - Agent-based models
Structure of agent-based models
Specification of agent-based models
Adaptive agents
Microsimulation and calibration of agent activies
Encoding agent-based models

GC7 - Simulation modeling
Simulation modeling

GC8 - Uncertainty
Conceptual model of uncertainty
Error
Problems of scale and zoning
Propagation of error in geospatial modeling
Theory of error propagation
Problems of currency,source,and scale
GC9 - Fuzzy sets
Fuzzy logic
Fuzzy measures
Fuzzy aggregation operators
Standardization
Weighting schemes

Geospatial Data

GD1 - Earth geometry
History of understanding Earth's shape
Geoids
Spheres and ellipsoids

GD2 - Land partitioning systems
Unsystematic methods
Systematic methods

GD3 - Georeferencing systems
Geographic coordinate system
Plane coordinate systems
Tessellated referencing systems
Linear referencing systems

GD4 - Datums
Horizontal datums
Vertical datums

GD5 - Data quality
Map projection properties
Map projection classes
Map projection parameters
Georegistration

GD6 - Data quality
Geometric accuracy
Thematic accuracy
Resolution
Precision
Primary and secondary sources

GD7 - Land surveying and GPS
Survey theory and electro-optical methods
Land records
Global Positioning System

GD8 - Digitizing
Tablet digitizing
On-screen digitizing
Scanning and automated vectorization

GD9 - Field data collection
Sample size selection
Spatial sample types
Sample intervals
Field data technologies

GD10 - Aerial imaging and photogrammetry
Nature of aerial image data
Platforms and sensors
Aerial image interpretation
Sstereoscopy and orthoimagery
Vector data extraction
Mission planning

GD11 - Satellite and shipboard remote sensing
Nature of multispectral image data
Platforms and sensors
Algorithms and processing
Ground verification and accuracy assessment
Applications and settings

GD12 - Metadata,standards, and infrastructures
Metadata
Content standards
Data warehouses
Exchange specifications
Transport protocols
Spatial Data Infrastructures

GIS&T and Society

GS1 - Legal aspects
The legal regime
Contract law
Liability
Privacy

GS2 - Economic aspects
Economics and the role of information
Valuing and measuring benefits
Models of benefits
Agency, organizational, and individual perpectives
Measuring costs

GS3 - Use of geospatial information in the public sector
Uses of geospatial information in government
Public participation in governing
Public participation GIS

GS4 - Geospatial information as property
Property regimes
Mechanisms of control of geospatial information
Enforcing control
GS5 - Dissemination of geospatial information

GS5 - Incentives and barriers to sharing geospatial information
Data sharing among organizations and individuals
Legal mechanisms for sharing geospatial information
Balancing security and open access to geospatial information

GS6 - Ethnics and geospatial information
Ethics and geospatial information
Codes of ethics for geospatial professionals

GS7 - Critical GIS
Epistemological critiques
Ethical critiques
Feminist critiques
Social critiques

Organizational & Institutional Aspects

OI1 - Origins of GIS&T
Public sector origins
Private sector origins
Academic origins
Learning from experience
Future trends

OI2 - Managing the GI system operations and infrastructure
Managing the GI system operations and infrastructure
Ongoing GI system revision
Budgeting for GI system management
Database administration
Sysstem management
User support

OI3 - Organizational structures and procedures
Organizational models for GI system management
Organizational models for coodinating GI systems and/or program participants and stakeholders
Integrating GIS&T with management information systems (MIS)

OI4 - GIS&T workforce themes
GIS&T staff development
GIS&T positions and qualifications
GIS&T training and education
Incorporating GIS&T into existing job classifications

OI5 - Institutional and inter-institutional aspects
Spatial data infrastructures
Adoption of standards
Technology transfer
Spatial data sharing among organizations
Openness
Balancing data acces,security,and privacy
Implications of distributed GIS&&T
Interorganizational and vendor GI systems

OI6 - Coordinating organizations
Federal agencies and national and international organizations and programs
State and regional coordinating bodies
Professional organizations
Publications
The geospatial community
The geospatial Industry

Appendix C - Tech Module Objectives that incorporate GIScience

Below are the objectives used in phase three. The objectives are taken directly from the Kansas State University LA Tech Module course syllabi (LAR 510, LAR 520…LAR 560). Objectives were used to evaluate the use of GIScience in the Kansas State University Tech Module sequence. Only objectives with a direct reference to GIScience or ideals of GIScience and Technology exhibited in relevant literature are included.

Tech Module 1 (LAR 510)

1. To create a learning community focused on landscape architectural problem solving and communication using digital tools including 3D Visualization, Geographic Information Systems (GIS), Graphics and Office Software and image capturing hardware, and possibly Computer Aided Drafting and Design (CADD).
2. To understand that design and the built environment are products of a process of communication.
3. To understand that professional landscape architects communicate in a variety of forms—verbal, written, and graphic—via digital media.
4. To learn effective coalescence and implementation of digital tools used to communicate existing landscape conditions and design alternatives via a real world project.
5. To learn foundational knowledge, skills and abilities related to digital landscape architectural problem solving including: digital theories, methods and standards used to organize, inventory, analyze, synthesize, create, and communicate design information.
6. To introduce and utilize GIScience data, technology, applications and methods—including GIS (ESRI ArcGIS 9.1), Thematic Mapping, and Remote Sensing—to create a developable land summary map at a variety of scales and 3D Fly Through of a landscape.

Tech Module 2 (LAR 520)

1. To create a learning community focused on landscape architectural problem solving and communication using digital tools including 3D Visualization, Geographic Information Systems (GIS), CADD, Image and Graphics and Office Software and image capturing hardware.
2. To build upon understanding that design and the built environment are products of a process of communication.
3. To further development of professional landscape architects communication knowledge, skills and abilities in a variety of forms—verbal, written, and graphic—via digital media.
4. To learn effective coalescence and implementation of digital tools used to communicate existing and proposed landscape features for site scale landscape projects.
5. To learn foundational knowledge, skills and abilities related to digital landscape architectural problem solving including: digital theories, methods and standards used to organize, inventory, analyze, synthesize, create, and communicate design information.
6. To build upon prior learning and utilize GIScience data, technology, applications and methods—including GIS (ESRI ArcGIS 9.x), Thematic Mapping, and Remote Sensing—to create a developable land summary map at a variety of scales and 3D Fly Through of a landscape.
7. To introduce and utilize AutoDesk Land Desktop 2007 (including AutoCAD 2007) and the National CAD Standard to create and develop existing and proposed landscape features and details and coalesce AutoCAD drawings (.dwg) with GIS and SketchUp applications to enhance digital modeling efficiency and communication options.
8. To introduce the basic elements of landscape surveying including terms and methods for measurement systems, profile leveling, topographic and site surveying.

Tech Module 3 LAR (530)

1. To create a learning community focused on landscape architectural problem solving and communication using digital tools including: 3D Modeling & Visualization, Geographic Information Systems (GIS), Graphics and Office Software, image capturing hardware, and Computer Aided Drafting and Design (CADD).
2. To apply and enhance understanding of effective coalescence and implementation of digital tools used to communicate existing and proposed landscape elements, and construction document survey of existing conditions (base maps), grading plans, planting plans, and earthwork estimates.
3. Gain knowledge and experience in site surveying methods, equipment and processes used by surveyors to develop site surveys for landscape architects.

Tech Module 4 LAR (540)

1. To create a learning community focused on landscape architectural problem solving and communication using digital tools including 3D Visualization, Geographic Information Systems (GIS), CADD, Image and Graphics and Office Software and image capturing hardware.
2. To build upon understanding that design and the built environment are products of a process of communication.
3. To further development of professional landscape architects communication knowledge, skills and abilities in a variety of forms—verbal, written, and graphic—via digital media.
4. To learn effective coalescence and implementation of digital tools used to communicate proposed landscape features for site scale landscape.
5. To learn foundational knowledge, skills and abilities related to digital landscape architectural problem solving including: digital theories, methods and standards used to organize, inventory, analyze, synthesize, create, and communicate design information.
6. To introduce and utilize AutoDesk Land Desktop 2007 (including AutoCAD 2007) and the National CAD Standard to create and develop existing and proposed landscape features and details and coalesce AutoCAD drawings (.dwg) with GIS and SketchUp applications to enhance digital modeling efficiency and communication options.
7. To introduce the basic elements of landscape surveying including terms and methods for measurement systems, profile leveling, topographic and site surveying.

Tech Module 5 (LAR 550)

1. To create a learning community focused on landscape architectural problem solving and communication using digital tools including: 3D Modeling & Visualization, Geographic Information Systems (GIS), Graphics and Office Software, image capturing hardware, and Computer Aided Drafting and Design (CADD).
2. To apply advanced understanding of effective coalescence and implementation of digital tools used to communicate existing and proposed landscape elements in 2D and 3D, and construction documents for a mixed use development.

Tech Module 6 (LAR 560)

1. Site Data Collection & Implementation- GPS, Laser, Level (1)
2. Spreadsheets & Database Tables, Templates, Data Query & Reporting
3. Thematic Mapping & Geoprocessing-GIS
4. Digital Documents, Imaging, Graphics & Presentation

Appendix D - Creating a Matrix Image

Microsoft Excel 2003 lacked the capability to include the necessary number of columns required for the phase one matrix in one worksheet. To view the matrix as a whole, the results had to be merged using an alternative software program. The following instructions illustrate the process used to merge results using ESRI's ARCmap GIS software.

Results (1's and 0's) of the phase 1a matrix were transferred into ten new excel worksheets using the first phase format of one worksheet for each of the ten GIS&T Knowledge Areas. Each worksheet was then named with the Knowledge Area initials and saved as a .txt file with ANSI coding . In Notepad the following information was inserted into the top of the document.

ncols 0
nrows 110
xllcorner 0
yllcorner 0
cellsize 1
nodata_value -9999

This information provided geospatial reference in ARCmap. Only the ncols and xllcorner information required modification. The ncols represented the number of columns. In Notepad the ncols (0) was replace with the appropriate number of columns for each Knowledge Area. For example the Data Manipulation (DN) Knowledge Area contained 14 columns (ncols 14). The xllcorner provided the data insertion point. The first Knowledge Area xllcorner remained at zero. Subsequent Knowledge Areas contained cumulative number of rows For example the first Knowledge Area contained 59 columns therefore the second xllcorner had a number of 59, the second Knowledge Area contained 30 columns therefore the third document had an xllcorner of 89 (59+30). The xllcorner was modified for each Knowledge Area based on this formula. Once modified to include spatial referencing information the documents were moved to ESRI's ArcCatalog. The ASCII to raster conversion tool in Arc Toolbox was used for creating the raster images. In the conversion tool, the .txt files were chosen as the input, and the data type was set to float. Each .txt file was converted in the same manner. Once each file was converted, in the data

management tools the raster option was selected and the target raster was chosen as the first Knowledge Area AM. The remaining Knowledge Area files were placed in the input.
A new raster image is created as a modified version of the AM raster. This image contained all results of the phase 1a matrix. A completed version containing the appropriate headings can be found in the following image.

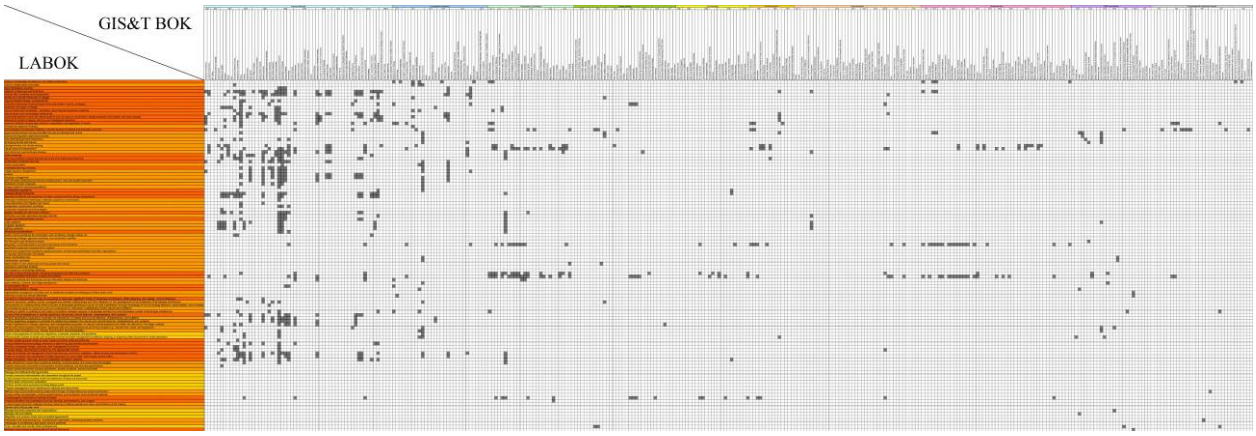

Figure A.1 The initial matrix with all 10 Knowledge Areas merged together into one document.

Appendix E - The Initial Matrix (1a)

LABOK				Command of Knowledge at time of Degree		GIS&T BOK																							
						Analytical Methods																							
						AM1		AM2			AM3						AM4				AM5								
Knowledge Statement / Competency Division	Domains		Knowledge Statements / Competencies	Mean	Standard Deviation	Academic Foundations	Analytical Approaches	Set Theory	Structured Query & Language	Spatial Queries	Distance & Lengths	Direction	Shape	Area	Proximity & Distance Decay	Adjacency & Connectivity	Buffers	Overlay	Neighborhoods	Map Algebra	Point Pattern Analysis	Kernels & Density Estimation	Spatial Cluster Analysis	Spatial Interaction	Analyzing Multidimensional Attributes	Cartographic Modeling	Multi-criteria Evaluation	Spatial Process Models
KNOWLEDGE STATEMENTS	Landscape Architecture History and Criticism	1	history of landscape architecture and allied professions	2.15	0.69	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		2	historic preservation principles	1.69	0.83	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Natural and Cultural Systems	3	land information sources	2.55	0.77	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		4	patterns of land use and built form	2.43	0.76	1	1	0	0	0	0	0	1	0	1	1	1	1	0	0	1	0	1	1	1	0	0	1
		5	natural site conditions and ecosystems	2.76	0.66	0	1	0	0	0	0	1	0	0	0	0	1	1	0	0	0	0	0	1	1	0	1	1
		6	social and cultural influences on design	2.19	0.81	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	1	0	0	0	0
		7	regional hazard design considerations	2.1	0.87	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	1	0
	Design and Planning Theories and Methodologies	8	creativity and process including design theory and problem –solving strategies	2.83	0.64	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	1	0	0
		9	aesthetic principles of design	2.78	0.71	0	0	0	0	0	1	1	1	1	0	0	1	0	0	1	0	0	0	0	0	0	0	1
		10	human factors such as behavior, perception, psychological and sensory response	2.33	0.76	0	0	0	0	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	0	0	0	1
		11	natural factors such as ecological relationships	2.53	0.75	0	1	0	0	0	0	0	0	0	0	1	1	0	1	1	0	0	1	1	0	0	0	1
		12	relationship between human and natural systems such as resource conservation, habitat restoration and creation, and urban ecology	2.36	0.79	1	0	0	0	0	0	0	0	0	1	0	1	0	1	0	0	0	0	1	1	0	0	1
		13	influence of context on design, planning, and management decisions	2.45	0.76	1	0	0	0	0	0	1	0	0	1	0	1	0	0	0	0	0	0	1	0	0	0	1
		14	research methods including data collection, interpretation, and application of results	2.37	0.93	1	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0
		15	therapeutic aspects of design	1.66	0.88	0	0	0	0	0	0	1	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0
		16	communication and education methods, including sharing knowledge and evaluating outcomes	2.15	0.99	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Public Policy and Regulation	17	governmental policies and laws that affect the use and development of land	1.8	0.85	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0
		18	political and regulatory approval processes	1.67	0.92	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		19	land and development economics	1.47	0.83	0	0	0	0	0	1	0	0	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0
		20	emerging trends and issues	1.65	0.83	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

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KNOWLEDGE STATEMENTS	Design, Planning and Management at Various Scales and Applications	21	photogrammetry and remote sensing	1.47	0.84	0	1	0	0	1	0	1	1	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0
		22	visual resource assessment	1.91	0.88	0	1	0	0	0	1	0	1	0	0	0	0	1	0	0	0	0	0	0	0	1	0	0	0
		23	agricultural and rural landscape analysis	1.68	0.85	0	1	0	0	0	0	0	1	0	0	0	1	0	0	0	0	0	0	0	1	1	0	0	1
		24	urban landscape	2.17	0.71	0	0	0	0	0	1	0	1	0	1	0	1	0	1	1	1	0	0	1	0	0	0	0	1
		25	planning principles including regional community and neighborhood planning	2.12	0.76	0	0	0	0	0	1	0	0	0	1	1	1	0	0	0	0	0	0	0	1	0	0	1	0
		26	conservation of natural resources	2.33	0.8	1	0	0	0	1	0	0	0	0	0	0	1	0	0	1	0	0	0	1	0	1	1	0	
		27	historic preservation	1.73	0.76	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		28	ecological planning principles	2.23	0.8	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	0	0	0	1	0	1	1	0	
		29	Water resource management	1.91	0.84	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1	0	0	1	0	0
		30	wetland	1.78	0.83	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	0	0	0	1	0	0	1	0	0
		31	floodplain management	1.8	0.86	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	0	0	0	1	0	0	1	0	0
		32	land and water reclamation procedures including quarry, mine and landfill reclamation	1.43	0.84	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1	0	0	0	0	0
		33	treatment of toxic materials	1.05	0.86	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	1	0	0	1	0	0
	Site Design and Engineering: Materials, Methods, Technologies and Applications	34	design needs for special populations	1.91	0.78	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		35	accessibility regulations	2.28	0.87	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0
		36	roadway design principles	2.15	0.83	0	0	0	0	0	1	1	1	1	1	1	1	1	0	0	0	0	0	1	0	0	0	0	0
		37	elements of vehicular and pedestrian circulation systems and their design requirements	2.57	0.72	0	0	0	0	0	1	1	1	0	1	1	1	0	0	0	0	0	0	1	0	0	0	0	0
		38	landscape maintenance techniques, materials, equipment, and practices	1.93	0.87	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		39	noise attenuation and mitigation techniques	1.66	0.82	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	1	0	0	0	0	0
		40	sustainable construction practices	1.82	0.84	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0
		41	construction equipment and technologies	1.76	0.87	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		42	grading, drainage and stormwater treatment	2.78	0.57	0	0	0	0	0	1	1	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0
		43	biofiltration and other alternative drainage methods	1.91	0.84	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		44	erosion and sedimentation control	2.28	0.82	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0
		45	utility systems	1.77	0.77	0	0	0	0	1	1	1	0	0	1	0	0	1	0	1	0	0	0	0	0	0	0	0	0
		46	Irrigation systems	1.75	0.88	0	0	0	0	1	1	1	0	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0
		47	lighting systems	1.7	0.79	0	0	0	0	1	1	1	0	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0
		48	structural considerations	2.06	0.82	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Construction Documentation and Administration	49	quality control procedures for construction, such as delivery, storage, testing, etc.	1.27	0.87	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0
		50	sequencing of design, approval, permitting, and construction activities	1.68	0.92	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		51	the life-cycle cost-analysis process	1.32	0.86	0	0	0	0	0	0	0	0		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		52	geographic coordinate systems and layout techniques and conventions	1.9	0.9	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		53	specification types and components for a project	1.89	0.83	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		54	general and supplemental conditions, special provisions, and technical specifications and their organizations	1.64	0.88	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		55	construction administration and details	1.73	0.92	0		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		56	basic construction law	1.48	0.84	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		57	construction contracts	1.55	0.88	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

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KNOWLEDGE STATEMENTS	Communication	58	determination of user values such as focus groups and surveys	1.52	0.83	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		59	consensus and team building	1.74	0.91	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		60	techniques for conducting meetings	1.59	0.97	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		61	the roles of visual communication, including photographic and video documentation	2.25	0.85	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0
		62	graphic presentation techniques, systems and symbols	2.71	0.73	0	1	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		63	interpretive methods and techniques such as information displays and brochures	1.82	0.98	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		64	public relations, outreach, and image development	1.49	0.97	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Values and Ethics in Practice	65	environmental ethics	2.08	0.82	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		66	social responsibility in design	2.1	0.78	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		67	organizational management principles such as leadership principles and landscape architect career cycle	1.61	0.93	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		68	resolving moral and ethical dilemmas	1.89	0.93	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
COMPETENCIES	Landscape Architecture History & Criticism	69	Develop an understanding of design as exemplified by historically significant works of landscape architecture, urban planning, civic design, and architecture	2.02	0.73	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	1	0	0	0	0	0
		70	Examine economic, political, social, ecological and esthetic relationships and their influence on the development of the profession of landscape architecture	1.65	0.78	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	1	0	0	1	0
		71	Demonstrate an understanding of the evolution of landscape architecture as an art and a profession through knowledge of its terminology, literature, personalities, and concepts	1.85	0.76	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0
		72	Demonstrate the ability to critique prior work and understand the relevance in addressing current issues and problems	1.89	0.74	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		73	Develop an ability to synthesize and make connections between aspects of landscape architecture and disciplines outside of landscape architecture	1.98	0.73	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	1	0	0

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COMPETENCIES	Natural & Cultural Systems	74	Conduct field investigations to identify significant natural and cultural features, characteristics, and systems	2.06	0.74	1	1	0	0	1	0	0	0	0	0	0	1	0	0	1	0	0	0	1	0	0	0	0	0
		75	Perform quantitative analyses to evaluate the interactions of natural and cultural features, characteristics, and systems	1.64	0.78	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1	0	0	1	0	0
		76	Perform qualitative analyses to evaluate the relationship between the natural and cultural features, characteristics, and systems	1.79	0.78	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1	0	0	1	0	0
		77	Predict implications of design, planning, and management proposals on natural cultural systems both within the site and in the larger context	1.88	0.76	0	0	0	0	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0
	Public Policy and Regulation	78	Identify and collect regulatory information, applicable data and required approvals governing a project (e.g., relevant laws, codes, and regulations)	1.31	0.74	1	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		79	Confirm code compliance (e.g. zoning, environment, and accessibility)	1.37	0.81	0	0	0	0	0	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		80	Assist in the preparation of ordinances, regulations, covenants, standards, and guidelines	0.77	0.69	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0
		81	Influence public policies on areas such as growth and land and water management by testifying, lobbying, or preparing written documents for public distribution	0.73	0.75	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0
	Design, Planning, and Management at Various Scales and Applications	82	Develop a design program based on users' needs and clients' goals and resources	2.13	0.75	0	0	0	0	1	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0
		83	Analyze relationships among design elements by determining opportunities and constraints	2.33	0.62	0	0	0	0	0	0	0	1	0	0	0	0	1	0	1	0	0	0	1	0	0	0	0	0
		84	Develop conceptual design, planning, and management solutions	2.39	0.61	0	0	0	0	0	0	0	0	0	1	1	0	1	0	0	0	0	0	0	0	0	0	0	0
		85	Evaluate design alternatives to determine the appropriate solution	2.45	0.59	0	0	0	0	0	1	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0
	Site Design and Engineering: Materials, Methods, Technologies and Applications	86	Design for protection and management of land resources (e.g. land forms, vegetation, habitat, erosion and sedimentation control)	2.13	0.64	0	0	0	0	1	0	0	0	0	0	1	1	1	0	1	0	0	0	1	0	0	1	0	0
		87	Design for protection and management of water resources (e.g. storm water, water supply, ground water)	2.05	0.66	0		0	0	0	0	0	0	0	0	1	1	1	0	1	0	0	0	1	0	0	0	0	0
		88	Design pedestrian, vehicular, and non-motorized circulation systems	2.28	0.62	0	0	0	0	0	1	1	0	0	1	1	0	1	0	1	0	0	0	0	0	0	0	0	0
		89	Design elements for construction considering materials, structural issues, and construction technologies	1.94	0.69	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0
	Construction Documentation and Administration	90	Prepare construction documents including plans, working drawings, and technical specifications	1.87	0.77	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		91	Prepare contract documents including agreements, general conditions, and bid documents	1.24	0.82	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		92	Manage the bidding/tendering process	0.72	0.7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		93	Provide construction administration and observation throughout the project	0.83	0.78	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		94	Conduct project closure including review and distribution of close-out documents	0.67	0.73	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		95	Perform post construction evaluation	0.91	0.79	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		96	Perform construction services including design-build	0.67	0.7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		97	Prepare management and maintenance manuals and documents	0.81	0.7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

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COMPETENCIES	Communication	98	Maintain clear communication among collaborators through correspondence and project coordination	1.51	0.9	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		99	Develop written documentation, such as projects reports, grant proposals, and promotional materials	1.43	0.84	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		100	Create graphic materials in a variety of media	2.19	0.76	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0
		101	Prepare and deliver oral presentations such as meetings, demonstrations, and outreach	2.18	0.72	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		102	Conduct project and public meetings including preparing of meeting agendas and notes, and facilitation of the meeting	1.34	0.89	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		103	Review and critique peer work	1.79	0.88	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Values and Ethics in Practice	104	Manage business practices and organizations	0.81	0.74	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		105	Manage risk and liability	0.86	0.81	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		106	Negotiate and prepare client and consultant agreements	0.74	0.79	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		107	Participate in life-long learning (e.g., a professional organization, continuing education activities)	1.56	1.03	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		0
		108	Participate in professional and public service activities	1.58	0.83	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		109	Train, educate and mentor other professionals	0.96	0.91	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		110	Maintain and promote professional and ethical standards	2.12	0.86	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
					Sum	9	8	0	1	8	17	13	9	3	20	15	33	17	4	17	2	0	2	27	5	6	13	9
					Average	0.08	0.07	0.00	0.01	0.07	0.15	0.12	0.08	0.03	0.18	0.14	0.30	0.15	0.04	0.15	0.02	0.00	0.02	0.25	0.05	0.05	0.12	0.08

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KNOWLEDGE STATEMENTS	Landscape Architecture History and Criticism	1	history of landscape architecture and allied professions	2.15	0.69	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		2	historic preservation principles	1.69	0.83	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Natural and Cultural Systems	3	land information sources	2.55	0.77	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		4	patterns of land use and built form	2.43	0.76	1	1	1	0	0	1	0	0	0	0	0	0	1	0	0	1	1	0	0	0	0	0
		5	natural site conditions and ecosystems	2.76	0.66	1	1	1	0	0	1	0	0	0	0	0	0	1	1	0	1	1	0	0	0	0	0
		6	social and cultural influences on design	2.19	0.81	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		7	regional hazard design considerations	2.1	0.87	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Design and Planning Theories and Methodologies	8	creativity and process including design theory and problem –solving strategies	2.83	0.64	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		9	aesthetic principles of design	2.78	0.71	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		10	human factors such as behavior, perception, psychological and sensory response	2.33	0.76	1	0		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		11	natural factors such as ecological relationships	2.53	0.75	1	1	1	0	0	0	0	0	0	0	0	0	1	0	0	1	1	0	0	0	0	0	0	0
		12	relationship between human and natural systems such as resource conservation, habitat restoration and creation, and urban ecology	2.36	0.79	1	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0
		13	influence of context on design, planning, and management decisions	2.45	0.76	1	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0
		14	research methods including data collection, interpretation, and application of results	2.37	0.93	1	0	0	0	0	1	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0
		15	therapeutic aspects of design	1.66	0.88	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		16	communication and education methods, including sharing knowledge and evaluating outcomes	2.15	0.99	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Public Policy and Regulation	17	governmental policies and laws that affect the use and development of land	1.8	0.85	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		18	political and regulatory approval processes	1.67	0.92	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		19	land and development economics	1.47	0.83	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		20	emerging trends and issues	1.65	0.83	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

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KNOWLEDGE STATEMENTS	Design, Planning and Management at Various Scales and Applications	21	photogrammetry and remote sensing	1.47	0.84	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0
		22	visual resource assessment	1.91	0.88	1	1	0	1	0	1	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0
		23	agricultural and rural landscape analysis	1.68	0.85	1	1	1	1	0	1	0	0	0	0	0	0	1	0	0	1	1	0	0	0	0
		24	urban landscape	2.17	0.71	1	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		25	planning principles including regional community and neighborhood planning	2.12	0.76	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		26	conservation of natural resources	2.33	0.8	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0
		27	historic preservation	1.73	0.76	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		28	ecological planning principles	2.23	0.8	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		29	Water resource management	1.91	0.84	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		30	wetland	1.78	0.83	1	1	1	0	0	0	0	0	0	0	0	0	1	0	0	1	1	0	0	0	0
		31	floodplain management	1.8	0.86	1	1	1	0	0	0	0	0	0	0	0	0	1	0	0	1	1	0	0	0	0
		32	land and water reclamation procedures including quarry, mine and landfill reclamation	1.43	0.84	1	1	1	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0
		33	treatment of toxic materials	1.05	0.86	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Site Design and Engineering: Materials, Methods, Technologies and Applications	34	design needs for special populations	1.91	0.78	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		35	accessibility regulations	2.28	0.87	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		36	roadway design principles	2.15	0.83	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		37	elements of vehicular and pedestrian circulation systems and their design requirements	2.57	0.72	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		38	landscape maintenance techniques, materials, equipment, and practices	1.93	0.87	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		39	noise attenuation and mitigation techniques	1.66	0.82	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		40	sustainable construction practices	1.82	0.84	1	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		41	construction equipment and technologies	1.76	0.87	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		42	grading, drainage and stormwater treatment	2.78	0.57	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		43	biofiltration and other alternative drainage methods	1.91	0.84	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		44	erosion and sedimentation control	2.28	0.82	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		45	utility systems	1.77	0.77	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		46	Irrigation systems	1.75	0.88	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		47	lighting systems	1.7	0.79	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		48	structural considerations	2.06	0.82	1	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Construction Documentation and Administration	49	quality control procedures for construction, such as delivery, storage, testing, etc.	1.27	0.87	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		50	sequencing of design, approval, permitting, and construction activities	1.68	0.92	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		51	the life-cycle cost-analysis process	1.32	0.86	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		52	geographic coordinate systems and layout techniques and conventions	1.9	0.9	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		53	specification types and components for a project	1.89	0.83	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		54	general and supplemental conditions, special provisions, and technical specifications and their organizations	1.64	0.88	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		55	construction administration and details	1.73	0.92	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		56	basic construction law	1.48	0.84	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		57	construction contracts	1.55	0.88	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

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KNOWLEDGE STATEMENTS	Communication	58	determination of user values such as focus groups and surveys	1.52	0.83	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		~~59~~	~~consensus and team building~~	~~1.74~~	~~0.91~~	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		60	techniques for conducting meetings	1.59	0.97	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0	0
		61	the roles of visual communication, including photographic and video documentation	2.25	0.85	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		62	graphic presentation techniques, systems and symbols	2.71	0.73	0	0	0	1	0	1	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0
		63	interpretive methods and techniques such as information displays and brochures	1.82	0.98	0	0	0	0	0	1	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0
		64	public relations, outreach, and image development	1.49	0.97	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Values and Ethics in Practice	65	environmental ethics	2.08	0.82	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		66	social responsibility in design	2.1	0.78	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		67	organizational management principles such as leadership principles and landscape architect career cycle	1.61	0.93	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		68	resolving moral and ethical dilemmas	1.89	0.93	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
COMPETENCIES	Landscape Architecture History & Criticism	69	Develop an understanding of design as exemplified by historically significant works of landscape architecture, urban planning, civic design, and architecture	2.02	0.73	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		70	Examine economic, political, social, ecological and esthetic relationships and their influence on the development of the profession of landscape architecture	1.65	0.78	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		71	Demonstrate an understanding of the evolution of landscape architecture as an art and a profession through knowledge of its terminology, literature, personalities, and concepts	1.85	0.76	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		72	Demonstrate the ability to critique prior work and understand the relevance in addressing current issues and problems	1.89	0.74	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		73	Develop an ability to synthesize and make connections between aspects of landscape architecture and disciplines outside of landscape architecture	1.98	0.73	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

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COMPETENCIES	Natural & Cultural Systems	74	Conduct field investigations to identify significant natural and cultural features, characteristics, and systems	2.06	0.74	1	0	1	1	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0
		75	Perform quantitative analyses to evaluate the interactions of natural and cultural features, characteristics, and systems	1.64	0.78	1	1	1	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		76	Perform qualitative analyses to evaluate the relationship between the natural and cultural features, characteristics, and systems	1.79	0.78	1	1	1	1	0	1	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0
		77	Predict implications of design, planning, and management proposals on natural cultural systems both within the site and in the larger context	1.88	0.76	1	0	1	1	0	1	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0
	Public Policy and Regulation	78	Identify and collect regulatory information, applicable data and required approvals governing a project (e.g., relevant laws, codes, and regulations)	1.31	0.74	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		79	Confirm code compliance (e.g. zoning, environment, and accessibility)	1.37	0.81	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		80	Assist in the preparation of ordinances, regulations, covenants, standards, and guidelines	0.77	0.69	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		81	Influence public policies on areas such as growth and land and water management by testifying, lobbying, or preparing written documents for public distribution	0.73	0.75	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Design, Planning, and Management at Various Scales and Applications	82	Develop a design program based on users' needs and clients' goals and resources	2.13	0.75	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		83	Analyze relationships among design elements by determining opportunities and constraints	2.33	0.62	1	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		84	Develop conceptual design, planning, and management solutions	2.39	0.61	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		85	Evaluate design alternatives to determine the appropriate solution	2.45	0.59	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Site Design and Engineering: Materials, Methods, Technologies and Applications	86	Design for protection and management of land resources (e.g. land forms, vegetation, habitat, erosion and sedimentation control)	2.13	0.64	1	1	1	1	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0
		87	Design for protection and management of water resources (e.g. storm water, water supply, ground water)	2.05	0.66	1	0	1	1	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0
		88	Design pedestrian, vehicular, and non-motorized circulation systems	2.28	0.62	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		89	Design elements for construction considering materials, structural issues, and construction technologies	1.94	0.69	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Construction Documentation and Administration	90	Prepare construction documents including plans, working drawings, and technical specifications	1.87	0.77	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		91	Prepare contract documents including agreements, general conditions, and bid documents	1.24	0.82	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		92	Manage the bidding/tendering process	0.72	0.7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		93	Provide construction administration and observation throughout the project	0.83	0.78	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		94	Conduct project closure including review and distribution of close-out documents	0.67	0.73	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		95	Perform post construction evaluation	0.91	0.79	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		96	Perform construction services including design-build	0.67	0.7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		97	Prepare management and maintenance manuals and documents	0.81	0.7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

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COMPETENCIES	Communication	98	Maintain clear communication among collaborators through correspondence and project coordination	1.51	0.9	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		99	Develop written documentation, such as projects reports, grant proposals, and promotional materials	1.43	0.84	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		100	Create graphic materials in a variety of media	2.19	0.76	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		101	Prepare and deliver oral presentations such as meetings, demonstrations, and outreach	2.18	0.72	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		102	Conduct project and public meetings including preparing of meeting agendas and notes, and facilitation of the meeting	1.34	0.89	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		103	Review and critique peer work	1.79	0.88	0	0		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Values and Ethics in Practice	104	Manage business practices and organizations	0.81	0.74	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		105	Manage risk and liability	0.86	0.81	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		106	Negotiate and prepare client and consultant agreements	0.74	0.79	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		107	Participate in life-long learning (e.g., a professional organization, continuing education activities)	1.56	1.03	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		108	Participate in professional and public service activities	1.58	0.83	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		109	Train, educate and mentor other professionals	0.96	0.91	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		110	Maintain and promote professional and ethical standards	2.12	0.86	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
					Sum	50	29	22	19	0	14	0	0	0	0	0	0	17	3	0	9	9	0	0	0	0		
					Average	0.45	0.26	0.20	0.17	0.00	0.13	0.00	0.00	0.00	0.00	0.00	0.00	0.15	0.03	0.00	0.08	0.08	0.00	0.00	0.00	0.00		

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KNOWLEDGE STATEMENTS	Landscape Architecture History and Criticism	1	history of landscape architecture and allied professions	2.15	0.69	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0.00
		2	historic preservation principles	1.69	0.83	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		1	0.02
	Natural and Cultural Systems	3	land information sources	2.55	0.77	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		3	0.05
		4	patterns of land use and built form	2.43	0.76	0	0	0	1	1	1	0	0	1	1	1	1	0	0	0		26	0.44
		5	natural site conditions and ecosystems	2.76	0.66	0	0	0	1	1	1	0	0	0	0	1	0	0	0	0		20	0.34
		6	social and cultural influences on design	2.19	0.81	0	0	0	0	0	0	0	0	1	0	1	0	0	0	0		4	0.07
		7	regional hazard design considerations	2.1	0.87	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0		5	0.08
	Design and Planning Theories and Methodologies	8	creativity and process including design theory and problem –solving strategies	2.83	0.64	0	0	1	0	0	0	0	0	0	0	1	0	0	0	0		4	0.07
		9	aesthetic principles of design	2.78	0.71	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		8	0.14
		10	human factors such as behavior, perception, psychological and sensory response	2.33	0.76	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0		5	0.09
		11	natural factors such as ecological relationships	2.53	0.75	0	0	0	1	1	1	0	0	0	1	1	0	0	0	0		19	0.32
		12	relationship between human and natural systems such as resource conservation, habitat restoration and creation, and urban ecology	2.36	0.79	0	0	0	0	1	1	0	0	0	1	1	1	0	0	0		15	0.25
		13	influence of context on design, planning, and management decisions	2.45	0.76	0	0	0	0	0	0	0	0	1	0	1	1	0	0	0		12	0.20
		14	research methods including data collection, interpretation, and application of results	2.37	0.93	0	0	1	0	0	0	1	0	0	0	0	0	0	0	0		7	0.12
		15	therapeutic aspects of design	1.66	0.88	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		2	0.03
		16	communication and education methods, including sharing knowledge and evaluating outcomes	2.15	0.99	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0		4	0.07
	Public Policy and Regulation	17	governmental policies and laws that affect the use and development of land	1.8	0.85	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		1	0.02
		18	political and regulatory approval processes	1.67	0.92	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0.00
		19	land and development economics	1.47	0.83	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		5	0.08
		20	emerging trends and issues	1.65	0.83	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0.00

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KNOWLEDGE STATEMENTS	Design, Planning and Management at Various Scales and Applications	21	photogrammetry and remote sensing	1.47	0.84	0	0	0	0	0	0	1	0	0	0	0	1	0	0	0		10	0.17
		22	visual resource assessment	1.91	0.88	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0		12	0.20
		~~23~~	~~agricultural and rural landscape analysis~~	~~1.68~~	~~0.85~~	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0		15	0.25
		24	urban landscape	2.17	0.71	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0		13	0.22
		25	planning principles including regional community and neighborhood planning	2.12	0.76	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0		10	0.17
		26	conservation of natural resources	2.33	0.8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		13	0.22
		27	historic preservation	1.73	0.76	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		1	0.02
		28	ecological planning principles	2.23	0.8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		8	0.14
		29	Water resource management	1.91	0.84	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		7	0.12
		30	wetland	1.78	0.83	0	0	0	1	1	1	0	0	0	0	0	0	0	0	0		13	0.22
		31	floodplain management	1.8	0.86	0	0	0	1	1	1	0	0	0	0	0	0	0	0	0		13	0.22
		32	land and water reclamation procedures including quarry, mine and landfill reclamation	1.43	0.84	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		6	0.10
		33	treatment of toxic materials	1.05	0.86		0	0	0	0	0	0	0	0	0	0	0	0	0	0		5	0.09
	Site Design and Engineering: Materials, Methods, Technologies and Applications	34	design needs for special populations	1.91	0.78	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		1	0.02
		35	accessibility regulations	2.28	0.87	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0		2	0.03
		36	roadway design principles	2.15	0.83	0	0	0	0	1	1	0	0	1	1	1	0	0	0	0		17	0.29
		37	elements of vehicular and pedestrian circulation systems and their design requirements	2.57	0.72	0	0	0	0	1	1	0	0	1	1	1	0	0	0	0		14	0.24
		38	landscape maintenance techniques, materials, equipment, and practices	1.93	0.87	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		1	0.02
		39	noise attenuation and mitigation techniques	1.66	0.82	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		2	0.03
		40	sustainable construction practices	1.82	0.84	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		4	0.07
		41	construction equipment and technologies	1.76	0.87	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		1	0.02
		42	grading, drainage and stormwater treatment	2.78	0.57	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0		10	0.17
		43	biofiltration and other alternative drainage methods	1.91	0.84	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0		4	0.07
		44	erosion and sedimentation control	2.28	0.82	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0		6	0.10
		45	utility systems	1.77	0.77	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0		9	0.15
		46	Irrigation systems	1.75	0.88	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0		8	0.14
		47	lighting systems	1.7	0.79	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0		8	0.14
		48	structural considerations	2.06	0.82	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		3	0.05
	Construction Documentation and Administration	49	quality control procedures for construction, such as delivery, storage, testing, etc.	1.27	0.87	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0		3	0.05
		50	sequencing of design, approval, permitting, and construction activities	1.68	0.92	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0.00
		51	the life-cycle cost-analysis process	1.32	0.86	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0.00
		52	geographic coordinate systems and layout techniques and conventions	1.9	0.9	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0		2	0.03
		53	specification types and components for a project	1.89	0.83	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0.00
		54	general and supplemental conditions, special provisions, and technical specifications and their organizations	1.64	0.88	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0.00
		55	construction administration and details	1.73	0.92	0	0	0	0	0	0	0	0	0	0	0		0	0	0		0	0.00
		56	basic construction law	1.48	0.84	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0.00
		57	construction contracts	1.55	0.88	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0.00

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KNOWLEDGE STATEMENTS	Communication	58	determination of user values such as focus groups and surveys	1.52	0.83	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0.00
		~~59~~	~~consensus and team building~~	~~1.74~~	~~0.91~~	0	0	0	0	0	0	0	0	0	0	0		0	0	0		0	0.00
		60	techniques for conducting meetings	1.59	0.97	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0.00
		61	the roles of visual communication, including photographic and video documentation	2.25	0.85	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0		3	0.05
		62	graphic presentation techniques, systems and symbols	2.71	0.73	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0		6	0.10
		63	interpretive methods and techniques such as information displays and brochures	1.82	0.98	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0		3	0.05
		64	public relations, outreach, and image development	1.49	0.97	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0.00
	Values and Ethics in Practice	65	environmental ethics	2.08	0.82	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		2	0.03
		66	social responsibility in design	2.1	0.78	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0.00
		67	organizational management principles such as leadership principles and landscape architect career cycle	1.61	0.93	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0.00
		68	resolving moral and ethical dilemmas	1.89	0.93	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0.00
COMPETENCIES	Landscape Architecture History & Criticism	69	Develop an understanding of design as exemplified by historically significant works of landscape architecture, urban planning, civic design, and architecture	2.02	0.73	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		3	0.05
		70	Examine economic, political, social, ecological and esthetic relationships and their influence on the development of the profession of landscape architecture	1.65	0.78	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		4	0.07
		71	Demonstrate an understanding of the evolution of landscape architecture as an art and a profession through knowledge of its terminology, literature, personalities, and concepts	1.85	0.76	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		1	0.02
		72	Demonstrate the ability to critique prior work and understand the relevance in addressing current issues and problems	1.89	0.74	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0.00
		73	Develop an ability to synthesize and make connections between aspects of landscape architecture and disciplines outside of landscape architecture	1.98	0.73	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0		4	0.07

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COMPETENCIES	Natural & Cultural Systems	74	Conduct field investigations to identify significant natural and cultural features, characteristics, and systems	2.06	0.74	0	0	0	1	1	1	0	0	0	0	0	0	0	0	0		13	0.22
		75	Perform quantitative analyses to evaluate the interactions of natural and cultural features, characteristics, and systems	1.64	0.78	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0		9	0.15
		76	Perform qualitative analyses to evaluate the relationship between the natural and cultural features, characteristics, and systems	1.79	0.78	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0		10	0.17
		77	Predict implications of design, planning, and management proposals on natural cultural systems both within the site and in the larger context	1.88	0.76	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0		8	0.14
	Public Policy and Regulation	78	Identify and collect regulatory information, applicable data and required approvals governing a project (e.g., relevant laws, codes, and regulations)	1.31	0.74	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0		3	0.05
		79	Confirm code compliance (e.g. zoning, environment, and accessibility)	1.37	0.81	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		3	0.05
		80	Assist in the preparation of ordinances, regulations, covenants, standards, and guidelines	0.77	0.69	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		2	0.03
		81	Influence public policies on areas such as growth and land and water management by testifying, lobbying, or preparing written documents for public distribution	0.73	0.75	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		2	0.03
	Design, Planning, and Management at Various Scales and Applications	82	Develop a design program based on users' needs and clients' goals and resources	2.13	0.75	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		2	0.03
		83	Analyze relationships among design elements by determining opportunities and constraints	2.33	0.62	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0		8	0.14
		84	Develop conceptual design, planning, and management solutions	2.39	0.61	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		4	0.07
		85	Evaluate design alternatives to determine the appropriate solution	2.45	0.59	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		4	0.07
	Site Design and Engineering: Materials, Methods, Technologies and Applications	86	Design for protection and management of land resources (e.g. land forms, vegetation, habitat, erosion and sedimentation control)	2.13	0.64	0	0	0	0	1	1	0	0	0	0	1	0	0	0	0		15	0.25
		87	Design for protection and management of water resources (e.g. storm water, water supply, ground water)	2.05	0.66	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0		11	0.19
		88	Design pedestrian, vehicular, and non-motorized circulation systems	2.28	0.62	0	0	0	0	1	1	0	0	1	0	1	0	0	0	0		12	0.20
		89	Design elements for construction considering materials, structural issues, and construction technologies	1.94	0.69	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		2	0.03
	Construction Documentation and Administration	90	Prepare construction documents including plans, working drawings, and technical specifications	1.87	0.77	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		1	0.02
		91	Prepare contract documents including agreements, general conditions, and bid documents	1.24	0.82	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0.00
		92	Manage the bidding/tendering process	0.72	0.7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0.00
		93	Provide construction administration and observation throughout the project	0.83	0.78	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0.00
		94	Conduct project closure including review and distribution of close-out documents	0.67	0.73	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0.00
		95	Perform post construction evaluation	0.91	0.79	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0.00
		96	Perform construction services including design-build	0.67	0.7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0.00
		97	Prepare management and maintenance manuals and documents	0.81	0.7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0.00

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COMPETENCIES	Communication	98	Maintain clear communication among collaborators through correspondence and project coordination	1.51	0.9	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0.00
		99	Develop written documentation, such as projects reports, grant proposals, and promotional materials	1.43	0.84	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0.00
		100	Create graphic materials in a variety of media	2.19	0.76	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0		3	0.05
		101	Prepare and deliver oral presentations such as meetings, demonstrations, and outreach	2.18	0.72	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0.00
		102	Conduct project and public meetings including preparing of meeting agendas and notes, and facilitation of the meeting	1.34	0.89	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0.00
		103	Review and critique peer work	1.79	0.88	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0.00
	Values and Ethics in Practice	104	Manage business practices and organizations	0.81	0.74	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0.00
		105	Manage risk and liability	0.86	0.81	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0.00
		106	Negotiate and prepare client and consultant agreements	0.74	0.79	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0.00
		107	Participate in life-long learning (e.g., a professional organization, continuing education activities)	1.56	1.03	0	0	0	0	0	0	0	0	0		0	0	0	0	0		0	0.00
		108	Participate in professional and public service activities	1.58	0.83	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0.00
		109	Train, educate and mentor other professionals	0.96	0.91	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0.00
		110	Maintain and promote professional and ethical standards	2.12	0.86	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0.00
					Sum	0	0	4	10	15	15	9	0	8	9	16	4	0	0	0			
					Average	0.00	0.00	0.04	0.09	0.14	0.14	0.08	0.00	0.07	0.08	0.15	0.04	0.00	0.00	0.00			

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KNOWLEDGE STATEMENTS	Landscape Architecture History and Criticism	1	history of landscape architecture and allied professions	2.15	0.69	1	0	1	0	0	0	1	0	1	0	0	0	0	0	0	1	0	0
		2	historic preservation principles	1.69	0.83	0	0	0	0	0	0	1	0	1	1	0	0	0	0	0	0	0	0
	Natural and Cultural Systems	3	land information sources	2.55	0.77	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
		4	patterns of land use and built form	2.43	0.76	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
		5	natural site conditions and ecosystems	2.76	0.66	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1
		6	social and cultural influences on design	2.19	0.81	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0
		7	regional hazard design considerations	2.1	0.87	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Design and Planning Theories and Methodologies	8	creativity and process including design theory and problem –solving strategies	2.83	0.64	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		9	aesthetic principles of design	2.78	0.71	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0
		10	human factors such as behavior, perception, psychological and sensory response	2.33	0.76	0	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	0	0
		11	natural factors such as ecological relationships	2.53	0.75	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1
		12	relationship between human and natural systems such as resource conservation, habitat restoration and creation, and urban ecology	2.36	0.79	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	1	1
		13	influence of context on design, planning, and management decisions	2.45	0.76	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
		14	research methods including data collection, interpretation, and application of results	2.37	0.93	1	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0
		15	therapeutic aspects of design	1.66	0.88	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0
		16	communication and education methods, including sharing knowledge and evaluating outcomes	2.15	0.99	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0
	Public Policy and Regulation	17	governmental policies and laws that affect the use and development of land	1.8	0.85	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0
		18	political and regulatory approval processes	1.67	0.92	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0
		19	land and development economics	1.47	0.83	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0
		20	emerging trends and issues	1.65	0.83	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0

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KNOWLEDGE STATEMENTS	Design, Planning and Management at Various Scales and Applications	21	photogrammetry and remote sensing	1.47	0.84	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0
		22	visual resource assessment	1.91	0.88	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		23	agricultural and rural landscape analysis	1.68	0.85	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		24	urban landscape	2.17	0.71	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		25	planning principles including regional community and neighborhood planning	2.12	0.76	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		26	conservation of natural resources	2.33	0.8	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	1
		27	historic preservation	1.73	0.76	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	1
		28	ecological planning principles	2.23	0.8	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	1
		29	Water resource management	1.91	0.84	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	1
		30	wetland	1.78	0.83	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
		31	floodplain management	1.8	0.86	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	1
		32	land and water reclamation procedures including quarry, mine and landfill reclamation	1.43	0.84	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	1
		33	treatment of toxic materials	1.05	0.86	0	0	0		0	0	0	0	0	1	0	0	0	0	0	0	0	0	0
	Site Design and Engineering: Materials, Methods, Technologies and Applications	34	design needs for special populations	1.91	0.78	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0
		35	accessibility regulations	2.28	0.87	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0
		36	roadway design principles	2.15	0.83	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		37	elements of vehicular and pedestrian circulation systems and their design requirements	2.57	0.72	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		38	landscape maintenance techniques, materials, equipment, and practices	1.93	0.87	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		39	noise attenuation and mitigation techniques	1.66	0.82	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		40	sustainable construction practices	1.82	0.84	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		41	construction equipment and technologies	1.76	0.87	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		42	grading, drainage and stormwater treatment	2.78	0.57	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		43	biofiltration and other alternative drainage methods	1.91	0.84	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		44	erosion and sedimentation control	2.28	0.82	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		45	utility systems	1.77	0.77	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		46	Irrigation systems	1.75	0.88	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		47	lighting systems	1.7	0.79	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		48	structural considerations	2.06	0.82	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

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KNOWLEDGE STATEMENTS	Construction Documentation and Administration	49	quality control procedures for construction, such as delivery, storage, testing, etc.	1.27	0.87	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		50	sequencing of design, approval, permitting, and construction activities	1.68	0.92	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		51	the life-cycle cost-analysis process	1.32	0.86	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		52	geographic coordinate systems and layout techniques and conventions	1.9	0.9	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		53	specification types and components for a project	1.89	0.83	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		54	general and supplemental conditions, special provisions, and technical specifications and their organizations	1.64	0.88	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		55	construction administration and details	1.73	0.92	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0	0	0	0
		56	basic construction law	1.48	0.84	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0
		57	construction contracts	1.55	0.88	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0
	Communication	58	determination of user values such as focus groups and surveys	1.52	0.83	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		59	consensus and team building	1.74	0.91	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		60	techniques for conducting meetings	1.59	0.97	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		61	the roles of visual communication, including photographic and video documentation	2.25	0.85	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		62	graphic presentation techniques, systems and symbols	2.71	0.73	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		63	interpretive methods and techniques such as information displays and brochures	1.82	0.98	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		64	public relations, outreach, and image development	1.49	0.97	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0
	Values and Ethics in Practice	65	environmental ethics	2.08	0.82	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		66	social responsibility in design	2.1	0.78	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0
		67	organizational management principles such as leadership principles and landscape architect career cycle	1.61	0.93	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		68	resolving moral and ethical dilemmas	1.89	0.93	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

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COMPETENCIES	Landscape Architecture History & Criticism	69	Develop an understanding of design as exemplified by historically significant works of landscape architecture, urban planning, civic design, and architecture	2.02	0.73	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
		70	Examine economic, political, social, ecological and esthetic relationships and their influence on the development of the profession of landscape architecture	1.65	0.78	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0		
		71	Demonstrate an understanding of the evolution of landscape architecture as an art and a profession through knowledge of its terminology, literature, personalities, and concepts	1.85	0.76	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
		72	Demonstrate the ability to critique prior work and understand the relevance in addressing current issues and problems	1.89	0.74	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
		73	Develop an ability to synthesize and make connections between aspects of landscape architecture and disciplines outside of landscape architecture	1.98	0.73	1	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0		
	Natural & Cultural Systems	74	Conduct field investigations to identify significant natural and cultural features, characteristics, and systems	2.06	0.74	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
		75	Perform quantitative analyses to evaluate the interactions of natural and cultural features, characteristics, and systems	1.64	0.78	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0		
		76	Perform qualitative analyses to evaluate the relationship between the natural and cultural features, characteristics, and systems	1.79	0.78	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0		
		77	Predict implications of design, planning, and management proposals on natural cultural systems both within the site and in the larger context	1.88	0.76	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		

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COMPETENCIES	Public Policy and Regulation	78	Identify and collect regulatory information, applicable data and required approvals governing a project (e.g., relevant laws, codes, and regulations)	1.31	0.74	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0
		79	Confirm code compliance (e.g. zoning, environment, and accessibility)	1.37	0.81	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0
		80	Assist in the preparation of ordinances, regulations, covenants, standards, and guidelines	0.77	0.69	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0
		81	Influence public policies on areas such as growth and land and water management by testifying, lobbying, or preparing written documents for public distribution	0.73	0.75	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0
	Design, Planning, and Management at Various Scales and Applications	82	Develop a design program based on users' needs and clients' goals and resources	2.13	0.75	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		83	Analyze relationships among design elements by determining opportunities and constraints	2.33	0.62	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		84	Develop conceptual design, planning, and management solutions	2.39	0.61	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		0
		85	Evaluate design alternatives to determine the appropriate solution	2.45	0.59	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Site Design and Engineering: Materials, Methods, Technologies and Applications	86	Design for protection and management of land resources (e.g. land forms, vegetation, habitat, erosion and sedimentation control)	2.13	0.64	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	1
		87	Design for protection and management of water resources (e.g. storm water, water supply, ground water)	2.05	0.66	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	1
		88	Design pedestrian, vehicular, and non-motorized circulation systems	2.28	0.62	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		89	Design elements for construction considering materials, structural issues, and construction technologies	1.94	0.69	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

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COMPETENCIES	Construction Documentation and Administration	90	Prepare construction documents including plans, working drawings, and technical specifications	1.87	0.77	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		91	Prepare contract documents including agreements, general conditions, and bid documents	1.24	0.82	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		92	Manage the bidding/tendering process	0.72	0.7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		93	Provide construction administration and observation throughout the project	0.83	0.78	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		94	Conduct project closure including review and distribution of close-out documents	0.67	0.73	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		95	Perform post construction evaluation	0.91	0.79	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		96	Perform construction services including design-build	0.67	0.7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		97	Prepare management and maintenance manuals and documents	0.81	0.7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Communication	98	Maintain clear communication among collaborators through correspondence and project coordination	1.51	0.9	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		99	Develop written documentation, such as projects reports, grant proposals, and promotional materials	1.43	0.84	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		100	Create graphic materials in a variety of media	2.19	0.76	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		101	Prepare and deliver oral presentations such as meetings, demonstrations, and outreach	2.18	0.72	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		102	Conduct project and public meetings including preparing of meeting agendas and notes, and facilitation of the meeting	1.34	0.89	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		103	Review and critique peer work	1.79	0.88	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Values and Ethics in Practice	104	Manage business practices and organizations	0.81	0.74	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		0
		105	Manage risk and liability	0.86	0.81	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		106	Negotiate and prepare client and consultant agreements	0.74	0.79	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		107	Participate in life-long learning (e.g., a professional organization, continuing education activities)	1.56	1.03	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		108	Participate in professional and public service activities	1.58	0.83	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		109	Train, educate and mentor other professionals	0.96	0.91	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		110	Maintain and promote professional and ethical standards	2.12	0.86	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
					Sum	6	2	1	0	4	0	6	2	8	24	0	0	0	3	0	1	3	15
					Average	0.05	0.02	0.01	0.00	0.04	0.00	0.05	0.02	0.07	0.22	0.00	0.00	0.00	0.03	0.00	0.01	0.03	0.14

LABOK				Command of Knowledge at time of Degree		GIS&T BOK														
						Conceptual Foundations														
						CF5								CF6						
Knowledge Statement / Competency Division	Domains		Knowledge Statements / Competencies	Mean	Standard Deviation	Categories	Mereology: Structural Relationships	Genealogical Relationships: Lineage, Inheritance	Topological Relationships	Metrical Relationships: Distance & Direction	Spatial Distribution	Region	Spatial Integration	Vagueness	Mathematical Models of Vagueness: Fuzzy Sets & Rough Sets	Error-based Uncertainty	Mathematical Models of Uncertainty: Probability & Statistics		Sum	Average
KNOWLEDGE STATEMENTS	Landscape Architecture History and Criticism	1	history of landscape architecture and allied professions	2.15	0.69	0	0	0	0	0	0	0	1	0	0	0	0		6	0.20
		2	historic preservation principles	1.69	0.83	0	0	0	0	0	0	0	0	0	0	0	0		3	0.10
	Natural and Cultural Systems	3	land information sources	2.55	0.77	0	0	0	0	0	0	1	0	0	0	0	0		2	0.07
		4	patterns of land use and built form	2.43	0.76	0	0	0	0	0	0	1	0	0	0	0	0		2	0.07
		5	natural site conditions and ecosystems	2.76	0.66	0	0	0	0	0	1	1	0	0	0	0	0		4	0.13
		6	social and cultural influences on design	2.19	0.81	0	0	0	0	0	0	1	0	0	0	0	0		2	0.07
		7	regional hazard design considerations	2.1	0.87	0	0	0	0	0	0	0	0	0	0	0	0		0	0.00
	Design and Planning Theories and Methodologies	8	creativity and process including design theory and problem –solving strategies	2.83	0.64	0	0	0	0	0	0	1	0	0	0	0	0		2	0.07
		9	aesthetic principles of design	2.78	0.71	0	0	0	0	0	0	0	0	0	0	0	0		1	0.03
		10	human factors such as behavior, perception, psychological and sensory response	2.33	0.76	0	0	0	0	0	0	0	0	0	0	0	0		2	0.07
		11	natural factors such as ecological relationships	2.53	0.75	0	0	0	0	0	0	0	0	0	0	0	0		2	0.07
		12	relationship between human and natural systems such as resource conservation, habitat restoration and creation, and urban ecology	2.36	0.79	0	0	0	0	0	0	0	0	0	0	0	0		3	0.10
		13	influence of context on design, planning, and management decisions	2.45	0.76	0	0	0	0	0	0	0	0	0	0	0	0		1	0.03
		14	research methods including data collection, interpretation, and application of results	2.37	0.93	0	0	0	0	0	0	0	0	0	0	0	0		3	0.10
		15	therapeutic aspects of design	1.66	0.88	0	0	0	0	0	0	0	0	0	0	0	0		1	0.03
		16	communication and education methods, including sharing knowledge and evaluating outcomes	2.15	0.99	0	0	0	0	0	0	0	0	0	0	0	0		1	0.03
	Public Policy and Regulation	17	governmental policies and laws that affect the use and development of land	1.8	0.85	0	0	0	0	0	0	0	0	0	0	0	0		1	0.03
		18	political and regulatory approval processes	1.67	0.92	0	0	0	0	0	0	0	0	0	0	0	0		1	0.03
		19	land and development economics	1.47	0.83	0	0	0	0	0	0	0	0	0	0	0	0		1	0.03
		20	emerging trends and issues	1.65	0.83	0	0	0	0	0	1	0	0	0	0	0	0		2	0.07

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KNOWLEDGE STATEMENTS	Design, Planning and Management at Various Scales and Applications	21	photogrammetry and remote sensing	1.47	0.84	0	0	0	0	0	0	0	0	0	0	0	0		1	0.03
		22	visual resource assessment	1.91	0.88	0	0	0	0	0	1	0	0	0	0	0	0		2	0.07
		23	agricultural and rural landscape analysis	1.68	0.85	0	0	0	0	0	1	0	0	0	0	0	0		1	0.03
		24	urban landscape	2.17	0.71	0	0	0	0	0	1	0	0	0	0	0	0		1	0.03
		25	planning principles including regional community and neighborhood planning	2.12	0.76	0	0	0	0	0	0	0	0	0	0	0	0		0	0.00
		26	conservation of natural resources	2.33	0.8	0	0	0	0	0	0	0	0	0	0	0	0		2	0.07
		27	historic preservation	1.73	0.76	0	0	0	0	0	0	0	0	0	0	0	0		3	0.10
		28	ecological planning principles	2.23	0.8	0	0	0	0	0	0	0	0	0	0	0	0		2	0.07
		29	Water resource management	1.91	0.84	0	0	0	0	0	0	1	0	0	0	0	0		3	0.10
		30	wetland	1.78	0.83	0	0	0	0	0	0	0	0	0	0	0	0		1	0.03
		31	floodplain management	1.8	0.86	0	0	0	0	0	0	0	0	0	0	0	0		2	0.07
		32	land and water reclamation procedures including quarry, mine and landfill reclamation	1.43	0.84	0	0	0	0	0	0	0	0	0	0	0	0		2	0.07
		33	treatment of toxic materials	1.05	0.86	0	0	0	0	0	0	0	0	0	0	0	0		1	0.03
	Site Design and Engineering: Materials, Methods, Technologies and Applications	34	design needs for special populations	1.91	0.78	0	0	0	0	0	0	0	0	0	0	0	0		1	0.03
		35	accessibility regulations	2.28	0.87	0	0	0	0	0	0	0	0	0	0	0	0		1	0.03
		36	roadway design principles	2.15	0.83	0	0	0	0	0	0	0	0	0	0	0	0		0	0.00
		37	elements of vehicular and pedestrian circulation systems and their design requirements	2.57	0.72	0	0	0	0	0	0	0	0	0	0	0	0		0	0.00
		38	landscape maintenance techniques, materials, equipment, and practices	1.93	0.87	0	0	0	0	0	0	0	0	0	0	0	0		0	0.00
		39	noise attenuation and mitigation techniques	1.66	0.82	0	0	0	0	0	0	0	0	0	0	0	0		0	0.00
		40	sustainable construction practices	1.82	0.84	0	0	0	0	0	0	0	0	0	0	0	0		0	0.00
		41	construction equipment and technologies	1.76	0.87	0	0	0	0	0	0	0	0	0	0	0	0		0	0.00
		42	grading, drainage and stormwater treatment	2.78	0.57	0	0	0	0	0	0	0	0	0	0	0	0		0	0.00
		43	biofiltration and other alternative drainage methods	1.91	0.84	0	0	0	0	0	0	0	0	0	0	0	0		0	0.00
		44	erosion and sedimentation control	2.28	0.82	0	0	0	0	0	0	0	0	0	0	0	0		0	0.00
		45	utility systems	1.77	0.77	0	0	0	0	0	0	0	0	0	0	0	0		0	0.00
		46	Irrigation systems	1.75	0.88	0	0	0	0	0	0	0	0	0	0	0	0		0	0.00
		47	lighting systems	1.7	0.79	0	0	0	0	0	0	0	0	0	0	0	0		0	0.00
		48	structural considerations	2.06	0.82	0	0	0	0	0	0	0	0	0	0	0	0		0	0.00

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						CF5										CF6						
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KNOWLEDGE STATEMENTS	Construction Documentation and Administration	49	quality control procedures for construction, such as delivery, storage, testing, etc.	1.27	0.87	0	0	0	0	0	0	0	0	0	0	0	0		0	0.00
		50	sequencing of design, approval, permitting, and construction activities	1.68	0.92	0	0	0	0	0	0	0	0	0	0	0	0		0	0.00
		51	the life-cycle cost-analysis process	1.32	0.86	0	0	0	0	0	0	0	0	0	0	0	0		0	0.00
		52	geographic coordinate systems and layout techniques and conventions	1.9	0.9	0	0	0	0	0	0	1	0	0	0	0	0		2	0.07
		53	specification types and components for a project	1.89	0.83	0	0	0	0	0	0	0	0	0	0	0	0		0	0.00
		54	general and supplemental conditions, special provisions, and technical specifications and their organizations	1.64	0.88	0	0	0	0	0	0	0	0	0	0	0	0		0	0.00
		55	construction administration and details	1.73	0.92	0	0	0	0	0	0	0	0	0	0	0	0		0	0.00
		56	basic construction law	1.48	0.84	0	0	0	0	0	0	0	0	0	0	0	0		1	0.03
		57	construction contracts	1.55	0.88	0	0	0	0	0	0	0	0	0	0	0	0		1	0.03
	Communication	58	determination of user values such as focus groups and surveys	1.52	0.83	0	0	0	0	0	0	0	0	0	0	0	0		0	0.00
		59	consensus and team building	1.74	0.91	0	0	0	0	0	0	0	0	0	0	0	0		0	0.00
		60	techniques for conducting meetings	1.59	0.97	0	0	0	0	0	0	0	0	0	0	0	0		0	0.00
		61	the roles of visual communication, including photographic and video documentation	2.25	0.85	0	0	0	0	0	0	0	0	0	0	0	0		0	0.00
		62	graphic presentation techniques, systems and symbols	2.71	0.73	0	0	0	0	0	0	0	0	0	0	0	0		1	0.03
		63	interpretive methods and techniques such as information displays and brochures	1.82	0.98	0	0	0	0	0	0	0	0	0	0	0	0		1	0.03
		64	public relations, outreach, and image development	1.49	0.97	0	0	0	0	0	0	0	0	0	0	0	0		1	0.03
	Values and Ethics in Practice	65	environmental ethics	2.08	0.82	0	0	0	0	0	0	0	0	0	0	0	0		1	0.03
		66	social responsibility in design	2.1	0.78	0	0	0	0	0	0	0	0	0	0	0	0		1	0.03
		67	organizational management principles such as leadership principles and landscape architect career cycle	1.61	0.93	0	0	0	0	0	0	0	0	0	0	0	0		0	0.00
		68	resolving moral and ethical dilemmas	1.89	0.93	0	0	0	0	0	0	0	0	0	0	0	0		1	0.03

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COMPETENCIES	Landscape Architecture History & Criticism	69	Develop an understanding of design as exemplified by historically significant works of landscape architecture, urban planning, civic design, and architecture	2.02	0.73	0	0	0	0	0	0	0	0	0	0	0	0		0	0.00
		70	Examine economic, political, social, ecological and esthetic relationships and their influence on the development of the profession of landscape architecture	1.65	0.78	0	0	0	0	0	0	0	0	0	0	0	0		1	0.03
		71	Demonstrate an understanding of the evolution of landscape architecture as an art and a profession through knowledge of its terminology, literature, personalities, and concepts	1.85	0.76	0	0	0	0	0	0	0	0	0	0	0	0		0	0.00
		72	Demonstrate the ability to critique prior work and understand the relevance in addressing current issues and problems	1.89	0.74	0	0	0	0	0	0	0	0	0	0	0	0		0	0.00
		73	Develop an ability to synthesize and make connections between aspects of landscape architecture and disciplines outside of landscape architecture	1.98	0.73	0	0	0	0	0	0	0	0	0	0	0	0		2	0.07
	Natural & Cultural Systems	74	Conduct field investigations to identify significant natural and cultural features, characteristics, and systems	2.06	0.74	0	0	0	0	0	0	0	0	0	0	0	0		0	0.00
		75	Perform quantitative analyses to evaluate the interactions of natural and cultural features, characteristics, and systems	1.64	0.78	0	0	0	0	0	0	0	0	0	0	0	0		1	0.03
		76	Perform qualitative analyses to evaluate the relationship between the natural and cultural features, characteristics, and systems	1.79	0.78	0	0	0	0	0	0	0	0	0	0	0	0		1	0.03
		77	Predict implications of design, planning, and management proposals on natural cultural systems both within the site and in the larger context	1.88	0.76	0	0	0	0	0	0	0	0	0	0	0	0		0	0.00

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COMPETENCIES	Public Policy and Regulation	78	Identify and collect regulatory information, applicable data and required approvals governing a project (e.g., relevant laws, codes, and regulations)	1.31	0.74	0	0	0	0	0	0	0	0	0	0	0	0		1	0.03
		79	Confirm code compliance (e.g. zoning, environment, and accessibility)	1.37	0.81	0	0	0	0	0	0	0	0	0	0	0	0		2	0.07
		80	Assist in the preparation of ordinances, regulations, covenants, standards, and guidelines	0.77	0.69	0	0	0	0	0	0	0	0	0	0	0	0		1	0.03
		81	Influence public policies on areas such as growth and land and water management by testifying, lobbying, or preparing written documents for public distribution	0.73	0.75	0	0	0	0	0	0	0	0	0	0	0	0		2	0.07
	Design, Planning, and Management at Various Scales and Applications	82	Develop a design program based on users' needs and clients' goals and resources	2.13	0.75	0	0	0	0	0	0	0	0	0	0	0	0		0	0.00
		83	Analyze relationships among design elements by determining opportunities and constraints	2.33	0.62	0	0	0	0	0	0	0	0	0	0	0	0		0	0.00
		84	Develop conceptual design, planning, and management solutions	2.39	0.61	0	0	0	0	0	0	0	0	0	0	0	0		0	0.00
		85	Evaluate design alternatives to determine the appropriate solution	2.45	0.59	0	0	0	0	0	0	0	0	0	0	0	0		0	0.00
	Site Design and Engineering: Materials, Methods, Technologies and Applications	86	Design for protection and management of land resources (e.g. land forms, vegetation, habitat, erosion and sedimentation control)	2.13	0.64	0	0	0	0	0	1	0	0	0	0	0	0		3	0.10
		87	Design for protection and management of water resources (e.g. storm water, water supply, ground water)	2.05	0.66	0	0	0	0	0	0	0	0	0	0	0	0		2	0.07
		88	Design pedestrian, vehicular, and non-motorized circulation systems	2.28	0.62	0	0	0	0	0	0	0	0	0	0	0	0		0	0.00
		89	Design elements for construction considering materials, structural issues, and construction technologies	1.94	0.69	0	0	0	0	0	0	0	0	0	0	0	0		0	0.00

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COMPETENCIES	Construction Documentation and Administration	90	Prepare construction documents including plans, working drawings, and technical specifications	1.87	0.77	0	0	0	0	0	0	0	0	0	0	0	0		0	0.00
		91	Prepare contract documents including agreements, general conditions, and bid documents	1.24	0.82	0	0	0	0	0	0	0	0	0	0	0	0		0	0.00
		92	Manage the bidding/tendering process	0.72	0.7	0	0	0	0	0	0	0	0	0	0	0	0		0	0.00
		93	Provide construction administration and observation throughout the project	0.83	0.78	0	0	0	0	0	0	0	0	0	0	0	0		0	0.00
		94	Conduct project closure including review and distribution of close-out documents	0.67	0.73	0	0	0	0	0	0	0	0	0	0	0	0		0	0.00
		95	Perform post construction evaluation	0.91	0.79	0	0	0	0	0	0	0	0	0	0	0	0		0	0.00
		96	Perform construction services including design-build	0.67	0.7	0	0	0	0	0	0	0	0	0	0	0	0		0	0.00
		97	Prepare management and maintenance manuals and documents	0.81	0.7	0	0	0	0	0	0	0	0	0	0	0	0		0	0.00
	Communication	98	Maintain clear communication among collaborators through correspondence and project coordination	1.51	0.9	0	0	0	0	0	0	0	0	0	0	0	0		0	0.00
		99	Develop written documentation, such as projects reports, grant proposals, and promotional materials	1.43	0.84	0	0	0	0	0	0	0	0	0	0	0	0		0	0.00
		100	Create graphic materials in a variety of media	2.19	0.76	0	0	0	0	0	0	0	0	0	0	0	0		0	0.00
		101	Prepare and deliver oral presentations such as meetings, demonstrations, and outreach	2.18	0.72	0	0	0	0	0	0	0	0	0	0	0	0		0	0.00
		102	Conduct project and public meetings including preparing of meeting agendas and notes, and facilitation of the meeting	1.34	0.89	0	0	0	0	0	0	0	0	0	0	0	0		0	0.00
		103	Review and critique peer work	1.79	0.88	0	0	0	0	0	0	0	0	0	0	0	0		0	0.00
	Values and Ethics in Practice	104	Manage business practices and organizations	0.81	0.74	0	0	0	0	0	0	0	0	0	0	0	0		0	0.00
		105	Manage risk and liability	0.86	0.81	0	0	0	0	0	0	0	0	0	0	0	0		0	0.00
		106	Negotiate and prepare client and consultant agreements	0.74	0.79	0	0	0	0	0	0	0	0	0	0	0	0		0	0.00
		107	Participate in life-long learning (e.g., a professional organization, continuing education activities)	1.56	1.03	0	0	0	0	0	0	0	0	0	0	0	0		0	0.00
		108	Participate in professional and public service activities	1.58	0.83	0	0	0	0	0	0	0	0	0	0	0	0		0	0.00
		109	Train, educate and mentor other professionals	0.96	0.91	0	0	0	0	0	0	0	0	0	0	0	0		0	0.00
		110	Maintain and promote professional and ethical standards	2.12	0.86	0	0	0	0	0	0	0	0	0	0	0	0		0	0.00
					Sum	0	0	0	0	0	6	7	1	0	0	0	0			
					Average	0.00	0.00	0.00	0.00	0.00	0.05	0.06	0.01	0.00	0.00	0.00	0.00			

LABOK				Command of Knowledge at time of Degree		GIS&T BOK																
						Cartography & Visualization																
						CV1		CV2			CV3				CV4							
Knowledge Statement / Competency Division	Domains		Knowledge Statements / Competencies	Mean	Standard Deviation	History of Cartography	Technological Transformations	Source Materials for Mapping	Data Abstraction: Classification, Selection, & Generalization	Projections as a Map Design Issue	Map Design Fundamentals	Basic Concepts of Symbolization	Color for Cartography & Visualization	Typography for Cartography & Visualization	Basic Thematic Mapping Methods	Multivariate Displays	Dynamic & Interactive Displays	Representing Terrain	Web Mapping & Visualization	Virtual & Immersive Environments	Spatialization	Visualization of Temporal Geographic Data	Visualization of Uncertainty
KNOWLEDGE STATEMENTS	Landscape Architecture History and Criticism	1	history of landscape architecture and allied professions	2.15	0.69	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		2	historic preservation principles	1.69	0.83	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Natural and Cultural Systems	3	land information sources	2.55	0.77	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		4	patterns of land use and built form	2.43	0.76	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		5	natural site conditions and ecosystems	2.76	0.66	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		6	social and cultural influences on design	2.19	0.81	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		7	regional hazard design considerations	2.1	0.87	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Design and Planning Theories and Methodologies	8	creativity and process including design theory and problem –solving strategies	2.83	0.64	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		9	aesthetic principles of design	2.78	0.71	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0
		10	human factors such as behavior, perception, psychological and sensory response	2.33	0.76	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0
		11	natural factors such as ecological relationships	2.53	0.75	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		12	relationship between human and natural systems such as resource conservation, habitat restoration and creation, and urban ecology	2.36	0.79	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		13	influence of context on design, planning, and management decisions	2.45	0.76	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		14	research methods including data collection, interpretation, and application of results	2.37	0.93	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		15	therapeutic aspects of design	1.66	0.88	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		16	communication and education methods, including sharing knowledge and evaluating outcomes	2.15	0.99	1	1	0	0	0	0	0	0	0	0	0	0	1	0	1	0	0
	Public Policy and Regulation	17	governmental policies and laws that affect the use and development of land	1.8	0.85	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		18	political and regulatory approval processes	1.67	0.92	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		19	land and development economics	1.47	0.83	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		20	emerging trends and issues	1.65	0.83	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

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KNOWLEDGE STATEMENTS	Design, Planning and Management at Various Scales and Applications	21	photogrammetry and remote sensing	1.47	0.84	0	1	1	0	0	0	0	1	0	0	0	0	0	0	0	0	0
		22	visual resource assessment	1.91	0.88	0	1	1	0	0	0	0	1	1	1	0	1	1	0	1	0	1	0
		23	agricultural and rural landscape analysis	1.68	0.85	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0
		24	urban landscape	2.17	0.71	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0
		25	planning principles including regional community and neighborhood planning	2.12	0.76	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0
		26	conservation of natural resources	2.33	0.8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		27	historic preservation	1.73	0.76	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		28	ecological planning principles	2.23	0.8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		29	Water resource management	1.91	0.84	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		30	wetland	1.78	0.83	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		31	floodplain management	1.8	0.86	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		32	land and water reclamation procedures including quarry, mine and landfill reclamation	1.43	0.84	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		33	treatment of toxic materials	1.05	0.86	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Site Design and Engineering: Materials, Methods, Technologies and Applications	34	design needs for special populations	1.91	0.78	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		35	accessibility regulations	2.28	0.87	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		36	roadway design principles	2.15	0.83	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0
		37	elements of vehicular and pedestrian circulation systems and their design requirements	2.57	0.72	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		38	landscape maintenance techniques, materials, equipment, and practices	1.93	0.87	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		39	noise attenuation and mitigation techniques	1.66	0.82	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		40	sustainable construction practices	1.82	0.84	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		41	construction equipment and technologies	1.76	0.87	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		42	grading, drainage and stormwater treatment	2.78	0.57	0	0	0	0	0	1	0	0	0	0	0	0	1	0	0	0	0	0
		43	biofiltration and other alternative drainage methods	1.91	0.84	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0
		44	erosion and sedimentation control	2.28	0.82	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0
		45	utility systems	1.77	0.77	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0
		46	Irrigation systems	1.75	0.88	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0
		47	lighting systems	1.7	0.79	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0
		48	structural considerations	2.06	0.82	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0
	Construction Documentation and Administration	49	quality control procedures for construction, such as delivery, storage, testing, etc.	1.27	0.87	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		50	sequencing of design, approval, permitting, and construction activities	1.68	0.92	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		51	the life-cycle cost-analysis process	1.32	0.86	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		52	geographic coordinate systems and layout techniques and conventions	1.9	0.9	0	0	1	0	1	0	1	1	1	1	1	1	0	0	0	0	0	0
		53	specification types and components for a project	1.89	0.83	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		54	general and supplemental conditions, special provisions, and technical specifications and their organizations	1.64	0.88	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		55	construction administration and details	1.73	0.92	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		56	basic construction law	1.48	0.84	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		57	construction contracts	1.55	0.88	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

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KNOWLEDGE STATEMENTS	Communication	58	determination of user values such as focus groups and surveys	1.52	0.83	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		59	consensus and team building	1.74	0.91	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		60	techniques for conducting meetings	1.59	0.97	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		61	the roles of visual communication, including photographic and video documentation	2.25	0.85	1	1	1	0	1	1	0	1	1	1	0	1	1	0	0	0	1	0
		62	graphic presentation techniques, systems and symbols	2.71	0.73	1	1	1	0	1	0	1	1	1	1	1	1	1	0	0	0	1	1
		63	interpretive methods and techniques such as information displays and brochures	1.82	0.98	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0
		64	public relations, outreach, and image development	1.49	0.97	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Values and Ethics in Practice	65	environmental ethics	2.08	0.82	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		66	social responsibility in design	2.1	0.78	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		67	organizational management principles such as leadership principles and landscape architect career cycle	1.61	0.93	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		68	resolving moral and ethical dilemmas	1.89	0.93	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
COMPETENCIES	Landscape Architecture History & Criticism	69	Develop an understanding of design as exemplified by historically significant works of landscape architecture, urban planning, civic design, and architecture	2.02	0.73	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		70	Examine economic, political, social, ecological and esthetic relationships and their influence on the development of the profession of landscape architecture	1.65	0.78	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		71	Demonstrate an understanding of the evolution of landscape architecture as an art and a profession through knowledge of its terminology, literature, personalities, and concepts	1.85	0.76	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		72	Demonstrate the ability to critique prior work and understand the relevance in addressing current issues and problems	1.89	0.74	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		73	Develop an ability to synthesize and make connections between aspects of landscape architecture and disciplines outside of landscape architecture	1.98	0.73	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Natural & Cultural Systems	74	Conduct field investigations to identify significant natural and cultural features, characteristics, and systems	2.06	0.74	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		75	Perform quantitative analyses to evaluate the interactions of natural and cultural features, characteristics, and systems	1.64	0.78	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		76	Perform qualitative analyses to evaluate the relationship between the natural and cultural features, characteristics, and systems	1.79	0.78	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		77	Predict implications of design, planning, and management proposals on natural cultural systems both within the site and in the larger context	1.88	0.76	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

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COMPETENCIES	Public Policy and Regulation	78	Identify and collect regulatory information, applicable data and required approvals governing a project (e.g., relevant laws, codes, and regulations)	1.31	0.74	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		79	Confirm code compliance (e.g. zoning, environment, and accessibility)	1.37	0.81	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		80	Assist in the preparation of ordinances, regulations, covenants, standards, and guidelines	0.77	0.69	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		81	Influence public policies on areas such as growth and land and water management by testifying, lobbying, or preparing written documents for public distribution	0.73	0.75	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Design, Planning, and Management at Various Scales and Applications	82	Develop a design program based on users' needs and clients' goals and resources	2.13	0.75	0	0		0	0	0	0	0	0	0	0	0	0	0	0	0	0
		83	Analyze relationships among design elements by determining opportunities and constraints	2.33	0.62	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		84	Develop conceptual design, planning, and management solutions	2.39	0.61	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		85	Evaluate design alternatives to determine the appropriate solution	2.45	0.59	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Site Design and Engineering: Materials, Methods, Technologies and Applications	86	Design for protection and management of land resources (e.g. land forms, vegetation, habitat, erosion and sedimentation control)	2.13	0.64	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0
		87	Design for protection and management of water resources (e.g. storm water, water supply, ground water)	2.05	0.66	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0
		88	Design pedestrian, vehicular, and non-motorized circulation systems	2.28	0.62	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0
		89	Design elements for construction considering materials, structural issues, and construction technologies	1.94	0.69	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0
	Construction Documentation and Administration	90	Prepare construction documents including plans, working drawings, and technical specifications	1.87	0.77	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		91	Prepare contract documents including agreements, general conditions, and bid documents	1.24	0.82	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		92	Manage the bidding/tendering process	0.72	0.7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		93	Provide construction administration and observation throughout the project	0.83	0.78	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		94	Conduct project closure including review and distribution of close-out documents	0.67	0.73	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		95	Perform post construction evaluation	0.91	0.79	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		96	Perform construction services including design-build	0.67	0.7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		97	Prepare management and maintenance manuals and documents	0.81	0.7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

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COMPETENCIES	Communication	98	Maintain clear communication among collaborators through correspondence and project coordination	1.51	0.9	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		99	Develop written documentation, such as projects reports, grant proposals, and promotional materials	1.43	0.84	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		100	Create graphic materials in a variety of media	2.19	0.76	0	0	1	0	1	1	0	0	0	0	0	0	1	0	0	0	0	0
		101	Prepare and deliver oral presentations such as meetings, demonstrations, and outreach	2.18	0.72	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		102	Conduct project and public meetings including preparing of meeting agendas and notes, and facilitation of the meeting	1.34	0.89	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		103	Review and critique peer work	1.79	0.88	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Values and Ethics in Practice	104	Manage business practices and organizations	0.81	0.74	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		105	Manage risk and liability	0.86	0.81	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		106	Negotiate and prepare client and consultant agreements	0.74	0.79	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		107	Participate in life-long learning (e.g., a professional organization, continuing education activities)	1.56	1.03	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		108	Participate in professional and public service activities	1.58	0.83	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		109	Train, educate and mentor other professionals	0.96	0.91	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		110	Maintain and promote professional and ethical standards	2.12	0.86	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
					Sum	6	8	6	0	6	17	2	5	4	4	3	5	6	0	2	0	3	1
					Average	0.05	0.07	0.06	0.00	0.05	0.15	0.02	0.05	0.04	0.04	0.03	0.05	0.05	0.00	0.02	0.00	0.03	0.01

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						CV5			CV6								
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KNOWLEDGE STATEMENTS	Landscape Architecture History and Criticism	1	history of landscape architecture and allied professions	2.15	0.69	0	0	0	0	0	0	0	0	0		2	0.07
		2	historic preservation principles	1.69	0.83	0	0	0	0	0	0	0	0	0		0	0.00
	Natural and Cultural Systems	3	land information sources	2.55	0.77	0	0	0	0	0	0	0	0	0		0	0.00
		4	patterns of land use and built form	2.43	0.76	0	0	0	0	0	0	0	0	0		0	0.00
		5	natural site conditions and ecosystems	2.76	0.66	0	0	0	0	0	0	0	0	0		0	0.00
		6	social and cultural influences on design	2.19	0.81	0	0	0	0	0	0	0	0	0		0	0.00
		7	regional hazard design considerations	2.1	0.87	0	0	0	0	0	0	0	0	0		0	0.00
	Design and Planning Theories and Methodologies	8	creativity and process including design theory and problem –solving strategies	2.83	0.64	0	0	0	0	0	0	0	0	0		0	0.00
		9	aesthetic principles of design	2.78	0.71	0	0	0	0	0	0	0	0	0		1	0.04
		10	human factors such as behavior, perception, psychological and sensory response	2.33	0.76	0	0	0	0	0	0	0	0	0		2	0.07
		11	natural factors such as ecological relationships	2.53	0.75	0	0	0	0	0	0	0	0	0		0	0.00
		12	relationship between human and natural systems such as resource conservation, habitat restoration and creation, and urban ecology	2.36	0.79	0	0	0	0	0	0	0	0	0		0	0.00
		13	influence of context on design, planning, and management decisions	2.45	0.76	0	0	0	0	0	0	0	0	0		0	0.00
		14	research methods including data collection, interpretation, and application of results	2.37	0.93	0	0	0	0	0	0	0	0	0		2	0.07
		15	therapeutic aspects of design	1.66	0.88	0	0	0	0	0	0	0	0	0		0	0.00
		16	communication and education methods, including sharing knowledge and evaluating outcomes	2.15	0.99	0	0	0	0	0	0	0	1	0		5	0.19
	Public Policy and Regulation	17	governmental policies and laws that affect the use and development of land	1.8	0.85	0	0	0	0	0	0	0	0	0		0	0.00
		18	political and regulatory approval processes	1.67	0.92	0	0	0	0	0	0	0	0	0		0	0.00
		19	land and development economics	1.47	0.83	0	0	0	0	0	0	0	0	0		0	0.00
		20	emerging trends and issues	1.65	0.83	0	0	0	0	0	0	0	0	0		0	0.00

LABOK						GIS&T BOK											
				Command of Knowledge at time of Degree		Cartography & Visualization											
						CV5			CV6								
Knowledge Statement / Competency Division	Domains		Knowledge Statements / Competencies	Mean	Standard Deviation	Computational Issues	Map Production	Map Reproduction	The Power of Maps	Map Reading	Map Interpretation	Map Analysis	Evaluation & Testing	Impact of Uncertainty		Sum	Average
KNOWLEDGE STATEMENTS	Design, Planning and Management at Various Scales and Applications	21	photogrammetry and remote sensing	1.47	0.84	0	1	0	0	0	1	1	0	0		6	0.22
		22	visual resource assessment	1.91	0.88	0	1	1	0	1	1	1	0	0		14	0.52
		23	agricultural and rural landscape analysis	1.68	0.85	0	0	0	0	0	1	0	0	0		2	0.07
		24	urban landscape	2.17	0.71	0	0	0	0	0	0	0	0	0		1	0.04
		25	planning principles including regional community and neighborhood planning	2.12	0.76	0	0	0	0	0	0	0	0	0		1	0.04
		26	conservation of natural resources	2.33	0.8	0	0	0	0	0	0	0	0	0		0	0.00
		27	historic preservation	1.73	0.76	0	0	0	0	0	0	0	0	0		0	0.00
		28	ecological planning principles	2.23	0.8	0	0	0	0	0	0	0	0	0		0	0.00
		29	Water resource management	1.91	0.84	0	0	0	0	0	0	0	0	0		0	0.00
		30	wetland	1.78	0.83	0	0	0	0	0	0	0	0	0		0	0.00
		31	floodplain management	1.8	0.86	0	0	0	0	0	0	0	0	0		0	0.00
		32	land and water reclamation procedures including quarry, mine and landfill reclamation	1.43	0.84	0	0	0	0	0	0	0	0	0		0	0.00
		33	treatment of toxic materials	1.05	0.86	0	0	0	0	0	0	0	0	0		0	0.00
	Site Design and Engineering: Materials, Methods, Technologies and Applications	34	design needs for special populations	1.91	0.78	0	0	0	0	0	0	0	0	0		0	0.00
		35	accessibility regulations	2.28	0.87	0	0	0	0	0	0	0	0	0		0	0.00
		36	roadway design principles	2.15	0.83	0	0	0	0	0	0	0	0	0		1	0.04
		37	elements of vehicular and pedestrian circulation systems and their design requirements	2.57	0.72	0	0	0	0	0	0	0	0	0		0	0.00
		38	landscape maintenance techniques, materials, equipment, and practices	1.93	0.87	0	0	0	0	0	0	0	0	0		0	0.00
		39	noise attenuation and mitigation techniques	1.66	0.82	0	0	0	0	0	0	0	0	0		0	0.00
		40	sustainable construction practices	1.82	0.84	0	0	0	0	0	0	0	0	0		0	0.00
		41	construction equipment and technologies	1.76	0.87	0	0	0	0	0	0	0	0	0		0	0.00
		42	grading, drainage and stormwater treatment	2.78	0.57	0	0	0	0	0	0	0	0	0		2	0.07
		43	biofiltration and other alternative drainage methods	1.91	0.84	0	0	0	0	0	0	0	0	0		1	0.04
		44	erosion and sedimentation control	2.28	0.82	0	0	0	0	0	0	0	0	0		1	0.04
		45	utility systems	1.77	0.77	0	0	0	0	0	0	0	0	0		1	0.04
		46	Irrigation systems	1.75	0.88	0	0	0	0	0	0	0	0	0		1	0.04
		47	lighting systems	1.7	0.79	0	0	0	0	0	0	0	0	0		1	0.04
		48	structural considerations	2.06	0.82	0	0	0	0	0	0	0	0	0		1	0.04
	Construction Documentation and Administration	49	quality control procedures for construction, such as delivery, storage, testing, etc.	1.27	0.87	0	0	0	0	0	0	0	0	0		0	0.00
		50	sequencing of design, approval, permitting, and construction activities	1.68	0.92	0	0	0	0	0	0	0	0	0		0	0.00
		51	the life-cycle cost-analysis process	1.32	0.86	0	0	0	0	0	0	0	0	0		0	0.00
		52	geographic coordinate systems and layout techniques and conventions	1.9	0.9	0	0	0	0	0	0	1	0	0		9	0.33
		53	specification types and components for a project	1.89	0.83	0	0	0	0	0	0	0	0	0		0	0.00
		54	general and supplemental conditions, special provisions, and technical specifications and their organizations	1.64	0.88	0	0	0	0	0	0	0	0	0		0	0.00
		55	construction administration and details	1.73	0.92	0	0	0	0	0	0	0	0	0		0	0.00
		56	basic construction law	1.48	0.84	0	0	0	0	0	0	0	0	0		0	0.00
		57	construction contracts	1.55	0.88	0	0	0	0	0	0	0	0	0		0	0.00

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KNOWLEDGE STATEMENTS	Communication	58	determination of user values such as focus groups and surveys	1.52	0.83	0	0	0	0	0	0	0	1	0		1	0.04
		59	consensus and team building	1.74	0.91	0	0	0	0	0	0	0	0	0		0	0.00
		60	techniques for conducting meetings	1.59	0.97	0	0	0	0	0	0	0	0	0		0	0.00
		61	the roles of visual communication, including photographic and video documentation	2.25	0.85	0	0	0	0	1	1	0	1	0		14	0.52
		62	graphic presentation techniques, systems and symbols	2.71	0.73	0	1	0	0	1	0	0	1	0		16	0.59
		63	interpretive methods and techniques such as information displays and brochures	1.82	0.98	0	0	0	0	0	0	0	0	0		2	0.07
		64	public relations, outreach, and image development	1.49	0.97	0	0	0	0	0	0	0	0	0		0	0.00
	Values and Ethics in Practice	65	environmental ethics	2.08	0.82	0	0	0	0	0	0	0	0	0		0	0.00
		66	social responsibility in design	2.1	0.78	0	0	0	0	0	0	0	0	0		0	0.00
		67	organizational management principles such as leadership principles and landscape architect career cycle	1.61	0.93	0	0	0	0	0	0	0	0	0		0	0.00
		68	resolving moral and ethical dilemmas	1.89	0.93	0	0	0	0	0	0	0	0	0		0	0.00
COMPETENCIES	Landscape Architecture History & Criticism	69	Develop an understanding of design as exemplified by historically significant works of landscape architecture, urban planning, civic design, and architecture	2.02	0.73	0	0	0	0	0	0	0	0	0		0	0.00
		70	Examine economic, political, social, ecological and esthetic relationships and their influence on the development of the profession of landscape architecture	1.65	0.78	0	0	0	0	0	0	0	0	0		0	0.00
		71	Demonstrate an understanding of the evolution of landscape architecture as an art and a profession through knowledge of its terminology, literature, personalities, and concepts	1.85	0.76	0	0	0	0	0	0	0	0	0		0	0.00
		72	Demonstrate the ability to critique prior work and understand the relevance in addressing current issues and problems	1.89	0.74	0	0	0	0	0	0	0	0	0		0	0.00
		73	Develop an ability to synthesize and make connections between aspects of landscape architecture and disciplines outside of landscape architecture	1.98	0.73	0	0	0	0	0	0	0	0	0		1	0.04
	Natural & Cultural Systems	74	Conduct field investigations to identify significant natural and cultural features, characteristics, and systems	2.06	0.74	0	0	0	0	0	0	0	0	0		0	0.00
		75	Perform quantitative analyses to evaluate the interactions of natural and cultural features, characteristics, and systems	1.64	0.78	0	0	0	0	0	0	0	0	0		0	0.00
		76	Perform qualitative analyses to evaluate the relationship between the natural and cultural features, characteristics, and systems	1.79	0.78	0	0	0	0	0	0	0	0	0		0	0.00
		77	Predict implications of design, planning, and management proposals on natural cultural systems both within the site and in the larger context	1.88	0.76	0	0	0	0	0	0	0	0	0		0	0.00

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COMPETENCIES	Public Policy and Regulation	78	Identify and collect regulatory information, applicable data and required approvals governing a project (e.g., relevant laws, codes, and regulations)	1.31	0.74	0	0	0	0	0	0	0	0	0		0	0.00
		79	Confirm code compliance (e.g. zoning, environment, and accessibility)	1.37	0.81	0	0	0	0	0	0	0	0	0		0	0.00
		80	Assist in the preparation of ordinances, regulations, covenants, standards, and guidelines	0.77	0.69	0	0	0	0	0	0	0	0	0		0	0.00
		81	Influence public policies on areas such as growth and land and water management by testifying, lobbying, or preparing written documents for public distribution	0.73	0.75	0	0	0	0	0	0	0	0	0		0	0.00
	Design, Planning, and Management at Various Scales and Applications	82	Develop a design program based on users' needs and clients' goals and resources	2.13	0.75	0	0	0	0	0	0	0	0	0		0	0.00
		83	Analyze relationships among design elements by determining opportunities and constraints	2.33	0.62	0	0	0	0	0	0	0	0	0		0	0.00
		84	Develop conceptual design, planning, and management solutions	2.39	0.61	0	0	0	0	0	0	0	0	0		0	0.00
		85	Evaluate design alternatives to determine the appropriate solution	2.45	0.59	0	0	0	0	0	0	0	0	0		0	0.00
	Site Design and Engineering: Materials, Methods, Technologies and Applications	86	Design for protection and management of land resources (e.g. land forms, vegetation, habitat, erosion and sedimentation control)	2.13	0.64	0	0	0	0	0	0	0	0	0		1	0.04
		87	Design for protection and management of water resources (e.g. storm water, water supply, ground water)	2.05	0.66	0	0	0	0	0	0	0	0	0		1	0.04
		88	Design pedestrian, vehicular, and non-motorized circulation systems	2.28	0.62	0	0	0	0	0	0	0	0	0		1	0.04
		89	Design elements for construction considering materials, structural issues, and construction technologies	1.94	0.69	0	0	0	0	0	0	0	0	0		1	0.04
	Construction Documentation and Administration	90	Prepare construction documents including plans, working drawings, and technical specifications	1.87	0.77	0	0	0	0	0	0	0	0	0		0	0.00
		91	Prepare contract documents including agreements, general conditions, and bid documents	1.24	0.82	0	0	0	0	0	0	0	0	0		0	0.00
		92	Manage the bidding/tendering process	0.72	0.7	0	0	0	0	0	0	0	0	0		0	0.00
		93	Provide construction administration and observation throughout the project	0.83	0.78	0	0	0	0	0	0	0	0	0		0	0.00
		94	Conduct project closure including review and distribution of close-out documents	0.67	0.73	0	0	0	0	0	0	0	0	0		0	0.00
		95	Perform post construction evaluation	0.91	0.79	0	0	0	0	0	0	0	0	0		0	0.00
		96	Perform construction services including design-build	0.67	0.7	0	0	0	0	0	0	0	0	0		0	0.00
		97	Prepare management and maintenance manuals and documents	0.81	0.7	0	0	0	0	0	0	0	0	0		0	0.00

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COMPETENCIES	Communication	98	Maintain clear communication among collaborators through correspondence and project coordination	1.51	0.9	0	0	0	0	0	0	0	0	0		0	0.00
		99	Develop written documentation, such as projects reports, grant proposals, and promotional materials	1.43	0.84	0	0	0	0	0	0	0	0	0		0	0.00
		100	Create graphic materials in a variety of media	2.19	0.76	0	0	1	0	0	0	0	0	0		5	0.19
		101	Prepare and deliver oral presentations such as meetings, demonstrations, and outreach	2.18	0.72	0	0	1	0	0	0	0	0	0		1	0.04
		102	Conduct project and public meetings including preparing of meeting agendas and notes, and facilitation of the meeting	1.34	0.89	0	0	0	0	0	0	0	0	0		0	0.00
		103	Review and critique peer work	1.79	0.88	0	0	0	0	0	0	0	0	0		0	0.00
	Values and Ethics in Practice	104	Manage business practices and organizations	0.81	0.74	0	0	0	0	0	0	0	0	0		0	0.00
		105	Manage risk and liability	0.86	0.81	0	0	0	0	0	0	0	0	0		0	0.00
		106	Negotiate and prepare client and consultant agreements	0.74	0.79	0	0	0	0	0	0	0	0	0		0	0.00
		107	Participate in life-long learning (e.g., a professional organization, continuing education activities)	1.56	1.03	0	0	0	0	0	0	0	0	0		0	0.00
		108	Participate in professional and public service activities	1.58	0.83	0	0	0	0	0	0	0	0	0		0	0.00
		109	Train, educate and mentor other professionals	0.96	0.91	0	0	0	0	0	0	0	0	0		0	0.00
		110	Maintain and promote professional and ethical standards	2.12	0.86	0	0	0	0	0	0	0	0	0		0	0.00
					Sum	0	3	3	0	3	4	3	4	0			
					Average	0.00	0.03	0.03	0.00	0.03	0.04	0.03	0.04	0.00			

LABOK						GIS&T BOK																			
				Command of Knowledge at time of Degree		Design Aspects																			
						DA1						DA2					DA3						DA4			
Knowledge Statement / Competency Division	Domains		Knowledge Statements / Competencies	Mean	Standard Deviation	Using Models to Represent information & processes	Components of Models: Data, Structures, Procedures	Scope of GIS&T Applications	Scope of GIS&T Design	Process of GIS&T Design	Problem Definition	Planning for Design	Application/ User Assessment	Requirements Analysis	Social, Political, & Cultural Issues	Feasibility Analysis	Software Systems	Data Costs	Labor Management	Capital: Facilities & Equipment	Funding	Modeling Tools	Conceptual Models	Logical Models	Physical Models
KNOWLEDGE STATEMENTS	Landscape Architecture History and Criticism	1	history of landscape architecture and allied professions	2.15	0.69	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		2	historic preservation principles	1.69	0.83	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Natural and Cultural Systems	3	land information sources	2.55	0.77	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		4	patterns of land use and built form	2.43	0.76	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		5	natural site conditions and ecosystems	2.76	0.66	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		6	social and cultural influences on design	2.19	0.81	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0
		7	regional hazard design considerations	2.1	0.87	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Design and Planning Theories and Methodologies	8	creativity and process including design theory and problem –solving strategies	2.83	0.64	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1
		9	aesthetic principles of design	2.78	0.71	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		10	human factors such as behavior, perception, psychological and sensory response	2.33	0.76	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		11	natural factors such as ecological relationships	2.53	0.75	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		12	relationship between human and natural systems such as resource conservation, habitat restoration and creation, and urban ecology	2.36	0.79	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		13	influence of context on design, planning, and management decisions	2.45	0.76	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		14	research methods including data collection, interpretation, and application of results	2.37	0.93	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		15	therapeutic aspects of design	1.66	0.88	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		16	communication and education methods, including sharing knowledge and evaluating outcomes	2.15	0.99	0	0	0	0	0	0	1	1	0	0	0	0	0	1	0	0	0	0	0	0

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						DA1					DA2					DA3						DA4			
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KNOWLEDGE STATEMENTS	Public Policy and Regulation	17	governmental policies and laws that affect the use and development of land	1.8	0.85	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0
		18	political and regulatory approval processes	1.67	0.92	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0
		19	land and development economics	1.47	0.83	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		20	emerging trends and issues	1.65	0.83	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Design, Planning and Management at Various Scales and Applications	21	photogrammetry and remote sensing	1.47	0.84	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0
		22	visual resource assessment	1.91	0.88	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		23	agricultural and rural landscape analysis	1.68	0.85	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		24	urban landscape	2.17	0.71	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		25	planning principles including regional community and neighborhood planning	2.12	0.76	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		26	conservation of natural resources	2.33	0.8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		27	historic preservation	1.73	0.76	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		28	ecological planning principles	2.23	0.8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		29	Water resource management	1.91	0.84	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		30	wetland	1.78	0.83	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		31	floodplain management	1.8	0.86	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		32	land and water reclamation procedures including quarry, mine and landfill reclamation	1.43	0.84	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		33	treatment of toxic materials	1.05	0.86	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Site Design and Engineering: Materials, Methods, Technologies and Applications	34	design needs for special populations	1.91	0.78	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		35	accessibility regulations	2.28	0.87	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		36	roadway design principles	2.15	0.83	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		37	elements of vehicular and pedestrian circulation systems and their design requirements	2.57	0.72	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		38	landscape maintenance techniques, materials, equipment, and practices	1.93	0.87	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		39	noise attenuation and mitigation techniques	1.66	0.82	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		40	sustainable construction practices	1.82	0.84	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		41	construction equipment and technologies	1.76	0.87	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		42	grading, drainage and stormwater treatment	2.78	0.57	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		43	biofiltration and other alternative drainage methods	1.91	0.84	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		44	erosion and sedimentation control	2.28	0.82	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		45	utility systems	1.77	0.77	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		46	Irrigation systems	1.75	0.88	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		47	lighting systems	1.7	0.79	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		48	structural considerations	2.06	0.82	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

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KNOWLEDGE STATEMENTS	Construction Documentation and Administration	49	quality control procedures for construction, such as delivery, storage, testing, etc.	1.27	0.87	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		50	sequencing of design, approval, permitting, and construction activities	1.68	0.92	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		51	the life-cycle cost-analysis process	1.32	0.86	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		52	geographic coordinate systems and layout techniques and conventions	1.9	0.9	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		53	specification types and components for a project	1.89	0.83	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		54	general and supplemental conditions, special provisions, and technical specifications and their organizations	1.64	0.88	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		55	construction administration and details	1.73	0.92	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		56	basic construction law	1.48	0.84	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		57	construction contracts	1.55	0.88	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Communication	58	determination of user values such as focus groups and surveys	1.52	0.83	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0
		59	consensus and team building	1.74	0.91	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		60	techniques for conducting meetings	1.59	0.97	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		61	the roles of visual communication, including photographic and video documentation	2.25	0.85	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		62	graphic presentation techniques, systems and symbols	2.71	0.73	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1
		63	interpretive methods and techniques such as information displays and brochures	1.82	0.98	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		64	public relations, outreach, and image development	1.49	0.97	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Values and Ethics in Practice	65	environmental ethics	2.08	0.82	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		66	social responsibility in design	2.1	0.78	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		67	organizational management principles such as leadership principles and landscape architect career cycle	1.61	0.93	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		68	resolving moral and ethical dilemmas	1.89	0.93	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

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COMPETENCIES	Landscape Architecture History & Criticism	69	Develop an understanding of design as exemplified by historically significant works of landscape architecture, urban planning, civic design, and architecture	2.02	0.73	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		70	Examine economic, political, social, ecological and esthetic relationships and their influence on the development of the profession of landscape architecture	1.65	0.78	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0
		71	Demonstrate an understanding of the evolution of landscape architecture as an art and a profession through knowledge of its terminology, literature, personalities, and concepts	1.85	0.76	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		72	Demonstrate the ability to critique prior work and understand the relevance in addressing current issues and problems	1.89	0.74	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		73	Develop an ability to synthesize and make connections between aspects of landscape architecture and disciplines outside of landscape architecture	1.98	0.73	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Natural & Cultural Systems	74	Conduct field investigations to identify significant natural and cultural features, characteristics, and systems	2.06	0.74	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		75	Perform quantitative analyses to evaluate the interactions of natural and cultural features, characteristics, and systems	1.64	0.78	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		76	Perform qualitative analyses to evaluate the relationship between the natural and cultural features, characteristics, and systems	1.79	0.78	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		77	Predict implications of design, planning, and management proposals on natural cultural systems both within the site and in the larger context	1.88	0.76	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

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COMPETENCIES	Public Policy and Regulation	78	Identify and collect regulatory information, applicable data and required approvals governing a project (e.g., relevant laws, codes, and regulations)	1.31	0.74	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		79	Confirm code compliance (e.g. zoning, environment, and accessibility)	1.37	0.81	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		80	Assist in the preparation of ordinances, regulations, covenants, standards, and guidelines	0.77	0.69	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		81	Influence public policies on areas such as growth and land and water management by testifying, lobbying, or preparing written documents for public distribution	0.73	0.75	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Design, Planning, and Management at Various Scales and Applications	82	Develop a design program based on users' needs and clients' goals and resources	2.13	0.75	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		83	Analyze relationships among design elements by determining opportunities and constraints	2.33	0.62	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		84	Develop conceptual design, planning, and management solutions	2.39	0.61	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		85	Evaluate design alternatives to determine the appropriate solution	2.45	0.59	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Site Design and Engineering: Materials, Methods, Technologies and Applications	86	Design for protection and management of land resources (e.g. land forms, vegetation, habitat, erosion and sedimentation control)	2.13	0.64	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		87	Design for protection and management of water resources (e.g. storm water, water supply, ground water)	2.05	0.66	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		88	Design pedestrian, vehicular, and non-motorized circulation systems	2.28	0.62	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		89	Design elements for construction considering materials, structural issues, and construction technologies	1.94	0.69	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

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COMPETENCIES	Construction Documentation and Administration	90	Prepare construction documents including plans, working drawings, and technical specifications	1.87	0.77	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		91	Prepare contract documents including agreements, general conditions, and bid documents	1.24	0.82	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		92	Manage the bidding/tendering process	0.72	0.7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		93	Provide construction administration and observation throughout the project	0.83	0.78	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		94	Conduct project closure including review and distribution of close-out documents	0.67	0.73	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		95	Perform post construction evaluation	0.91	0.79	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		96	Perform construction services including design-build	0.67	0.7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		97	Prepare management and maintenance manuals and documents	0.81	0.7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Communication	98	Maintain clear communication among collaborators through correspondence and project coordination	1.51	0.9	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		99	Develop written documentation, such as projects reports, grant proposals, and promotional materials	1.43	0.84	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		100	Create graphic materials in a variety of media	2.19	0.76	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1
		101	Prepare and deliver oral presentations such as meetings, demonstrations, and outreach	2.18	0.72	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		102	Conduct project and public meetings including preparing of meeting agendas and notes, and facilitation of the meeting	1.34	0.89	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		103	Review and critique peer work	1.79	0.88	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Values and Ethics in Practice	104	Manage business practices and organizations	0.81	0.74	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		105	Manage risk and liability	0.86	0.81	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		106	Negotiate and prepare client and consultant agreements	0.74	0.79	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		107	Participate in life-long learning (e.g., a professional organization, continuing education activities)	1.56	1.03	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		108	Participate in professional and public service activities	1.58	0.83	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		109	Train, educate and mentor other professionals	0.96	0.91	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0
		110	Maintain and promote professional and ethical standards	2.12	0.86	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
					Sum	0	0	0	0	0	0	2	2	1	4	0	0	1	1	0	0	0	3	3	3
					Average	0.00	0.00	0.00	0.00	0.00	0.00	0.02	0.02	0.01	0.04	0.00	0.00	0.01	0.01	0.00	0.00	0.00	0.03	0.03	0.03

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KNOWLEDGE STATEMENTS	Landscape Architecture History and Criticism	1	history of landscape architecture and allied professions	2.15	0.69	0	0	0	0	0	0	0	0	0	0	0	0		0	0.00
		2	historic preservation principles	1.69	0.83	0	0	0	0	0	0	0	0	0	0	0	0		0	0.00
	Natural and Cultural Systems	3	land information sources	2.55	0.77	0	0	0	0	0	0	0	0	0	0	0	0		0	0.00
		4	patterns of land use and built form	2.43	0.76	0	0	0	0	0	0	0	0	0	0	0	0		0	0.00
		5	natural site conditions and ecosystems	2.76	0.66	0	0	0	0	0	0	0	0	0	0	0	0		0	0.00
		6	social and cultural influences on design	2.19	0.81	0	0	0	0	0	0	0	0	0	0	0	0		1	0.03
		7	regional hazard design considerations	2.1	0.87	0	0	0	0	0	0	0	0	0	0	0	0		0	0.00
	Design and Planning Theories and Methodologies	8	creativity and process including design theory and problem –solving strategies	2.83	0.64	0	0	0	0	0	0	0	0	0	0	0	0		3	0.09
		9	aesthetic principles of design	2.78	0.71	0	0	0	0	0	0	0	0	0	0	0	0		0	0.00
		10	human factors such as behavior, perception, psychological and sensory response	2.33	0.76	0	0	0	0	0	0	0	0	0	0	0	0		0	0.00
		11	natural factors such as ecological relationships	2.53	0.75	0	0	0	0	0	0	0	0	0	0	0	0		0	0.00
		12	relationship between human and natural systems such as resource conservation, habitat restoration and creation, and urban ecology	2.36	0.79	0	0	0	0	0	0	0	0	0	0	0	0		0	0.00
		13	influence of context on design, planning, and management decisions	2.45	0.76	0	0	0	0	0	0	0	0	0	0	0	0		0	0.00
		14	research methods including data collection, interpretation, and application of results	2.37	0.93	0	0	0	0	0	0	0	0	0	0	0	0		0	0.00
		15	therapeutic aspects of design	1.66	0.88	0	0	0	0	0	0	0	0	0	0	0	0		0	0.00
		16	communication and education methods, including sharing knowledge and evaluating outcomes	2.15	0.99	0	0	0	0	0	0	0	0	0	0	0	0		3	0.09

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KNOWLEDGE STATEMENTS	Public Policy and Regulation	17	governmental policies and laws that affect the use and development of land	1.8	0.85	0	0	0	0	0	0	0	0	0	0	0	0		1	0.03
		18	political and regulatory approval processes	1.67	0.92	0	0	0	0	0	0	0	0	0	0	0	0		1	0.03
		19	land and development economics	1.47	0.83	0	0	0	0	0	0	0	0	0	0	0	0		0	0.00
		20	emerging trends and issues	1.65	0.83	0	0	0	0	0	0	0	0	0	0	0			0	0.00
	Design, Planning and Management at Various Scales and Applications	21	photogrammetry and remote sensing	1.47	0.84	0	0	0	0	0	0	0	0	0	0	0	0		1	0.03
		22	visual resource assessment	1.91	0.88	0	0	0	0	0	0	0	0	0	0	0	0		0	0.00
		23	agricultural and rural landscape analysis	1.68	0.85	0	1	0	0	0	0	0	0	0	0	0	0		1	0.03
		24	urban landscape	2.17	0.71	0	0	0	0	0	0	0	0	0	0	0	0		0	0.00
		25	planning principles including regional community and neighborhood planning	2.12	0.76	0	0	0	0	0	0	0	0	0	0	0	0		0	0.00
		26	conservation of natural resources	2.33	0.8	0	0	0	0	0	0	0	0	0	0	0	0		0	0.00
		27	historic preservation	1.73	0.76	0	0	0	0	0	0	0	0	0	0	0	0		0	0.00
		28	ecological planning principles	2.23	0.8	0	0	0	0	0	0	0	0	0	0	0	0		0	0.00
		29	Water resource management	1.91	0.84	0	0	0	0	0	0	0	0	0	0	0	0		0	0.00
		30	wetland	1.78	0.83		0	0	0	0	0	0	0	0	0	0	0		0	0.00
		31	floodplain management	1.8	0.86	0	0	0	0	0	0	0	0	0	0	0	0		0	0.00
		32	land and water reclamation procedures including quarry, mine and landfill reclamation	1.43	0.84	0	0	0	0	0	0	0	0	0	0	0	0		0	0.00
		33	treatment of toxic materials	1.05	0.86	0	0	0	0	0	0	0	0	0	0	0	0		0	0.00
	Site Design and Engineering: Materials, Methods, Technologies and Applications	34	design needs for special populations	1.91	0.78	0	0	0	0	0	0	0	0	0	0	0	0		0	0.00
		35	accessibility regulations	2.28	0.87	0	0	0	0	0	0	0	0	0	0	0	0		0	0.00
		36	roadway design principles	2.15	0.83	0	0	0	0	0	0	0	0	0	0	0	0		0	0.00
		37	elements of vehicular and pedestrian circulation systems and their design requirements	2.57	0.72	0	0	0	0	0	0	0	0	0	0	0	0		0	0.00
		38	landscape maintenance techniques, materials, equipment, and practices	1.93	0.87	0	0	0	0	0	0	0	0	0	0	0	0		0	0.00
		39	noise attenuation and mitigation techniques	1.66	0.82	0	0	0	0	0	0	0	0	0	0	0	0		0	0.00
		40	sustainable construction practices	1.82	0.84	0	0	0	0	0	0	0	0	0	0	0	0		0	0.00
		41	construction equipment and technologies	1.76	0.87	0	0	0	0	0	0	0	0	0	0	0	0		0	0.00
		42	grading, drainage and stormwater treatment	2.78	0.57	0	0	0	0	0	0	0	0	0	0	0	0		0	0.00
		43	biofiltration and other alternative drainage methods	1.91	0.84	0	0	0	0	0	0	0	0	0	0	0	0		0	0.00
		44	erosion and sedimentation control	2.28	0.82	0	0	0	0	0	0	0	0	0	0	0	0		0	0.00
		45	utility systems	1.77	0.77	0	0	0	0	0	0	0	0	0	0	0	0		0	0.00
		46	Irrigation systems	1.75	0.88	0	0	0	0	0	0	0	0	0	0	0	0		0	0.00
		47	lighting systems	1.7	0.79	0	0	0	0	0	0	0	0	0	0	0	0		0	0.00
		48	structural considerations	2.06	0.82	0	0	0	0	0	0	0	0	0	0	0	0		0	0.00

LABOK						GIS&T BOK														
Knowledge Statement / Competency Division	Domains		Knowledge Statements / Competencies	Command of Knowledge at time of Degree		Design Aspects														
						DA5				DA6				DA7						
				Mean	Standard Deviation	Recognizing Analytical Components	Identifying & Designing Analytical Procedures	Coupling Scientific Models with GIS	Formalizing a Procedure Design	Workflow Analysis & Design	User Interfaces	Development Environments for Geospatial Applications	Computer-aided Software Engineering (CASE) Tools	Implementation Planning	Implementation Tasks	System Testing	System Deployment		Sum	Average
KNOWLEDGE STATEMENTS	Construction Documentation and Administration	49	quality control procedures for construction, such as delivery, storage, testing, etc.	1.27	0.87	0	0	0	0	0	0	0	0	0	0	0	0		0	0.00
		50	sequencing of design, approval, permitting, and construction activities	1.68	0.92	0	0	0	0	0	0	0	0	0	0	0	0		0	0.00
		51	the life-cycle cost-analysis process	1.32	0.86	0	0	0	0	0	0	0	0	0	0	0	0		0	0.00
		52	geographic coordinate systems and layout techniques and conventions	1.9	0.9	0	0	0	0	0	0	0	0	0	0	0	0		0	0.00
		53	specification types and components for a project	1.89	0.83	0	0	0	0	0	0	0	0	0	0	0	0		0	0.00
		54	general and supplemental conditions, special provisions, and technical specifications and their organizations	1.64	0.88	0	0	0	0	0	0	0	0	0	0	0	0		0	0.00
		55	construction administration and details	1.73	0.92	0	0	0	0	0	0	0	0	0	0	0	0		0	0.00
		56	basic construction law	1.48	0.84	0	0	0	0	0	0	0	0	0	0	0	0		0	0.00
		57	construction contracts	1.55	0.88	0	0	0	0	0	0	0	0	0	0	0	0		0	0.00
	Communication	58	determination of user values such as focus groups and surveys	1.52	0.83	0	0	0	0	0	0	0	0	0	0	0	0		1	0.03
		59	consensus and team building	1.74	0.91	0	0	0	0	0	0	0	0	0	0	0	0		0	0.00
		60	techniques for conducting meetings	1.59	0.97	0	0	0	0	0	0	0	0	0	0	0	0		0	0.00
		61	the roles of visual communication, including photographic and video documentation	2.25	0.85	0	0	0	1	0	0	0	0	0	0	0	0		1	0.03
		62	graphic presentation techniques, systems and symbols	2.71	0.73	1	0	0	0	0	0	0	0	0	0	0	0		4	0.13
		63	interpretive methods and techniques such as information displays and brochures	1.82	0.98	0	0	0	0	0	0	0	0	0	0	0	0		0	0.00
		64	public relations, outreach, and image development	1.49	0.97	0	0	0	0	0	0	0	0	0	0	0	0		0	0.00
	Values and Ethics in Practice	65	environmental ethics	2.08	0.82	0	0	0	0	0	0	0	0	0	0	0	0		0	0.00
		66	social responsibility in design	2.1	0.78	0	0	0	0	0	0	0	0	0	0	0	0		0	0.00
		67	organizational management principles such as leadership principles and landscape architect career cycle	1.61	0.93	0	0	0	0	0	0	0	0	0	0	0	0		0	0.00
		68	resolving moral and ethical dilemmas	1.89	0.93	0	0	0	0	0	0	0	0	0	0	0	0		0	0.00

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COMPETENCIES	Landscape Architecture History & Criticism	69	Develop an understanding of design as exemplified by historically significant works of landscape architecture, urban planning, civic design, and architecture	2.02	0.73	0	0	0	0	0	0	0	0	0	0	0	0		0	0.00
		70	Examine economic, political, social, ecological and esthetic relationships and their influence on the development of the profession of landscape architecture	1.65	0.78	0	0	0	0	0	0	0	0	0	0	0	0		1	0.03
		71	Demonstrate an understanding of the evolution of landscape architecture as an art and a profession through knowledge of its terminology, literature, personalities, and concepts	1.85	0.76	0	0	0	0	0	0	0	0	0	0	0	0		0	0.00
		72	Demonstrate the ability to critique prior work and understand the relevance in addressing current issues and problems	1.89	0.74	0	0	0	0	0	0	0	0	0	0	0	0		0	0.00
		73	Develop an ability to synthesize and make connections between aspects of landscape architecture and disciplines outside of landscape architecture	1.98	0.73	0	0	0	0	0	0	0	0	0	0	0	0		0	0.00
	Natural & Cultural Systems	74	Conduct field investigations to identify significant natural and cultural features, characteristics, and systems	2.06	0.74	0	0	0	0	0	0	0	0	0	0	0	0		0	0.00
		75	Perform quantitative analyses to evaluate the interactions of natural and cultural features, characteristics, and systems	1.64	0.78	0	0	0	0	0	0	0	0	0	0	0	0		0	0.00
		76	Perform qualitative analyses to evaluate the relationship between the natural and cultural features, characteristics, and systems	1.79	0.78	0	0	0	0	0	0	0	0	0	0	0	0		0	0.00
		77	Predict implications of design, planning, and management proposals on natural cultural systems both within the site and in the larger context	1.88	0.76	0	0	0	0	0	0	0	0	1	0	0	0		1	0.03

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COMPETENCIES	Public Policy and Regulation	78	Identify and collect regulatory information, applicable data and required approvals governing a project (e.g., relevant laws, codes, and regulations)	1.31	0.74	0	0	0	0	0	0	0	0	0	0	0	0		0	0.00
		79	Confirm code compliance (e.g. zoning, environment, and accessibility)	1.37	0.81	0	0	0	0	0	0	0	0	0	0	0	0		0	0.00
		80	Assist in the preparation of ordinances, regulations, covenants, standards, and guidelines	0.77	0.69	0	0	0	0	0	0	0	0	0	0	0	0		0	0.00
		81	Influence public policies on areas such as growth and land and water management by testifying, lobbying, or preparing written documents for public distribution	0.73	0.75	0	0	0	0	0	0	0	0	0	0	0	0		0	0.00
	Design, Planning, and Management at Various Scales and Applications	82	Develop a design program based on users' needs and clients' goals and resources	2.13	0.75	0	0	0	0	0	0	0	0	0	0	0	0		0	0.00
		83	Analyze relationships among design elements by determining opportunities and constraints	2.33	0.62	0	0	0	0	0	0	0	0	0	0	0	0		0	0.00
		84	Develop conceptual design, planning, and management solutions	2.39	0.61	0	0	0	0	0	0	0	0	0	0	0	0		0	0.00
		85	Evaluate design alternatives to determine the appropriate solution	2.45	0.59	0	0	0	0	0	0	0	0	0	0	0	0		0	0.00
	Site Design and Engineering: Materials, Methods, Technologies and Applications	86	Design for protection and management of land resources (e.g. land forms, vegetation, habitat, erosion and sedimentation control)	2.13	0.64	0	0	0	0	0	0	0	0	0	0	0	0		0	0.00
		87	Design for protection and management of water resources (e.g. storm water, water supply, ground water)	2.05	0.66	0	0	0	0	0	0	0	0	0	0	0	0		0	0.00
		88	Design pedestrian, vehicular, and non-motorized circulation systems	2.28	0.62	0	0	0	0	0	0	0	0	0	0	0	0		0	0.00
		89	Design elements for construction considering materials, structural issues, and construction technologies	1.94	0.69	0	0	0	0	0	0	0	0	0	0	0	0		0	0.00

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COMPETENCIES	Construction Documentation and Administration	90	Prepare construction documents including plans, working drawings, and technical specifications	1.87	0.77	0	0	0	0	0	0	0	0	0	0	0	0		0	0.00
		91	Prepare contract documents including agreements, general conditions, and bid documents	1.24	0.82	0	0	0	0	0	0	0	0	0	0	0	0		0	0.00
		92	Manage the bidding/tendering process	0.72	0.7	0	0	0	0	0	0	0	0	0	0	0	0		0	0.00
		93	Provide construction administration and observation throughout the project	0.83	0.78	0	0	0	0	0	0	0	0	0	0	0	0		0	0.00
		94	Conduct project closure including review and distribution of close-out documents	0.67	0.73	0	0	0	0	0	0	0	0	0	0	0	0		0	0.00
		95	Perform post construction evaluation	0.91	0.79	0	0	0	0	0	0	0	0	0	0	0	0		0	0.00
		96	Perform construction services including design-build	0.67	0.7	0	0	0	0	0	0	0	0	0	0	0	0		0	0.00
		97	Prepare management and maintenance manuals and documents	0.81	0.7	0	0	0	0	0	0	0	0	0	0	0	0		0	0.00
	Communication	98	Maintain clear communication among collaborators through correspondence and project coordination	1.51	0.9	0	0	0	0	0	0	0	0	0	0	0	0		0	0.00
		99	Develop written documentation, such as projects reports, grant proposals, and promotional materials	1.43	0.84	0	0	0	0	0	0	0	0	0	0	0	0		0	0.00
		100	Create graphic materials in a variety of media	2.19	0.76	0	0	0	0	0	1	0	0	0	0	0	0		4	0.13
		101	Prepare and deliver oral presentations such as meetings, demonstrations, and outreach	2.18	0.72	0	0	0	0	0	0	0	0	0	0	0	0		0	0.00
		102	Conduct project and public meetings including preparing of meeting agendas and notes, and facilitation of the meeting	1.34	0.89	0	0	0	0	0	0	0	0	0	0	0	0		0	0.00
		103	Review and critique peer work	1.79	0.88	0	0	0	0	0	0	0	0	0	0	0	0		0	0.00
	Values and Ethics in Practice	104	Manage business practices and organizations	0.81	0.74	0	0	0	0	0	0	0	0	0	0	0	0		0	0.00
		105	Manage risk and liability	0.86	0.81	0	0	0	0	0	0	0	0	0	0	0	0		0	0.00
		106	Negotiate and prepare client and consultant agreements	0.74	0.79	0	0	0	0	0	0	0	0	0	0	0	0		0	0.00
		107	Participate in life-long learning (e.g., a professional organization, continuing education activities)	1.56	1.03	0	0	0	0	0	0	0	0	0	0	0	0		0	0.00
		108	Participate in professional and public service activities	1.58	0.83	0	0	0	0	0	0	0	0	0	0	0	0		0	0.00
		109	Train, educate and mentor other professionals	0.96	0.91	0	0	0	0	0	0	0	0	0	0	0	0		2	0.06
		110	Maintain and promote professional and ethical standards	2.12	0.86	0	0	0	0	0	0	0	0	0	0	0	0		0	0.00
					Sum	1	1	0	1	0	1	0	0	1	0	0	0			
					Average	0.01	0.01	0.00	0.01	0.00	0.01	0.00	0.00	0.01	0.00	0.00	0.00			

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						DM1		DM2				DM3							DM4							DM5					
Knowledge Statement / Competency Division	Domains		Knowledge Statements / Competencies	Mean	Standard Deviation	Basic Data Structures	Data Retrieval Strategies	Coevolution of DBMS & GIS	Relational DBMS	Object-oriented DBMS	Extensions of the Relational Model	Grid Representations	The Raster Model	*Grid Compression Methods	The Hexagonal Model	Triangulated Irregular Network (TIN) Model	Resolution	Hierarchical Data Models	Geometric Primitives	The Spaghetti Model	The Topological Model	Classic Vector Data Models	The Network Model	Linear Referencing	Object-based Spatial Databases	Spatio-temproal GIS	Modeling Uncertainty	Modeling Three-dimensional Entities		Sum	Average
KNOWLEDGE STATEMENTS	Landscape Architecture History and Criticism	1	history of landscape architecture and allied professions	2.15	0.69	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0.00
		2	historic preservation principles	1.69	0.83	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0.00
	Natural and Cultural Systems	3	land information sources	2.55	0.77	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0.00
		4	patterns of land use and built form	2.43	0.76	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0.00
		5	natural site conditions and ecosystems	2.76	0.66	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0.00
		6	social and cultural influences on design	2.19	0.81	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0.00
		7	regional hazard design considerations	2.1	0.87	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0.00
	Design and Planning Theories and Methodologies	8	creativity and process including design theory and problem –solving strategies	2.83	0.64	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0.00
		9	aesthetic principles of design	2.78	0.71	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0.00
		10	human factors such as behavior, perception, psychological and sensory response	2.33	0.76	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0.00
		11	natural factors such as ecological relationships	2.53	0.75	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0.00
		12	relationship between human and natural systems such as resource conservation, habitat restoration and creation, and urban ecology	2.36	0.79	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0.00
		13	influence of context on design, planning, and management decisions	2.45	0.76	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0.00
		14	research methods including data collection, interpretation, and application of results	2.37	0.93	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0.00
		15	therapeutic aspects of design	1.66	0.88	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0.00
		16	communication and education methods, including sharing knowledge and evaluating outcomes	2.15	0.99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0.00
	Public Policy and Regulation	17	governmental policies and laws that affect the use and development of land	1.8	0.85	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0.00
		18	political and regulatory approval processes	1.67	0.92	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0.00
		19	land and development economics	1.47	0.83	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0.00
		20	emerging trends and issues	1.65	0.83	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0.00

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KNOWLEDGE STATEMENTS	Design, Planning and Management at Various Scales and Applications	21	photogrammetry and remote sensing	1.47	0.84	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0.00
		22	visual resource assessment	1.91	0.88	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0.00
		23	agricultural and rural landscape analysis	1.68	0.85	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0.00
		24	urban landscape	2.17	0.71	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0.00
		25	planning principles including regional community and neighborhood planning	2.12	0.76	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0.00
		26	conservation of natural resources	2.33	0.8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0.00
		27	historic preservation	1.73	0.76	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0.00
		28	ecological planning principles	2.23	0.8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0.00
		29	Water resource management	1.91	0.84	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0.00
		30	wetland	1.78	0.83	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0.00
		31	floodplain management	1.8	0.86	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0.00
		32	land and water reclamation procedures including quarry, mine and landfill reclamation	1.43	0.84	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0.00
		33	treatment of toxic materials	1.05	0.86	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0	0	0	0	0	0		0	0.00
	Site Design and Engineering: Materials, Methods, Technologies and Applications	34	design needs for special populations	1.91	0.78	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0.00
		35	accessibility regulations	2.28	0.87	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0		1	0.04
		36	roadway design principles	2.15	0.83	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0		1	0.04
		37	elements of vehicular and pedestrian circulation systems and their design requirements	2.57	0.72	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0.00
		38	landscape maintenance techniques, materials, equipment, and practices	1.93	0.87	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0.00
		39	noise attenuation and mitigation techniques	1.66	0.82	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0.00
		40	sustainable construction practices	1.82	0.84	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0.00
		41	construction equipment and technologies	1.76	0.87	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0.00
		42	grading, drainage and stormwater treatment	2.78	0.57	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0.00
		43	biofiltration and other alternative drainage methods	1.91	0.84	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0.00
		44	erosion and sedimentation control	2.28	0.82	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0.00
		45	utility systems	1.77	0.77	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0.00
		46	Irrigation systems	1.75	0.88	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0.00
		47	lighting systems	1.7	0.79	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0.00
		48	structural considerations	2.06	0.82	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0.00
	Construction Documentation and Administration	49	quality control procedures for construction, such as delivery, storage, testing, etc.	1.27	0.87	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0.00
		50	sequencing of design, approval, permitting, and construction activities	1.68	0.92	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0.00
		51	the life-cycle cost-analysis process	1.32	0.86	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0.00
		52	geographic coordinate systems and layout techniques and conventions	1.9	0.9	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0		2	0.09
		53	specification types and components for a project	1.89	0.83	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0.00
		54	general and supplemental conditions, special provisions, and technical specifications and their organizations	1.64	0.88	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0.00
		55	construction administration and details	1.73	0.92	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0.00
		56	basic construction law	1.48	0.84	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0.00
		57	construction contracts	1.55	0.88	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0.00

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KNOWLEDGE STATEMENTS	Communication	58	determination of user values such as focus groups and surveys	1.52	0.83	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0.00
		59	consensus and team building	1.74	0.91	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0.00
		60	techniques for conducting meetings	1.59	0.97	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0.00
		61	the roles of visual communication, including photographic and video documentation	2.25	0.85	0	0	0	0	0	0	0	1	0	0	0	1	0	1	0	0	0	0	0	0	0	1		4	0.17
		62	graphic presentation techniques, systems and symbols	2.71	0.73	0	0	0	0	0	0	0	0	0	0	1	0	0	1	0	1	0	0	0	0	0	0	1		4	0.17
		63	interpretive methods and techniques such as information displays and brochures	1.82	0.98	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0.00
		64	public relations, outreach, and image development	1.49	0.97	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0.00
	Values and Ethics in Practice	65	environmental ethics	2.08	0.82	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0.00
		66	social responsibility in design	2.1	0.78	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0.00
		67	organizational management principles such as leadership principles and landscape architect career cycle	1.61	0.93	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0.00
		68	resolving moral and ethical dilemmas	1.89	0.93	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0.00
COMPETENCIES	Landscape Architecture History & Criticism	69	Develop an understanding of design as exemplified by historically significant works of landscape architecture, urban planning, civic design, and architecture	2.02	0.73	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0.00
		70	Examine economic, political, social, ecological and esthetic relationships and their influence on the development of the profession of landscape architecture	1.65	0.78	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0.00
		71	Demonstrate an understanding of the evolution of landscape architecture as an art and a profession through knowledge of its terminology, literature, personalities, and concepts	1.85	0.76	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0.00
		72	Demonstrate the ability to critique prior work and understand the relevance in addressing current issues and problems	1.89	0.74	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0.00
		73	Develop an ability to synthesize and make connections between aspects of landscape architecture and disciplines outside of landscape architecture	1.98	0.73	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0.00
	Natural & Cultural Systems	74	Conduct field investigations to identify significant natural and cultural features, characteristics, and systems	2.06	0.74	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0.00
		75	Perform quantitative analyses to evaluate the interactions of natural and cultural features, characteristics, and systems	1.64	0.78	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0.00
		76	Perform qualitative analyses to evaluate the relationship between the natural and cultural features, characteristics, and systems	1.79	0.78	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0.00
		77	Predict implications of design, planning, and management proposals on natural cultural systems both within the site and in the larger context	1.88	0.76	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0.00

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COMPETENCIES	Public Policy and Regulation	78	Identify and collect regulatory information, applicable data and required approvals governing a project (e.g., relevant laws, codes, and regulations)	1.31	0.74	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0.00
		79	Confirm code compliance (e.g. zoning, environment, and accessibility)	1.37	0.81	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0.00
		80	Assist in the preparation of ordinances, regulations, covenants, standards, and guidelines	0.77	0.69	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0.00
		81	Influence public policies on areas such as growth and land and water management by testifying, lobbying, or preparing written documents for public distribution	0.73	0.75	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0.00
	Design, Planning, and Management at Various Scales and Applications	82	Develop a design program based on users' needs and clients' goals and resources	2.13	0.75	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0.00
		83	Analyze relationships among design elements by determining opportunities and constraints	2.33	0.62	0	0	0	0	0	0	0	0	0	0	0		0	0	0	0	0	0	0	0	0	0	0		0	0.00
		84	Develop conceptual design, planning, and management solutions	2.39	0.61	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0.00
		85	Evaluate design alternatives to determine the appropriate solution	2.45	0.59	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0.00
	Site Design and Engineering: Materials, Methods, Technologies and Applications	86	Design for protection and management of land resources (e.g. land forms, vegetation, habitat, erosion and sedimentation control)	2.13	0.64	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0.00
		87	Design for protection and management of water resources (e.g. storm water, water supply, ground water)	2.05	0.66	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0.00
		88	Design pedestrian, vehicular, and non-motorized circulation systems	2.28	0.62	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0		1	0.04
		89	Design elements for construction considering materials, structural issues, and construction technologies	1.94	0.69	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0.00
	Construction Documentation and Administration	90	Prepare construction documents including plans, working drawings, and technical specifications	1.87	0.77	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0.00
		91	Prepare contract documents including agreements, general conditions, and bid documents	1.24	0.82	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0.00
		92	Manage the bidding/tendering process	0.72	0.7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0.00
		93	Provide construction administration and observation throughout the project	0.83	0.78	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0.00
		94	Conduct project closure including review and distribution of close-out documents	0.67	0.73	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0.00
		95	Perform post construction evaluation	0.91	0.79	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0.00
		96	Perform construction services including design-build	0.67	0.7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0.00
		97	Prepare management and maintenance manuals and documents	0.81	0.7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0.00

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COMPETENCIES	Communication	98	Maintain clear communication among collaborators through correspondence and project coordination	1.51	0.9	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0.00
		99	Develop written documentation, such as projects reports, grant proposals, and promotional materials	1.43	0.84	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0.00
		100	Create graphic materials in a variety of media	2.19	0.76	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	1	0	0	0	0	0	1		4	0.17
		101	Prepare and deliver oral presentations such as meetings, demonstrations, and outreach	2.18	0.72	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0.00
		102	Conduct project and public meetings including preparing of meeting agendas and notes, and facilitation of the meeting	1.34	0.89	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0.00
		103	Review and critique peer work	1.79	0.88	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0.00
	Values and Ethics in Practice	104	Manage business practices and organizations	0.81	0.74	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0.00
		105	Manage risk and liability	0.86	0.81	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0.00
		106	Negotiate and prepare client and consultant agreements	0.74	0.79	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0.00
		107	Participate in life-long learning (e.g., a professional organization, continuing education activities)	1.56	1.03	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0.00
		108	Participate in professional and public service activities	1.58	0.83	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0.00
		109	Train, educate and mentor other professionals	0.96	0.91	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0.00
		110	Maintain and promote professional and ethical standards	2.12	0.86	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0.00
					Sum	0	0	0	0	0	0	0	3	1	0	1	1	0	2	0	2	0	3	1	0	0	0	3			
					Average	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.03	0.01	0.00	0.01	0.01	0.00	0.02	0.00	0.02	0.00	0.03	0.01	0.00	0.00	0.00	0.03			

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							DN1						DN2				DN3									
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	KNOWLEDGE STATEMENTS	Landscape Architecture History and Criticism	1	history of landscape architecture and allied professions	2.15	0.69	0	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0.00
			2	historic preservation principles	1.69	0.83	0	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0.00
		Natural and Cultural Systems	3	land information sources	2.55	0.77	0	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0.00
			4	patterns of land use and built form	2.43	0.76	0	0	0	0	0	0	0	0	0	1	0	0	0	0		1	0.07
			5	natural site conditions and ecosystems	2.76	0.66	0	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0.00
			6	social and cultural influences on design	2.19	0.81	0	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0.00
			7	regional hazard design considerations	2.1	0.87	0	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0.00
		Design and Planning Theories and Methodologies	8	creativity and process including design theory and problem –solving strategies	2.83	0.64	0	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0.00
			9	aesthetic principles of design	2.78	0.71	0	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0.00
			10	human factors such as behavior, perception, psychological and sensory response	2.33	0.76	0	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0.00
			11	natural factors such as ecological relationships	2.53	0.75	0	0	0	0	0	0	0	0	0	1	0	0	0	0		1	0.07
			12	relationship between human and natural systems such as resource conservation, habitat restoration and creation, and urban ecology	2.36	0.79	0	0	0	0	0	0	0	0	0	1	0	0	0	0		1	0.07
			13	influence of context on design, planning, and management decisions	2.45	0.76	0	0	0	0	0	0	0	0	0	1	0	0	0	0		1	0.07
			14	research methods including data collection, interpretation, and application of results	2.37	0.93	1	1	0	0	0	0	0	0	0	0	1	0	0	0		3	0.21
			15	therapeutic aspects of design	1.66	0.88	0	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0.00
			16	communication and education methods, including sharing knowledge and evaluating outcomes	2.15	0.99	1	1	0	0	0	0	0	0	0	0	0	0	0	0		2	0.14
		Public Policy and Regulation	17	governmental policies and laws that affect the use and development of land	1.8	0.85	0	0	0	0	0	0	0	0	0	1	0	0	0	0		1	0.07
			18	political and regulatory approval processes	1.67	0.92	0	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0.00
			19	land and development economics	1.47	0.83	0	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0.00
			20	emerging trends and issues	1.65	0.83	0	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0.00

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	KNOWLEDGE STATEMENTS	Design, Planning and Management at Various Scales and Applications	21	photogrammetry and remote sensing	1.47	0.84	0	0	0	1	1	0	1	0	0	0	0	0	0	0		3	0.21
			22	visual resource assessment	1.91	0.88	1	0	0	1	1	0	1	0	0	0	0	0	0	0		4	0.29
			23	agricultural and rural landscape analysis	1.68	0.85	0	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0.00
			24	urban landscape	2.17	0.71	0	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0.00
			25	planning principles including regional community and neighborhood planning	2.12	0.76	0	0	0	0	0	0	1	0	0	0	0	0	0	0		1	0.07
			26	conservation of natural resources	2.33	0.8	0	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0.00
			27	historic preservation	1.73	0.76	0	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0.00
			28	ecological planning principles	2.23	0.8	0	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0.00
			29	Water resource management	1.91	0.84	0	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0.00
			30	wetland	1.78	0.83	0	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0.00
			31	floodplain management	1.8	0.86	0	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0.00
			32	land and water reclamation procedures including quarry, mine and landfill reclamation	1.43	0.84	0	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0.00
			33	treatment of toxic materials	1.05	0.86	0	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0.00
		Site Design and Engineering: Materials, Methods, Technologies and Applications	34	design needs for special populations	1.91	0.78	0	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0.00
			35	accessibility regulations	2.28	0.87	0	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0.00
			36	roadway design principles	2.15	0.83	0	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0.00
			37	elements of vehicular and pedestrian circulation systems and their design requirements	2.57	0.72	0	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0.00
			38	landscape maintenance techniques, materials, equipment, and practices	1.93	0.87	0	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0.00
			39	noise attenuation and mitigation techniques	1.66	0.82	0	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0.00
			40	sustainable construction practices	1.82	0.84	0	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0.00
			41	construction equipment and technologies	1.76	0.87	0	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0.00
			42	grading, drainage and stormwater treatment	2.78	0.57	0	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0.00
			43	biofiltration and other alternative drainage methods	1.91	0.84	0	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0.00
			44	erosion and sedimentation control	2.28	0.82	0	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0.00
			45	utility systems	1.77	0.77	0	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0.00
			46	Irrigation systems	1.75	0.88	0	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0.00
			47	lighting systems	1.7	0.79	0	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0.00
			48	structural considerations	2.06	0.82	0	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0.00

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	KNOWLEDGE STATEMENTS	Construction Documentation and Administration	49	quality control procedures for construction, such as delivery, storage, testing, etc.	1.27	0.87	0	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0.00
			50	sequencing of design, approval, permitting, and construction activities	1.68	0.92	0	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0.00
			51	the life-cycle cost-analysis process	1.32	0.86	0	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0.00
			52	geographic coordinate systems and layout techniques and conventions	1.9	0.9	1	1	1	0	0	1	0	0	0	0	0	0	0	0		4	0.29
			53	specification types and components for a project	1.89	0.83	0	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0.00
			54	general and supplemental conditions, special provisions, and technical specifications and their organizations	1.64	0.88	0	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0.00
			55	construction administration and details	1.73	0.92	0	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0.00
			56	basic construction law	1.48	0.84	0	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0.00
			57	construction contracts	1.55	0.88	0	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0.00
		Communication	58	determination of user values such as focus groups and surveys	1.52	0.83	0	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0.00
			59	consensus and team building	1.74	0.91	0	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0.00
			60	techniques for conducting meetings	1.59	0.97	0	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0.00
			61	the roles of visual communication, including photographic and video documentation	2.25	0.85	0	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0.00
			62	graphic presentation techniques, systems and symbols	2.71	0.73	0	0	1	0	0	0	0	0	0	0	0	0	0	0		1	0.07
			63	interpretive methods and techniques such as information displays and brochures	1.82	0.98	0	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0.00
			64	public relations, outreach, and image development	1.49	0.97	0	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0.00
		Values and Ethics in Practice	65	environmental ethics	2.08	0.82	0	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0.00
			66	social responsibility in design	2.1	0.78	0	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0.00
			67	organizational management principles such as leadership principles and landscape architect career cycle	1.61	0.93	0	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0.00
			68	resolving moral and ethical dilemmas	1.89	0.93	0	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0.00

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	COMPETENCIES	Landscape Architecture History & Criticism	69	Develop an understanding of design as exemplified by historically significant works of landscape architecture, urban planning, civic design, and architecture	2.02	0.73	0	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0.00
			70	Examine economic, political, social, ecological and esthetic relationships and their influence on the development of the profession of landscape architecture	1.65	0.78	0	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0.00
			71	Demonstrate an understanding of the evolution of landscape architecture as an art and a profession through knowledge of its terminology, literature, personalities, and concepts	1.85	0.76	0	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0.00
			72	Demonstrate the ability to critique prior work and understand the relevance in addressing current issues and problems	1.89	0.74	0	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0.00
			73	Develop an ability to synthesize and make connections between aspects of landscape architecture and disciplines outside of landscape architecture	1.98	0.73	0	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0.00
		Natural & Cultural Systems	74	Conduct field investigations to identify significant natural and cultural features, characteristics, and systems	2.06	0.74	0	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0.00
			75	Perform quantitative analyses to evaluate the interactions of natural and cultural features, characteristics, and systems	1.64	0.78	0	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0.00
			76	Perform qualitative analyses to evaluate the relationship between the natural and cultural features, characteristics, and systems	1.79	0.78	0	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0.00
			77	Predict implications of design, planning, and management proposals on natural cultural systems both within the site and in the larger context	1.88	0.76	0	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0.00

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	COMPETENCIES	Public Policy and Regulation	78	Identify and collect regulatory information, applicable data and required approvals governing a project (e.g., relevant laws, codes, and regulations)	1.31	0.74	0	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0.00
			79	Confirm code compliance (e.g. zoning, environment, and accessibility)	1.37	0.81	0	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0.00
			80	Assist in the preparation of ordinances, regulations, covenants, standards, and guidelines	0.77	0.69	0	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0.00
			81	Influence public policies on areas such as growth and land and water management by testifying, lobbying, or preparing written documents for public distribution	0.73	0.75	0	0	0	0	0	0	0	0	0	1	0	0	0	0		1	0.07
		Design, Planning, and Management at Various Scales and Applications	82	Develop a design program based on users' needs and clients' goals and resources	2.13	0.75	0	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0.00
			83	Analyze relationships among design elements by determining opportunities and constraints	2.33	0.62	0	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0.00
			84	Develop conceptual design, planning, and management solutions	2.39	0.61	0	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0.00
			85	Evaluate design alternatives to determine the appropriate solution	2.45	0.59	0	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0.00
		Site Design and Engineering: Materials, Methods, Technologies and Applications	86	Design for protection and management of land resources (e.g. land forms, vegetation, habitat, erosion and sedimentation control)	2.13	0.64	0	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0.00
			87	Design for protection and management of water resources (e.g. storm water, water supply, ground water)	2.05	0.66	0	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0.00
			88	Design pedestrian, vehicular, and non-motorized circulation systems	2.28	0.62	0	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0.00
			89	Design elements for construction considering materials, structural issues, and construction technologies	1.94	0.69	0	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0.00
		Construction Documentation and Administration	90	Prepare construction documents including plans, working drawings, and technical specifications	1.87	0.77	0	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0.00
			91	Prepare contract documents including agreements, general conditions, and bid documents	1.24	0.82	0	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0.00
			92	Manage the bidding/tendering process	0.72	0.7	0	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0.00
			93	Provide construction administration and observation throughout the project	0.83	0.78	0	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0.00
			94	Conduct project closure including review and distribution of close-out documents	0.67	0.73	0	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0.00
			95	Perform post construction evaluation	0.91	0.79	0	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0.00
			96	Perform construction services including design-build	0.67	0.7	0	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0.00
			97	Prepare management and maintenance manuals and documents	0.81	0.7	0	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0.00

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	COMPETENCIES	Communication	98	Maintain clear communication among collaborators through correspondence and project coordination	1.51	0.9	0	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0.00
			99	Develop written documentation, such as projects reports, grant proposals, and promotional materials	1.43	0.84	0	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0.00
			100	Create graphic materials in a variety of media	2.19	0.76	0	0	1	1	0	0	0	0	0	0	0	0	0	0		2	0.14
			101	Prepare and deliver oral presentations such as meetings, demonstrations, and outreach	2.18	0.72	0	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0.00
			102	Conduct project and public meetings including preparing of meeting agendas and notes, and facilitation of the meeting	1.34	0.89	0	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0.00
			103	Review and critique peer work	1.79	0.88	0	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0.00
		Values and Ethics in Practice	104	Manage business practices and organizations	0.81	0.74	0	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0.00
			105	Manage risk and liability	0.86	0.81	0	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0.00
			106	Negotiate and prepare client and consultant agreements	0.74	0.79	0	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0.00
			107	Participate in life-long learning (e.g., a professional organization, continuing education activities)	1.56	1.03	0	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0.00
			108	Participate in professional and public service activities	1.58	0.83	0	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0.00
			109	Train, educate and mentor other professionals	0.96	0.91	0	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0.00
			110	Maintain and promote professional and ethical standards	2.12	0.86	0	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0.00
						Sum	4	3	3	3	2	1	3	0	0	6	1	0	0	0			
						Average	0.04	0.03	0.03	0.03	0.02	0.01	0.03	0.00	0.00	0.05	0.01	0.00	0.00	0.00			

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KNOWLEDGE STATEMENTS	Landscape Architecture History and Criticism	1	history of landscape architecture and allied professions	2.15	0.69	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		2	historic preservation principles	1.69	0.83	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Natural and Cultural Systems	3	land information sources	2.55	0.77	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		4	patterns of land use and built form	2.43	0.76	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0
		5	natural site conditions and ecosystems	2.76	0.66	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		6	social and cultural influences on design	2.19	0.81	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		7	regional hazard design considerations	2.1	0.87	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Design and Planning Theories and Methodologies	8	creativity and process including design theory and problem –solving strategies	2.83	0.64	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		9	aesthetic principles of design	2.78	0.71	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		10	human factors such as behavior, perception, psychological and sensory response	2.33	0.76	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		11	natural factors such as ecological relationships	2.53	0.75	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		12	relationship between human and natural systems such as resource conservation, habitat restoration and creation, and urban ecology	2.36	0.79	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		13	influence of context on design, planning, and management decisions	2.45	0.76	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		14	research methods including data collection, interpretation, and application of results	2.37	0.93	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		15	therapeutic aspects of design	1.66	0.88	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		16	communication and education methods, including sharing knowledge and evaluating outcomes	2.15	0.99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Public Policy and Regulation	17	governmental policies and laws that affect the use and development of land	1.8	0.85	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		18	political and regulatory approval processes	1.67	0.92	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		19	land and development economics	1.47	0.83	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		20	emerging trends and issues	1.65	0.83	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

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Knowledge Statement / Competency Division	Domains		Knowledge Statements / Competencies	Mean	Standard Deviation	Origins	Trends	High Performance Computing	Computational Intelligence	Non-Linearity Relationships & non-Gaussian Distributions	Pattern Recognition	Geospatial Data Classification	Multi-layer Feed-forward Neutral Networks	Space-scale Algorithms	Rule Learning	Neutral Network Schemes	CA Model Structure	CA Transition Rule	CA Simulation & Calibration	Integration of CA & Other Geocomputation Methods	Typical CA Applications
KNOWLEDGE STATEMENTS	Design, Planning and Management at Various Scales and Applications	21	photogrammetry and remote sensing	1.47	0.84	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		22	visual resource assessment	1.91	0.88	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		23	agricultural and rural landscape analysis	1.68	0.85	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0
		24	urban landscape	2.17	0.71	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		25	planning principles including regional community and neighborhood planning	2.12	0.76	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		26	conservation of natural resources	2.33	0.8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		27	historic preservation	1.73	0.76	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		28	ecological planning principles	2.23	0.8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		29	Water resource management	1.91	0.84	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		30	wetland	1.78	0.83	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		31	floodplain management	1.8	0.86	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		32	land and water reclamation procedures including quarry, mine and landfill reclamation	1.43	0.84	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		33	treatment of toxic materials	1.05	0.86	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Site Design and Engineering: Materials, Methods, Technologies and Applications	34	design needs for special populations	1.91	0.78	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		35	accessibility regulations	2.28	0.87	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		36	roadway design principles	2.15	0.83	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		37	elements of vehicular and pedestrian circulation systems and their design requirements	2.57	0.72	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		38	landscape maintenance techniques, materials, equipment, and practices	1.93	0.87	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		39	noise attenuation and mitigation techniques	1.66	0.82	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		40	sustainable construction practices	1.82	0.84	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		41	construction equipment and technologies	1.76	0.87	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		42	grading, drainage and stormwater treatment	2.78	0.57	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		43	biofiltration and other alternative drainage methods	1.91	0.84	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0
		44	erosion and sedimentation control	2.28	0.82	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		45	utility systems	1.77	0.77	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0
		46	Irrigation systems	1.75	0.88	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0
		47	lighting systems	1.7	0.79	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0
		48	structural considerations	2.06	0.82	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Construction Documentation and Administration	49	quality control procedures for construction, such as delivery, storage, testing, etc.	1.27	0.87	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		50	sequencing of design, approval, permitting, and construction activities	1.68	0.92	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		51	the life-cycle cost-analysis process	1.32	0.86	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		52	geographic coordinate systems and layout techniques and conventions	1.9	0.9	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		53	specification types and components for a project	1.89	0.83	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		54	general and supplemental conditions, special provisions, and technical specifications and their organizations	1.64	0.88	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		55	construction administration and details	1.73	0.92	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		56	basic construction law	1.48	0.84	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		57	construction contracts	1.55	0.88	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Communication	58	determination of user values such as focus groups and surveys	1.52	0.83	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		59	consensus and team building	1.74	0.91	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		60	techniques for conducting meetings	1.59	0.97	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		61	the roles of visual communication, including photographic and video documentation	2.25	0.85	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		62	graphic presentation techniques, systems and symbols	2.71	0.73	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		63	interpretive methods and techniques such as information displays and brochures	1.82	0.98	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		64	public relations, outreach, and image development	1.49	0.97	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Values and Ethics in Practice	65	environmental ethics	2.08	0.82	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		66	social responsibility in design	2.1	0.78	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		67	organizational management principles such as leadership principles and landscape architect career cycle	1.61	0.93	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		68	resolving moral and ethical dilemmas	1.89	0.93	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

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COMPETENCIES	Landscape Architecture History & Criticism	69	Develop an understanding of design as exemplified by historically significant works of landscape architecture, urban planning, civic design, and architecture	2.02	0.73	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		70	Examine economic, political, social, ecological and esthetic relationships and their influence on the development of the profession of landscape architecture	1.65	0.78	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		71	Demonstrate an understanding of the evolution of landscape architecture as an art and a profession through knowledge of its terminology, literature, personalities, and concepts	1.85	0.76	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		72	Demonstrate the ability to critique prior work and understand the relevance in addressing current issues and problems	1.89	0.74	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		73	Develop an ability to synthesize and make connections between aspects of landscape architecture and disciplines outside of landscape architecture	1.98	0.73	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Natural & Cultural Systems	74	Conduct field investigations to identify significant natural and cultural features, characteristics, and systems	2.06	0.74	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		75	Perform quantitative analyses to evaluate the interactions of natural and cultural features, characteristics, and systems	1.64	0.78	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		76	Perform qualitative analyses to evaluate the relationship between the natural and cultural features, characteristics, and systems	1.79	0.78	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		77	Predict implications of design, planning, and management proposals on natural cultural systems both within the site and in the larger context	1.88	0.76	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Public Policy and Regulation	78	Identify and collect regulatory information, applicable data and required approvals governing a project (e.g., relevant laws, codes, and regulations)	1.31	0.74	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		79	Confirm code compliance (e.g. zoning, environment, and accessibility)	1.37	0.81	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		80	Assist in the preparation of ordinances, regulations, covenants, standards, and guidelines	0.77	0.69	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		81	Influence public policies on areas such as growth and land and water management by testifying, lobbying, or preparing written documents for public distribution	0.73	0.75	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Design, Planning, and Management at Various Scales and Applications	82	Develop a design program based on users' needs and clients' goals and resources	2.13	0.75	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		83	Analyze relationships among design elements by determining opportunities and constraints	2.33	0.62	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		84	Develop conceptual design, planning, and management solutions	2.39	0.61	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		85	Evaluate design alternatives to determine the appropriate solution	2.45	0.59	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Site Design and Engineering: Materials, Methods, Technologies and Applications	86	Design for protection and management of land resources (e.g. land forms, vegetation, habitat, erosion and sedimentation control)	2.13	0.64	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		87	Design for protection and management of water resources (e.g. storm water, water supply, ground water)	2.05	0.66	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		88	Design pedestrian, vehicular, and non-motorized circulation systems	2.28	0.62	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		89	Design elements for construction considering materials, structural issues, and construction technologies	1.94	0.69	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

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COMPETENCIES	Construction Documentation and Administration	90	Prepare construction documents including plans, working drawings, and technical specifications	1.87	0.77	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		91	Prepare contract documents including agreements, general conditions, and bid documents	1.24	0.82	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		92	Manage the bidding/tendering process	0.72	0.7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		93	Provide construction administration and observation throughout the project	0.83	0.78	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		94	Conduct project closure including review and distribution of close-out documents	0.67	0.73	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		95	Perform post construction evaluation	0.91	0.79	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		96	Perform construction services including design-build	0.67	0.7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		97	Prepare management and maintenance manuals and documents	0.81	0.7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Communication	98	Maintain clear communication among collaborators through correspondence and project coordination	1.51	0.9	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		99	Develop written documentation, such as projects reports, grant proposals, and promotional materials	1.43	0.84	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		100	Create graphic materials in a variety of media	2.19	0.76	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		101	Prepare and deliver oral presentations such as meetings, demonstrations, and outreach	2.18	0.72	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		102	Conduct project and public meetings including preparing of meeting agendas and notes, and facilitation of the meeting	1.34	0.89	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		103	Review and critique peer work	1.79	0.88	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Values and Ethics in Practice	104	Manage business practices and organizations	0.81	0.74	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		105	Manage risk and liability	0.86	0.81	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		106	Negotiate and prepare client and consultant agreements	0.74	0.79	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		107	Participate in life-long learning (e.g., a professional organization, continuing education activities)	1.56	1.03	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		108	Participate in professional and public service activities	1.58	0.83	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		109	Train, educate and mentor other professionals	0.96	0.91	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		110	Maintain and promote professional and ethical standards	2.12	0.86	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
					Sum	0	0	0	0	0	6	0	0	0	0	0	0	0	0	0	0
					Average	##	0.00	0.00	0.00	0.00	0.05	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

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KNOWLEDGE STATEMENTS	Landscape Architecture History and Criticism	1	history of landscape architecture and allied professions	2.15	0.69	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		2	historic preservation principles	1.69	0.83	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Natural and Cultural Systems	3	land information sources	2.55	0.77	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		4	patterns of land use and built form	2.43	0.76	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		5	natural site conditions and ecosystems	2.76	0.66	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0
		6	social and cultural influences on design	2.19	0.81	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		7	regional hazard design considerations	2.1	0.87	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Design and Planning Theories and Methodologies	8	creativity and process including design theory and problem –solving strategies	2.83	0.64	0	0	0	0	0	0	0	0	0	0	0	0	1	0		0	0	0	0	0
		9	aesthetic principles of design	2.78	0.71	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
		10	human factors such as behavior, perception, psychological and sensory response	2.33	0.76	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		11	natural factors such as ecological relationships	2.53	0.75	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0
		12	relationship between human and natural systems such as resource conservation, habitat restoration and creation, and urban ecology	2.36	0.79	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		13	influence of context on design, planning, and management decisions	2.45	0.76	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		14	research methods including data collection, interpretation, and application of results	2.37	0.93	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		15	therapeutic aspects of design	1.66	0.88	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		16	communication and education methods, including sharing knowledge and evaluating outcomes	2.15	0.99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Public Policy and Regulation	17	governmental policies and laws that affect the use and development of land	1.8	0.85	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		18	political and regulatory approval processes	1.67	0.92	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		19	land and development economics	1.47	0.83	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		20	emerging trends and issues	1.65	0.83	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

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KNOWLEDGE STATEMENTS	Design, Planning and Management at Various Scales and Applications	21	photogrammetry and remote sensing	1.47	0.84	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		22	visual resource assessment	1.91	0.88	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0
		23	agricultural and rural landscape analysis	1.68	0.85	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		24	urban landscape	2.17	0.71	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		25	planning principles including regional community and neighborhood planning	2.12	0.76	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		26	conservation of natural resources	2.33	0.8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		27	historic preservation	1.73	0.76	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		28	ecological planning principles	2.23	0.8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		29	Water resource management	1.91	0.84	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		30	wetland	1.78	0.83	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		31	floodplain management	1.8	0.86	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		32	land and water reclamation procedures including quarry, mine and landfill reclamation	1.43	0.84	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		33	treatment of toxic materials	1.05	0.86	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Site Design and Engineering: Materials, Methods, Technologies and Applications	34	design needs for special populations	1.91	0.78	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		35	accessibility regulations	2.28	0.87	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		36	roadway design principles	2.15	0.83	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		37	elements of vehicular and pedestrian circulation systems and their design requirements	2.57	0.72	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		38	landscape maintenance techniques, materials, equipment, and practices	1.93	0.87	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		39	noise attenuation and mitigation techniques	1.66	0.82	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		40	sustainable construction practices	1.82	0.84	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		41	construction equipment and technologies	1.76	0.87	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		42	grading, drainage and stormwater treatment	2.78	0.57	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		43	biofiltration and other alternative drainage methods	1.91	0.84	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		44	erosion and sedimentation control	2.28	0.82	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		45	utility systems	1.77	0.77	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		46	Irrigation systems	1.75	0.88	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		47	lighting systems	1.7	0.79	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		48	structural considerations	2.06	0.82	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Construction Documentation and Administration	49	quality control procedures for construction, such as delivery, storage, testing, etc.	1.27	0.87	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		50	sequencing of design, approval, permitting, and construction activities	1.68	0.92	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		51	the life-cycle cost-analysis process	1.32	0.86	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		52	geographic coordinate systems and layout techniques and conventions	1.9	0.9	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	1
		53	specification types and components for a project	1.89	0.83	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		54	general and supplemental conditions, special provisions, and technical specifications and their organizations	1.64	0.88	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		55	construction administration and details	1.73	0.92	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		56	basic construction law	1.48	0.84	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		57	construction contracts	1.55	0.88	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Communication	58	determination of user values such as focus groups and surveys	1.52	0.83	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		59	consensus and team building	1.74	0.91	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		60	techniques for conducting meetings	1.59	0.97	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		61	the roles of visual communication, including photographic and video documentation	2.25	0.85	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0
		62	graphic presentation techniques, systems and symbols	2.71	0.73	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	1
		63	interpretive methods and techniques such as information displays and brochures	1.82	0.98	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		64	public relations, outreach, and image development	1.49	0.97	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Values and Ethics in Practice	65	environmental ethics	2.08	0.82	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		66	social responsibility in design	2.1	0.78	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		67	organizational management principles such as leadership principles and landscape architect career cycle	1.61	0.93	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		68	resolving moral and ethical dilemmas	1.89	0.93	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

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				Command of Knowledge at time of Degree		GC4					GC5		GC6						GC7	GC8					
Knowledge Statement / Competency Division	Domains		Knowledge Statements / Competencies	Mean	Standard Deviation	Greedy Heuristics	Interchange Heuristics	Interchange with Probability	Simulated Annealing	Lagrangian Relaxation	GA & Global Solutions	Genetic Algorithms & Artificial Genomes	Structure of Agent Based Models	Specification of Agent Based Models	Adaptive Agents	Microsimulation & Calibration of Agent Activities	Encoding Agent-based Models	Simulation Modeling	Conceptual Model of Uncertainty	Error	Problems of Scale & Zoning	Propagation of Error in Geospatial Modeling	Theory of Error Propagation	Problems of Currency, Source, & Scale
COMPETENCIES	Landscape Architecture History & Criticism	69	Develop an understanding of design as exemplified by historically significant works of landscape architecture, urban planning, civic design, and architecture	2.02	0.73	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		70	Examine economic, political, social, ecological and esthetic relationships and their influence on the development of the profession of landscape architecture	1.65	0.78	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		71	Demonstrate an understanding of the evolution of landscape architecture as an art and a profession through knowledge of its terminology, literature, personalities, and concepts	1.85	0.76	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		72	Demonstrate the ability to critique prior work and understand the relevance in addressing current issues and problems	1.89	0.74	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		73	Develop an ability to synthesize and make connections between aspects of landscape architecture and disciplines outside of landscape architecture	1.98	0.73	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Natural & Cultural Systems	74	Conduct field investigations to identify significant natural and cultural features, characteristics, and systems	2.06	0.74	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		75	Perform quantitative analyses to evaluate the interactions of natural and cultural features, characteristics, and systems	1.64	0.78	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		76	Perform qualitative analyses to evaluate the relationship between the natural and cultural features, characteristics, and systems	1.79	0.78	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		77	Predict implications of design, planning, and management proposals on natural cultural systems both within the site and in the larger context	1.88	0.76	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Public Policy and Regulation	78	Identify and collect regulatory information, applicable data and required approvals governing a project (e.g., relevant laws, codes, and regulations)	1.31	0.74	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		79	Confirm code compliance (e.g. zoning, environment, and accessibility)	1.37	0.81	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		80	Assist in the preparation of ordinances, regulations, covenants, standards, and guidelines	0.77	0.69	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		81	Influence public policies on areas such as growth and land and water management by testifying, lobbying, or preparing written documents for public distribution	0.73	0.75	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Design, Planning, and Management at Various Scales and Applications	82	Develop a design program based on users' needs and clients' goals and resources	2.13	0.75	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		83	Analyze relationships among design elements by determining opportunities and constraints	2.33	0.62	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		84	Develop conceptual design, planning, and management solutions	2.39	0.61	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		85	Evaluate design alternatives to determine the appropriate solution	2.45	0.59	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0
	Site Design and Engineering: Materials, Methods, Technologies and Applications	86	Design for protection and management of land resources (e.g. land forms, vegetation, habitat, erosion and sedimentation control)	2.13	0.64	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		87	Design for protection and management of water resources (e.g. storm water, water supply, ground water)	2.05	0.66	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		88	Design pedestrian, vehicular, and non-motorized circulation systems	2.28	0.62	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		89	Design elements for construction considering materials, structural issues, and construction technologies	1.94	0.69	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

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COMPETENCIES	Construction Documentation and Administration	90	Prepare construction documents including plans, working drawings, and technical specifications	1.87	0.77	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		91	Prepare contract documents including agreements, general conditions, and bid documents	1.24	0.82	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		92	Manage the bidding/tendering process	0.72	0.7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		93	Provide construction administration and observation throughout the project	0.83	0.78	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		94	Conduct project closure including review and distribution of close-out documents	0.67	0.73	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		95	Perform post construction evaluation	0.91	0.79	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		96	Perform construction services including design-build	0.67	0.7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		97	Prepare management and maintenance manuals and documents	0.81	0.7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Communication	98	Maintain clear communication among collaborators through correspondence and project coordination	1.51	0.9	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		99	Develop written documentation, such as projects reports, grant proposals, and promotional materials	1.43	0.84	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		100	Create graphic materials in a variety of media	2.19	0.76	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0
		101	Prepare and deliver oral presentations such as meetings, demonstrations, and outreach	2.18	0.72	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		102	Conduct project and public meetings including preparing of meeting agendas and notes, and facilitation of the meeting	1.34	0.89	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		103	Review and critique peer work	1.79	0.88	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Values and Ethics in Practice	104	Manage business practices and organizations	0.81	0.74	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0	0	0	0	0	0
		105	Manage risk and liability	0.86	0.81	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		106	Negotiate and prepare client and consultant agreements	0.74	0.79	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		107	Participate in life-long learning (e.g., a professional organization, continuing education activities)	1.56	1.03	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		108	Participate in professional and public service activities	1.58	0.83	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		109	Train, educate and mentor other professionals	0.96	0.91	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		110	Maintain and promote professional and ethical standards	2.12	0.86	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
					Sum	0	0	0	0	0	0	0	0	0	0	0	0	0	5	4	2	0	0	0	2
					Average	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.05	0.04	0.02	0.00	0.00	0.00	0.02

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Knowledge Statement / Competency Division	Domains		Knowledge Statements / Competencies	Mean	Standard Deviation	Fuzzy Logic	Fuzzy Measures	Fuzzy Aggregation Operators	Standardization	Weighting Schemes		Sum	Average
KNOWLEDGE STATEMENTS	Landscape Architecture History and Criticism	1	history of landscape architecture and allied professions	2.15	0.69	0	0	0	0	0		0	0.00
		2	historic preservation principles	1.69	0.83	0	0	0	0	0		0	0.00
	Natural and Cultural Systems	3	land information sources	2.55	0.77	0	0	0	0	0		0	0.00
		4	patterns of land use and built form	2.43	0.76	0	0	0	0	0		1	0.03
		5	natural site conditions and ecosystems	2.76	0.66	0	0	0	0	0		1	0.03
		6	social and cultural influences on design	2.19	0.81	0	0	0	0	0		0	0.00
		7	regional hazard design considerations	2.1	0.87	0	0	0	0	0		0	0.00
	Design and Planning Theories and Methodologies	8	creativity and process including design theory and problem –solving strategies	2.83	0.64	0	0	0	0	0		1	0.03
		9	aesthetic principles of design	2.78	0.71	0	0	0	0	0		0	0.00
		10	human factors such as behavior, perception, psychological and sensory response	2.33	0.76	0	0	0	0	0		0	0.00
		11	natural factors such as ecological relationships	2.53	0.75	0	0	0	0	0		1	0.03
		12	relationship between human and natural systems such as resource conservation, habitat restoration and creation, and urban ecology	2.36	0.79	0	0	0	0	0		0	0.00
		13	influence of context on design, planning, and management decisions	2.45	0.76	0	0	0	0	0		0	0.00
		14	research methods including data collection, interpretation, and application of results	2.37	0.93	0	0	0	0	0		0	0.00
		15	therapeutic aspects of design	1.66	0.88	0	0	0	0	0		0	0.00
		16	communication and education methods, including sharing knowledge and evaluating outcomes	2.15	0.99	0	0	0	0	0		0	0.00
	Public Policy and Regulation	17	governmental policies and laws that affect the use and development of land	1.8	0.85	0	0	0	0	0		0	0.00
		18	political and regulatory approval processes	1.67	0.92	0	0	0	0	0		0	0.00
		19	land and development economics	1.47	0.83	0	0	0	0	0		0	0.00
		20	emerging trends and issues	1.65	0.83	0	0	0	0	0		0	0.00

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KNOWLEDGE STATEMENTS	Design, Planning and Management at Various Scales and Applications	21	photogrammetry and remote sensing	1.47	0.84	0	0	0	0	0		0	0.00
		22	visual resource assessment	1.91	0.88	0	0	0	0	0		2	0.05
		23	agricultural and rural landscape analysis	1.68	0.85	0	0	0	0	0		1	0.03
		24	urban landscape	2.17	0.71	0	0	0	0	0		0	0.00
		25	planning principles including regional community and neighborhood planning	2.12	0.76	0	0	0	0	0		0	0.00
		26	conservation of natural resources	2.33	0.8	0	0	0	0	0		0	0.00
		27	historic preservation	1.73	0.76	0	0	0	0	0		0	0.00
		28	ecological planning principles	2.23	0.8	0	0	0	0	0		0	0.00
		29	Water resource management	1.91	0.84	0	0	0	0	0		0	0.00
		30	wetland	1.78	0.83	0	0	0	0	0		0	0.00
		31	floodplain management	1.8	0.86	0	0	0	0	0		0	0.00
		32	land and water reclamation procedures including quarry, mine and landfill reclamation	1.43	0.84	0	0	0	0	0		0	0.00
		33	treatment of toxic materials	1.05	0.86	0	0	0	0	0		0	0.00
	Site Design and Engineering: Materials, Methods, Technologies and Applications	34	design needs for special populations	1.91	0.78	0	0	0	0	0		0	0.00
		35	accessibility regulations	2.28	0.87	0	0	0	0	0		0	0.00
		36	roadway design principles	2.15	0.83	0	0	0	0	0		0	0.00
		37	elements of vehicular and pedestrian circulation systems and their design requirements	2.57	0.72	0	0	0	0	0		0	0.00
		38	landscape maintenance techniques, materials, equipment, and practices	1.93	0.87	0	0	0	0	0		0	0.00
		39	noise attenuation and mitigation techniques	1.66	0.82	0	0	0	0	0		0	0.00
		40	sustainable construction practices	1.82	0.84	0	0	0	0	0		0	0.00
		41	construction equipment and technologies	1.76	0.87	0	0	0	0	0		0	0.00
		42	grading, drainage and stormwater treatment	2.78	0.57	0	0	0	0	0		0	0.00
		43	biofiltration and other alternative drainage methods	1.91	0.84	0	0	0	0	0		1	0.03
		44	erosion and sedimentation control	2.28	0.82	0	0	0	0	0		0	0.00
		45	utility systems	1.77	0.77	0	0	0	0	0		1	0.03
		46	Irrigation systems	1.75	0.88	0	0	0	0	0		1	0.03
		47	lighting systems	1.7	0.79	0	0	0	0	0		1	0.03
		48	structural considerations	2.06	0.82	0	0	0	0	0		0	0.00
	Construction Documentation and Administration	49	quality control procedures for construction, such as delivery, storage, testing, etc.	1.27	0.87	0	0	0	0	0		0	0.00
		50	sequencing of design, approval, permitting, and construction activities	1.68	0.92	0	0	0	0	0		0	0.00
		51	the life-cycle cost-analysis process	1.32	0.86	0	0	0	0	0		0	0.00
		52	geographic coordinate systems and layout techniques and conventions	1.9	0.9	0	0	0	0	0		2	0.05
		53	specification types and components for a project	1.89	0.83	0	0	0	0	0		0	0.00
		54	general and supplemental conditions, special provisions, and technical specifications and their organizations	1.64	0.88	0	0	0	0	0		0	0.00
		55	construction administration and details	1.73	0.92	0	0	0	0	0		0	0.00
		56	basic construction law	1.48	0.84	0	0	0	0	0		0	0.00
		57	construction contracts	1.55	0.88	0	0	0	0	0		0	0.00
	Communication	58	determination of user values such as focus groups and surveys	1.52	0.83	0	0	0	0	0		0	0.00
		59	consensus and team building	1.74	0.91	0	0	0	0	0		0	0.00
		60	techniques for conducting meetings	1.59	0.97	0	0	0	0	0		0	0.00
		61	the roles of visual communication, including photographic and video documentation	2.25	0.85	0	0	0	0	0		1	0.03
		62	graphic presentation techniques, systems and symbols	2.71	0.73	0	0	0	0	0		3	0.08
		63	interpretive methods and techniques such as information displays and brochures	1.82	0.98	0	0	0	0	0		0	0.00
		64	public relations, outreach, and image development	1.49	0.97	0	0	0	0	0		0	0.00
	Values and Ethics in Practice	65	environmental ethics	2.08	0.82	0	0	0	0	0		0	0.00
		66	social responsibility in design	2.1	0.78	0	0	0	0	0		0	0.00
		67	organizational management principles such as leadership principles and landscape architect career cycle	1.61	0.93	0	0	0	0	0		0	0.00
		68	resolving moral and ethical dilemmas	1.89	0.93	0	0	0	0	0		0	0.00

LABOK						GIS&T BOK							
				Command of Knowledge at time of Degree		Geocomputation							
						GC9							
Knowledge Statement / Competency Division	Domains		Knowledge Statements / Competencies	Mean	Standard Deviation	Fuzzy Logic	Fuzzy Measures	Fuzzy Aggregation Operators	Standardization	Weighting Schemes		Sum	Average
COMPETENCIES	Landscape Architecture History & Criticism	69	Develop an understanding of design as exemplified by historically significant works of landscape architecture, urban planning, civic design, and architecture	2.02	0.73	0	0	0	0	0		0	0.00
		70	Examine economic, political, social, ecological and esthetic relationships and their influence on the development of the profession of landscape architecture	1.65	0.78	0	0	0	0	0		0	0.00
		71	Demonstrate an understanding of the evolution of landscape architecture as an art and a profession through knowledge of its terminology, literature, personalities, and concepts	1.85	0.76	0	0	0	0	0		0	0.00
		72	Demonstrate the ability to critique prior work and understand the relevance in addressing current issues and problems	1.89	0.74	0	0	0	0	0		0	0.00
		73	Develop an ability to synthesize and make connections between aspects of landscape architecture and disciplines outside of landscape architecture	1.98	0.73	0	0	0	0	0		0	0.00
	Natural & Cultural Systems	74	Conduct field investigations to identify significant natural and cultural features, characteristics, and systems	2.06	0.74	0	0	0	0	0		0	0.00
		75	Perform quantitative analyses to evaluate the interactions of natural and cultural features, characteristics, and systems	1.64	0.78	0	0	0	0	0		0	0.00
		76	Perform qualitative analyses to evaluate the relationship between the natural and cultural features, characteristics, and systems	1.79	0.78	0	0	0	0	0		0	0.00
		77	Predict implications of design, planning, and management proposals on natural cultural systems both within the site and in the larger context	1.88	0.76	0	0	0	0	0		0	0.00
	Public Policy and Regulation	78	Identify and collect regulatory information, applicable data and required approvals governing a project (e.g., relevant laws, codes, and regulations)	1.31	0.74	0	0	0	0	0		0	0.00
		79	Confirm code compliance (e.g. zoning, environment, and accessibility)	1.37	0.81	0	0	0	0	0		0	0.00
		80	Assist in the preparation of ordinances, regulations, covenants, standards, and guidelines	0.77	0.69	0	0	0	0	0		0	0.00
		81	Influence public policies on areas such as growth and land and water management by testifying, lobbying, or preparing written documents for public distribution	0.73	0.75	0	0	0	0	0		0	0.00
	Design, Planning, and Management at Various Scales and Applications	82	Develop a design program based on users' needs and clients' goals and resources	2.13	0.75	0	0	0	0	0		0	0.00
		83	Analyze relationships among design elements by determining opportunities and constraints	2.33	0.62	0	0	0	0	0		0	0.00
		84	Develop conceptual design, planning, and management solutions	2.39	0.61	0	0	0	0	0		0	0.00
		85	Evaluate design alternatives to determine the appropriate solution	2.45	0.59	0	0	0	0	0		1	0.03
	Site Design and Engineering: Materials, Methods, Technologies and Applications	86	Design for protection and management of land resources (e.g. land forms, vegetation, habitat, erosion and sedimentation control)	2.13	0.64	0	0	0	0	0		0	0.00
		87	Design for protection and management of water resources (e.g. storm water, water supply, ground water)	2.05	0.66	0	0	0	0	0		0	0.00
		88	Design pedestrian, vehicular, and non-motorized circulation systems	2.28	0.62	0	0	0	0	0		0	0.00
		89	Design elements for construction considering materials, structural issues, and construction technologies	1.94	0.69	0	0	0	0	0		0	0.00

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COMPETENCIES	Construction Documentation and Administration	90	Prepare construction documents including plans, working drawings, and technical specifications	1.87	0.77	0	0	0	0	0		0	0.00
		91	Prepare contract documents including agreements, general conditions, and bid documents	1.24	0.82	0	0	0	0	0		0	0.00
		92	Manage the bidding/tendering process	0.72	0.7	0	0	0	0	0		0	0.00
		93	Provide construction administration and observation throughout the project	0.83	0.78	0	0	0	0	0		0	0.00
		94	Conduct project closure including review and distribution of close-out documents	0.67	0.73	0	0	0	0	0		0	0.00
		95	Perform post construction evaluation	0.91	0.79	0	0	0	0	0		0	0.00
		96	Perform construction services including design-build	0.67	0.7	0	0	0	0	0		0	0.00
		97	Prepare management and maintenance manuals and documents	0.81	0.7	0	0	0	0	0		0	0.00
	Communication	98	Maintain clear communication among collaborators through correspondence and project coordination	1.51	0.9	0	0	0	0	0		0	0.00
		99	Develop written documentation, such as projects reports, grant proposals, and promotional materials	1.43	0.84	0	0	0	0	0		0	0.00
		100	Create graphic materials in a variety of media	2.19	0.76	0	0	0	0	0		1	0.03
		101	Prepare and deliver oral presentations such as meetings, demonstrations, and outreach	2.18	0.72	0	0	0	0	0		0	0.00
		102	Conduct project and public meetings including preparing of meeting agendas and notes, and facilitation of the meeting	1.34	0.89	0	0	0	0	0		0	0.00
		103	Review and critique peer work	1.79	0.88	0	0	0	0	0		0	0.00
	Values and Ethics in Practice	104	Manage business practices and organizations	0.81	0.74	0	0	0	0	0		0	0.00
		105	Manage risk and liability	0.86	0.81	0	0	0	0	0		0	0.00
		106	Negotiate and prepare client and consultant agreements	0.74	0.79	0	0	0	0	0		0	0.00
		107	Participate in life-long learning (e.g., a professional organization, continuing education activities)	1.56	1.03	0	0	0	0	0		0	0.00
		108	Participate in professional and public service activities	1.58	0.83	0	0	0	0	0		0	0.00
		109	Train, educate and mentor other professionals	0.96	0.91	0	0	0	0	0		0	0.00
		110	Maintain and promote professional and ethical standards	2.12	0.86	0	0	0	0	0		0	0.00
					Sum	0	0	0	0	0			
					Average	0.00	0.00	0.00	0.00	0.00			

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KNOWLEDGE STATEMENTS	Landscape Architecture History and Criticism	1	history of landscape architecture and allied professions	2.15	0.69	1	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		2	historic preservation principles	1.69	0.83	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Natural and Cultural Systems	3	land information sources	2.55	0.77	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		4	patterns of land use and built form	2.43	0.76	1	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		5	natural site conditions and ecosystems	2.76	0.66	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		6	social and cultural influences on design	2.19	0.81	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		7	regional hazard design considerations	2.1	0.87	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Design and Planning Theories and Methodologies	8	creativity and process including design theory and problem –solving strategies	2.83	0.64	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		9	aesthetic principles of design	2.78	0.71	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		10	human factors such as behavior, perception, psychological and sensory response	2.33	0.76	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		11	natural factors such as ecological relationships	2.53	0.75	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		12	relationship between human and natural systems such as resource conservation, habitat restoration and creation, and urban ecology	2.36	0.79	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		13	influence of context on design, planning, and management decisions	2.45	0.76	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		14	research methods including data collection, interpretation, and application of results	2.37	0.93	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		15	therapeutic aspects of design	1.66	0.88	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		16	communication and education methods, including sharing knowledge and evaluating outcomes	2.15	0.99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Public Policy and Regulation	17	governmental policies and laws that affect the use and development of land	1.8	0.85	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		18	political and regulatory approval processes	1.67	0.92	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		19	land and development economics	1.47	0.83	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		20	emerging trends and issues	1.65	0.83	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

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KNOWLEDGE STATEMENTS	Design, Planning and Management at Various Scales and Applications	21	photogrammetry and remote sensing	1.47	0.84	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0
		22	visual resource assessment	1.91	0.88	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0
		23	agricultural and rural landscape analysis	1.68	0.85	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		24	urban landscape	2.17	0.71	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		25	planning principles including regional community and neighborhood planning	2.12	0.76	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		26	conservation of natural resources	2.33	0.8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		27	historic preservation	1.73	0.76	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		28	ecological planning principles	2.23	0.8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		29	Water resource management	1.91	0.84	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		30	wetland	1.78	0.83	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		31	floodplain management	1.8	0.86	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		32	land and water reclamation procedures including quarry, mine and landfill reclamation	1.43	0.84	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		33	treatment of toxic materials	1.05	0.86	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Site Design and Engineering: Materials, Methods, Technologies and Applications	34	design needs for special populations	1.91	0.78	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		35	accessibility regulations	2.28	0.87	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		36	roadway design principles	2.15	0.83	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		37	elements of vehicular and pedestrian circulation systems and their design requirements	2.57	0.72	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		38	landscape maintenance techniques, materials, equipment, and practices	1.93	0.87	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		39	noise attenuation and mitigation techniques	1.66	0.82	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		40	sustainable construction practices	1.82	0.84	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		41	construction equipment and technologies	1.76	0.87	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		42	grading, drainage and stormwater treatment	2.78	0.57	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		43	biofiltration and other alternative drainage methods	1.91	0.84	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		44	erosion and sedimentation control	2.28	0.82	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		45	utility systems	1.77	0.77	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		46	Irrigation systems	1.75	0.88	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		47	lighting systems	1.7	0.79	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		48	structural considerations	2.06	0.82	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

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KNOWLEDGE STATEMENTS	Construction Documentation and Administration	49	quality control procedures for construction, such as delivery, storage, testing, etc.	1.27	0.87	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		50	sequencing of design, approval, permitting, and construction activities	1.68	0.92	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		51	the life-cycle cost-analysis process	1.32	0.86	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		52	geographic coordinate systems and layout techniques and conventions	1.9	0.9	1	0	1	1	1	1	1	0	1	1	1	1	1	1	1	0	1	0	0	0	1	0	0	0	1	0	0	0	0
		53	specification types and components for a project	1.89	0.83	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		54	general and supplemental conditions, special provisions, and technical specifications and their organizations	1.64	0.88	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		55	construction administration and details	1.73	0.92	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		56	basic construction law	1.48	0.84	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		57	construction contracts	1.55	0.88	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Communication	58	determination of user values such as focus groups and surveys	1.52	0.83	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		59	consensus and team building	1.74	0.91	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		60	techniques for conducting meetings	1.59	0.97	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		61	the roles of visual communication, including photographic and video documentation	2.25	0.85	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0
		62	graphic presentation techniques, systems and symbols	2.71	0.73	1	0	1	0	0	1	1	0	1	1	1	1	1	1	1	0	1	1	0	0	0	0	0	0	0	0	0	0	0
		63	interpretive methods and techniques such as information displays and brochures	1.82	0.98	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		64	public relations, outreach, and image development	1.49	0.97	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Values and Ethics in Practice	65	environmental ethics	2.08	0.82	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		66	social responsibility in design	2.1	0.78	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		67	organizational management principles such as leadership principles and landscape architect career cycle	1.61	0.93	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		68	resolving moral and ethical dilemmas	1.89	0.93	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

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COMPETENCIES	Landscape Architecture History & Criticism	69	Develop an understanding of design as exemplified by historically significant works of landscape architecture, urban planning, civic design, and architecture	2.02	0.73	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0					
		70	Examine economic, political, social, ecological and esthetic relationships and their influence on the development of the profession of landscape architecture	1.65	0.78	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0					
		71	Demonstrate an understanding of the evolution of landscape architecture as an art and a profession through knowledge of its terminology, literature, personalities, and concepts	1.85	0.76	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0					
		72	Demonstrate the ability to critique prior work and understand the relevance in addressing current issues and problems	1.89	0.74	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0					
		73	Develop an ability to synthesize and make connections between aspects of landscape architecture and disciplines outside of landscape architecture	1.98	0.73	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0					
	Natural & Cultural Systems	74	Conduct field investigations to identify significant natural and cultural features, characteristics, and systems	2.06	0.74	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0					
		75	Perform quantitative analyses to evaluate the interactions of natural and cultural features, characteristics, and systems	1.64	0.78	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0					
		76	Perform qualitative analyses to evaluate the relationship between the natural and cultural features, characteristics, and systems	1.79	0.78	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0					
		77	Predict implications of design, planning, and management proposals on natural cultural systems both within the site and in the larger context	1.88	0.76	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0					

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COMPETENCIES	Public Policy and Regulation	78	Identify and collect regulatory information, applicable data and required approvals governing a project (e.g., relevant laws, codes, and regulations)	1.31	0.74	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		79	Confirm code compliance (e.g. zoning, environment, and accessibility)	1.37	0.81	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		80	Assist in the preparation of ordinances, regulations, covenants, standards, and guidelines	0.77	0.69	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		81	Influence public policies on areas such as growth and land and water management by testifying, lobbying, or preparing written documents for public distribution	0.73	0.75	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Design, Planning, and Management at Various Scales and Applications	82	Develop a design program based on users' needs and clients' goals and resources	2.13	0.75	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		83	Analyze relationships among design elements by determining opportunities and constraints	2.33	0.62	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		84	Develop conceptual design, planning, and management solutions	2.39	0.61	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		85	Evaluate design alternatives to determine the appropriate solution	2.45	0.59	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Site Design and Engineering: Materials, Methods, Technologies and Applications	86	Design for protection and management of land resources (e.g. land forms, vegetation, habitat, erosion and sedimentation control)	2.13	0.64	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		87	Design for protection and management of water resources (e.g. storm water, water supply, ground water)	2.05	0.66	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		88	Design pedestrian, vehicular, and non-motorized circulation systems	2.28	0.62	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		89	Design elements for construction considering materials, structural issues, and construction technologies	1.94	0.69	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

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COMPETENCIES	Construction Documentation and Administration	90	Prepare construction documents including plans, working drawings, and technical specifications	1.87	0.77	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		91	Prepare contract documents including agreements, general conditions, and bid documents	1.24	0.82	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		92	Manage the bidding/tendering process	0.72	0.7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		93	Provide construction administration and observation throughout the project	0.83	0.78	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		94	Conduct project closure including review and distribution of close-out documents	0.67	0.73	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		95	Perform post construction evaluation	0.91	0.79	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		96	Perform construction services including design-build	0.67	0.7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		97	Prepare management and maintenance manuals and documents	0.81	0.7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Communication	98	Maintain clear communication among collaborators through correspondence and project coordination	1.51	0.9	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		99	Develop written documentation, such as projects reports, grant proposals, and promotional materials	1.43	0.84	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		100	Create graphic materials in a variety of media	2.19	0.76	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		101	Prepare and deliver oral presentations such as meetings, demonstrations, and outreach	2.18	0.72	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		102	Conduct project and public meetings including preparing of meeting agendas and notes, and facilitation of the meeting	1.34	0.89	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		103	Review and critique peer work	1.79	0.88	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Values and Ethics in Practice	104	Manage business practices and organizations	0.81	0.74	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		105	Manage risk and liability	0.86	0.81	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		106	Negotiate and prepare client and consultant agreements	0.74	0.79	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		107	Participate in life-long learning (e.g., a professional organization, continuing education activities)	1.56	1.03	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		108	Participate in professional and public service activities	1.58	0.83	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		109	Train, educate and mentor other professionals	0.96	0.91	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		110	Maintain and promote professional and ethical standards	2.12	0.86	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
					Sum	4	0	2	4	4	2	2	0	2	2	2	4	2	2	2	0	2	4	0	2	1	0	0		
					Average	0.04	0.00	0.02	0.04	0.04	0.02	0.02	0.00	0.02	0.02	0.02	0.04	0.02	0.02	0.02	0.00	0.02	0.04	0.00	0.02	0.01	0.00	0.00		

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KNOWLEDGE STATEMENTS	Landscape Architecture History and Criticism	1	history of landscape architecture and allied professions	2.15	0.69	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1		4	0.09
		2	historic preservation principles	1.69	0.83	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0.00
	Natural and Cultural Systems	3	land information sources	2.55	0.77	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0.00
		4	patterns of land use and built form	2.43	0.76	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		3	0.06
		5	natural site conditions and ecosystems	2.76	0.66	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0.00
		6	social and cultural influences on design	2.19	0.81	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0.00
		7	regional hazard design considerations	2.1	0.87	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0.00
	Design and Planning Theories and Methodologies	8	creativity and process including design theory and problem –solving strategies	2.83	0.64	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0.00
		9	aesthetic principles of design	2.78	0.71	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0.00
		10	human factors such as behavior, perception, psychological and sensory response	2.33	0.76	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0.00
		11	natural factors such as ecological relationships	2.53	0.75	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0.00
		12	relationship between human and natural systems such as resource conservation, habitat restoration and creation, and urban ecology	2.36	0.79	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0.00
		13	influence of context on design, planning, and management decisions	2.45	0.76	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0.00
		14	research methods including data collection, interpretation, and application of results	2.37	0.93	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0.00
		15	therapeutic aspects of design	1.66	0.88	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0.00
		16	communication and education methods, including sharing knowledge and evaluating outcomes	2.15	0.99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0.00
	Public Policy and Regulation	17	governmental policies and laws that affect the use and development of land	1.8	0.85	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		2	0.04
		18	political and regulatory approval processes	1.67	0.92	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0.00
		19	land and development economics	1.47	0.83	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0.00
		20	emerging trends and issues	1.65	0.83	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0.00

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KNOWLEDGE STATEMENTS	Design, Planning and Management at Various Scales and Applications	21	photogrammetry and remote sensing	1.47	0.84	0	0	0	0	0	0	0	1	0	1	1	1	0	1	1	0	0	0	0	0	0	0	0	0		9	0.19
		22	visual resource assessment	1.91	0.88	1	0	1	0	0	0	0	1	0	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0		8	0.17
		23	agricultural and rural landscape analysis	1.68	0.85	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0.00
		24	urban landscape	2.17	0.71	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0.00
		25	planning principles including regional community and neighborhood planning	2.12	0.76	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0.00
		26	conservation of natural resources	2.33	0.8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0.00
		27	historic preservation	1.73	0.76	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0.00
		28	ecological planning principles	2.23	0.8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0.00
		29	Water resource management	1.91	0.84	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0.00
		30	wetland	1.78	0.83	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0.00
		31	floodplain management	1.8	0.86	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0.00
		32	land and water reclamation procedures including quarry, mine and landfill reclamation	1.43	0.84	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0.00
		33	treatment of toxic materials	1.05	0.86	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0.00
	Site Design and Engineering: Materials, Methods, Technologies and Applications	34	design needs for special populations	1.91	0.78	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0.00
		35	accessibility regulations	2.28	0.87	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0.00
		36	roadway design principles	2.15	0.83	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0.00
		37	elements of vehicular and pedestrian circulation systems and their design requirements	2.57	0.72	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0.00
		38	landscape maintenance techniques, materials, equipment, and practices	1.93	0.87	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0.00
		39	noise attenuation and mitigation techniques	1.66	0.82	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0.00
		40	sustainable construction practices	1.82	0.84	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0.00
		41	construction equipment and technologies	1.76	0.87	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0.00
		42	grading, drainage and stormwater treatment	2.78	0.57	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0.00
		43	biofiltration and other alternative drainage methods	1.91	0.84	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0.00
		44	erosion and sedimentation control	2.28	0.82	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0.00
		45	utility systems	1.77	0.77	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0.00
		46	Irrigation systems	1.75	0.88	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0.00
		47	lighting systems	1.7	0.79	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0.00
		48	structural considerations	2.06	0.82	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0.00

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KNOWLEDGE STATEMENTS	Construction Documentation and Administration	49	quality control procedures for construction, such as delivery, storage, testing, etc.	1.27	0.87	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0.00
		50	sequencing of design, approval, permitting, and construction activities	1.68	0.92	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0.00
		51	the life-cycle cost-analysis process	1.32	0.86	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0.00
		52	geographic coordinate systems and layout techniques and conventions	1.9	0.9	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1		17	0.36
		53	specification types and components for a project	1.89	0.83	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0.00
		54	general and supplemental conditions, special provisions, and technical specifications and their organizations	1.64	0.88	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0.00
		55	construction administration and details	1.73	0.92	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0.00
		56	basic construction law	1.48	0.84	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0.00
		57	construction contracts	1.55	0.88	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0.00
	Communication	58	determination of user values such as focus groups and surveys	1.52	0.83	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0.00
		59	consensus and team building	1.74	0.91	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0.00
		60	techniques for conducting meetings	1.59	0.97	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0.00
		61	the roles of visual communication, including photographic and video documentation	2.25	0.85	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		1	0.02
		62	graphic presentation techniques, systems and symbols	2.71	0.73	1	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0		17	0.36
		63	interpretive methods and techniques such as information displays and brochures	1.82	0.98	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0.00
		64	public relations, outreach, and image development	1.49	0.97	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0.00
	Values and Ethics in Practice	65	environmental ethics	2.08	0.82	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0.00
		66	social responsibility in design	2.1	0.78	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0.00
		67	organizational management principles such as leadership principles and landscape architect career cycle	1.61	0.93	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0.00
		68	resolving moral and ethical dilemmas	1.89	0.93	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0.00

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COMPETENCIES	Landscape Architecture History & Criticism	69	Develop an understanding of design as exemplified by historically significant works of landscape architecture, urban planning, civic design, and architecture	2.02	0.73	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0.00
		70	Examine economic, political, social, ecological and esthetic relationships and their influence on the development of the profession of landscape architecture	1.65	0.78	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0.00
		71	Demonstrate an understanding of the evolution of landscape architecture as an art and a profession through knowledge of its terminology, literature, personalities, and concepts	1.85	0.76	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0.00
		72	Demonstrate the ability to critique prior work and understand the relevance in addressing current issues and problems	1.89	0.74	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0.00
		73	Develop an ability to synthesize and make connections between aspects of landscape architecture and disciplines outside of landscape architecture	1.98	0.73	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0.00
	Natural & Cultural Systems	74	Conduct field investigations to identify significant natural and cultural features, characteristics, and systems	2.06	0.74	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0.00
		75	Perform quantitative analyses to evaluate the interactions of natural and cultural features, characteristics, and systems	1.64	0.78	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0.00
		76	Perform qualitative analyses to evaluate the relationship between the natural and cultural features, characteristics, and systems	1.79	0.78	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0.00
		77	Predict implications of design, planning, and management proposals on natural cultural systems both within the site and in the larger context	1.88	0.76	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0.00

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COMPETENCIES	Public Policy and Regulation	78	Identify and collect regulatory information, applicable data and required approvals governing a project (e.g., relevant laws, codes, and regulations)	1.31	0.74	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0.00
		79	Confirm code compliance (e.g. zoning, environment, and accessibility)	1.37	0.81	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0.00
		80	Assist in the preparation of ordinances, regulations, covenants, standards, and guidelines	0.77	0.69	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0.00
		81	Influence public policies on areas such as growth and land and water management by testifying, lobbying, or preparing written documents for public distribution	0.73	0.75	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0.00
	Design, Planning, and Management at Various Scales and Applications	82	Develop a design program based on users' needs and clients' goals and resources	2.13	0.75	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0.00
		83	Analyze relationships among design elements by determining opportunities and constraints	2.33	0.62	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0.00
		84	Develop conceptual design, planning, and management solutions	2.39	0.61	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0.00
		85	Evaluate design alternatives to determine the appropriate solution	2.45	0.59	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0.00
	Site Design and Engineering: Materials, Methods, Technologies and Applications	86	Design for protection and management of land resources (e.g. land forms, vegetation, habitat, erosion and sedimentation control)	2.13	0.64	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0.00
		87	Design for protection and management of water resources (e.g. storm water, water supply, ground water)	2.05	0.66	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0.00
		88	Design pedestrian, vehicular, and non-motorized circulation systems	2.28	0.62	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0.00
		89	Design elements for construction considering materials, structural issues, and construction technologies	1.94	0.69	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0.00

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COMPETENCIES	Construction Documentation and Administration	90	Prepare construction documents including plans, working drawings, and technical specifications	1.87	0.77	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0.00
		91	Prepare contract documents including agreements, general conditions, and bid documents	1.24	0.82	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0.00
		92	Manage the bidding/tendering process	0.72	0.7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0.00
		93	Provide construction administration and observation throughout the project	0.83	0.78	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0.00
		94	Conduct project closure including review and distribution of close-out documents	0.67	0.73	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0.00
		95	Perform post construction evaluation	0.91	0.79	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0.00
		96	Perform construction services including design-build	0.67	0.7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0.00
		97	Prepare management and maintenance manuals and documents	0.81	0.7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0.00
	Communication	98	Maintain clear communication among collaborators through correspondence and project coordination	1.51	0.9	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0.00
		99	Develop written documentation, such as projects reports, grant proposals, and promotional materials	1.43	0.84	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0.00
		100	Create graphic materials in a variety of media	2.19	0.76	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0		1	0.02
		101	Prepare and deliver oral presentations such as meetings, demonstrations, and outreach	2.18	0.72	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0.00
		102	Conduct project and public meetings including preparing of meeting agendas and notes, and facilitation of the meeting	1.34	0.89	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0.00
		103	Review and critique peer work	1.79	0.88	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0.00
	Values and Ethics in Practice	104	Manage business practices and organizations	0.81	0.74	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0.00
		105	Manage risk and liability	0.86	0.81	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0.00
		106	Negotiate and prepare client and consultant agreements	0.74	0.79	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0.00
		107	Participate in life-long learning (e.g., a professional organization, continuing education activities)	1.56	1.03	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0.00
		108	Participate in professional and public service activities	1.58	0.83	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0.00
		109	Train, educate and mentor other professionals	0.96	0.91	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0.00
		110	Maintain and promote professional and ethical standards	2.12	0.86	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0.00
					Sum	2	0	2	0	1	0	0	2	0	2	1	1	0	2	1	0	0	0	3	0	0	0	0	2			
					Average	0.02	0.00	0.02	0.00	0.01	0.00	0.00	0.02	0.00	0.02	0.01	0.01	0.00	0.02	0.01	0.00	0.00	0.00	0.03	0.00	0.00	0.00	0.00	0.02			

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KNOWLEDGE STATEMENTS	Landscape Architecture History and Criticism	1	history of landscape architecture and allied professions	2.15	0.69	0	0	0	0	0	0	0	0	0	0	0	0
		2	historic preservation principles	1.69	0.83	0	0	0	0	0	0	0	0	0	0	0	0
	Natural and Cultural Systems	3	land information sources	2.55	0.77	0	0	0	0	0	0	0	0	0	0	0	0
		4	patterns of land use and built form	2.43	0.76	0	0	0	0	0	0	0	0	0	0	0	0
		5	natural site conditions and ecosystems	2.76	0.66	0	0	0	0	0	0	0	0	0	0	0	0
		6	social and cultural influences on design	2.19	0.81	0	0	0	0	0	0	0	0	0	0	0	0
		7	regional hazard design considerations	2.1	0.87	0	0	0	0	0	0	0	0	0	0	0	0
	Design and Planning Theories and Methodologies	8	creativity and process including design theory and problem –solving strategies	2.83	0.64	0	0	0	0	0	0	0	0	0	0	0	0
		9	aesthetic principles of design	2.78	0.71	0	0	0	0	0	0	0	0	0	0	0	0
		10	human factors such as behavior, perception, psychological and sensory response	2.33	0.76	0	0	0	0	0	0	0	0	0	0	0	0
		11	natural factors such as ecological relationships	2.53	0.75	0	0	0	0	0	0	0	0	0	0	0	0
		12	relationship between human and natural systems such as resource conservation, habitat restoration and creation, and urban ecology	2.36	0.79	0	0	0	0	0	0	0	0	0	0	0	0
		13	influence of context on design, planning, and management decisions	2.45	0.76	0	0	0	0	0	0	0	0	0	0	0	0
		14	research methods including data collection, interpretation, and application of results	2.37	0.93	0	0	0	0	0	0	0	0	0	0	0	0
		15	therapeutic aspects of design	1.66	0.88	0	0	0	0	0	0	0	0	0	0	0	0
		16	communication and education methods, including sharing knowledge and evaluating outcomes	2.15	0.99	0	0	0	0	0	0	0	0	0	0	0	0
	Public Policy and Regulation	17	governmental policies and laws that affect the use and development of land	1.8	0.85	0	0	1	1	0	0	0	0	0	1	0	0
		18	political and regulatory approval processes	1.67	0.92	0	0	0	1	0	0	0	0	0	1	0	0
		19	land and development economics	1.47	0.83	0	0	0	0	1	0	0	0	0	1	0	0
		20	emerging trends and issues	1.65	0.83	0	0	0	0	0	1	0	0	0	1	0	0

LABOK						GIS&T BOK											
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Knowledge Statement / Competency Division	Domains		Knowledge Statements / Competencies	Mean	Standard Deviation	The Legal Regime	Contract Law	Liability	Privacy	Economics & the role of Information	Valuing & Measuring Benefits	Models of Benefits	Agency, Organizational, & Individual Perspectives	Measuring Costs	Uses of Geospatial Information in Government	Public Participation in Governing	Public Participation GIS
KNOWLEDGE STATEMENTS	Design, Planning and Management at Various Scales and Applications	21	photogrammetry and remote sensing	1.47	0.84	0	0	0	0	0	0	0	0	0	0	0	0
		22	visual resource assessment	1.91	0.88	0	0	0	0	0	0	0	0	0	0	0	0
		23	agricultural and rural landscape analysis	1.68	0.85	0	0	0	0	0	0	0	0	0	0	0	0
		24	urban landscape	2.17	0.71	0	0	0	0	0	0	0	0	0	0	0	0
		25	planning principles including regional community and neighborhood planning	2.12	0.76	0	0	0	0	0	0	0	0	0	0	0	0
		26	conservation of natural resources	2.33	0.8	0	0	0	0	0	0	0	0	0	0	0	0
		27	historic preservation	1.73	0.76	0	0	0	0	0	0	0	0	0	0	0	0
		28	ecological planning principles	2.23	0.8	0	0	0	0	0	0	0	0	0	0	0	0
		29	Water resource management	1.91	0.84	0	0	0	0	0	0	0	0	0	0	0	0
		30	wetland	1.78	0.83	0	0	0	0	0	0	0	0	0	0	0	0
		31	floodplain management	1.8	0.86	0	0	0	0	0	0	0	0	0	0	0	0
		32	land and water reclamation procedures including quarry, mine and landfill reclamation	1.43	0.84	0	0	0	0	0	0	0	0	0	0	0	0
		33	treatment of toxic materials	1.05	0.86	0	0	0	0	0	0	0	0	0	0	0	0
	Site Design and Engineering: Materials, Methods, Technologies and Applications	34	design needs for special populations	1.91	0.78	0	0	0	0	0	0	0	0	0	0	0	0
		35	accessibility regulations	2.28	0.87	0	0	0	0	0	0	0	0	0	0	0	0
		36	roadway design principles	2.15	0.83	0	0	0	0	0	0	0	0	0	0	0	0
		37	elements of vehicular and pedestrian circulation systems and their design requirements	2.57	0.72	0	0	0	0	0	0	0	0	0	0	0	0
		38	landscape maintenance techniques, materials, equipment, and practices	1.93	0.87	0	0	0	0	0	0	0	0	0	0	0	0
		39	noise attenuation and mitigation techniques	1.66	0.82	0	0	0	0	0	0	0	0	0	0	0	0
		40	sustainable construction practices	1.82	0.84	0	0	0	0	0	0	0	0	0	0	0	0
		41	construction equipment and technologies	1.76	0.87	0	0	0	0	0	0	0	0	0	0	0	0
		42	grading, drainage and stormwater treatment	2.78	0.57	0	0	0	0	0	0	0	0	0	0	0	0
		43	biofiltration and other alternative drainage methods	1.91	0.84	0	0	0	0	0	0	0	0	0	0	0	0
		44	erosion and sedimentation control	2.28	0.82	0	0	0	0	0	0	0	0	0	0	0	0
		45	utility systems	1.77	0.77	0	0	0	0	0	0	0	0	0	1	0	0
		46	Irrigation systems	1.75	0.88	0	0	0	0	0	0	0	0	0	0	0	0
		47	lighting systems	1.7	0.79	0	0	0	0	0	0	0	0	0	0	0	0
		48	structural considerations	2.06	0.82	0	0	0	0	0	0	0	0	0	0	0	0

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KNOWLEDGE STATEMENTS	Construction Documentation and Administration	49	quality control procedures for construction, such as delivery, storage, testing, etc.	1.27	0.87	0	0	0	0	0	0	0	0	0	0	0	0
		50	sequencing of design, approval, permitting, and construction activities	1.68	0.92	0	0	0	0	0	0	0	0	0	0	0	0
		51	the life-cycle cost-analysis process	1.32	0.86	0	0	0	0	0	1	0	0	0	0	0	0
		52	geographic coordinate systems and layout techniques and conventions	1.9	0.9	0	0	0	0	0	0	0	0	0	0	0	0
		53	specification types and components for a project	1.89	0.83	0	0	0	0	0	0	0	0	0	0	0	0
		54	general and supplemental conditions, special provisions, and technical specifications and their organizations	1.64	0.88	0	0	0	0	0	0	0	0	0	0	0	0
		55	construction administration and details	1.73	0.92	0	0	0	0	0	0	0	0	0	0	0	0
		56	basic construction law	1.48	0.84	0	0	0	0	0	0	0	0	0	0	0	0
		57	construction contracts	1.55	0.88	0	0	0	0	0	0	0	0	0	0	0	0
	Communication	58	determination of user values such as focus groups and surveys	1.52	0.83	0	0	0	0	0	0	0	0	0	0	0	0
		59	consensus and team building	1.74	0.91	0	0	0	0	0	0	0	0	0	0	0	0
		60	techniques for conducting meetings	1.59	0.97	0	0	0	0	0	0	0	0	0	0	0	0
		61	the roles of visual communication, including photographic and video documentation	2.25	0.85	0	0	0	0	0	0	1	0	0	0	0	1
		62	graphic presentation techniques, systems and symbols	2.71	0.73	0	0	0	0	0	0	1	0	0	0	0	0
		63	interpretive methods and techniques such as information displays and brochures	1.82	0.98	0	0	0	0	0	0	0	0	0	0	0	0
		64	public relations, outreach, and image development	1.49	0.97	0	0	0	0	0	0	0	0	0	0	0	1
	Values and Ethics in Practice	65	environmental ethics	2.08	0.82	0	0	0	0	0	0	0	0	0	0	0	0
		66	social responsibility in design	2.1	0.78	0	0	1	0	0	0	0	0	0	0	0	0
		67	organizational management principles such as leadership principles and landscape architect career cycle	1.61	0.93	0	0	0	0	0	0	0	0	0	0	0	0
		68	resolving moral and ethical dilemmas	1.89	0.93	0	0	0	0	0	0	0	0	0	0	0	0

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COMPETENCIES	Landscape Architecture History & Criticism	69	Develop an understanding of design as exemplified by historically significant works of landscape architecture, urban planning, civic design, and architecture	2.02	0.73	0	0	0	0	0	0	0	0	0	0	0	0
		70	Examine economic, political, social, ecological and esthetic relationships and their influence on the development of the profession of landscape architecture	1.65	0.78	0	0	0	0	0	0	0	0	0	0	0	0
		71	Demonstrate an understanding of the evolution of landscape architecture as an art and a profession through knowledge of its terminology, literature, personalities, and concepts	1.85	0.76	0	0	0	0	0	0	0	0	0	0	0	0
		72	Demonstrate the ability to critique prior work and understand the relevance in addressing current issues and problems	1.89	0.74	0	0	0	0	0	0	0	0	0	0	0	0
		73	Develop an ability to synthesize and make connections between aspects of landscape architecture and disciplines outside of landscape architecture	1.98	0.73	0	0	0	0	0	0	0	0	0	0	0	0
	Natural & Cultural Systems	74	Conduct field investigations to identify significant natural and cultural features, characteristics, and systems	2.06	0.74	0	0	0	0	0	0	0	0	0	0	0	0
		75	Perform quantitative analyses to evaluate the interactions of natural and cultural features, characteristics, and systems	1.64	0.78	0	0	0	0	0	0	0	0	0	0	0	0
		76	Perform qualitative analyses to evaluate the relationship between the natural and cultural features, characteristics, and systems	1.79	0.78	0	0	0	0	0	0	0	0	0	0	0	0
		77	Predict implications of design, planning, and management proposals on natural cultural systems both within the site and in the larger context	1.88	0.76	0	0	0	0	0	0	0	0	0	0	0	0
	Public Policy and Regulation	78	Identify and collect regulatory information, applicable data and required approvals governing a project (e.g., relevant laws, codes, and regulations)	1.31	0.74	0	0	0	0	0	0	0	0	0	1	0	0
		79	Confirm code compliance (e.g. zoning, environment, and accessibility)	1.37	0.81	0	0	0	0	0	0	0	0	0	1	0	0
		80	Assist in the preparation of ordinances, regulations, covenants, standards, and guidelines	0.77	0.69	0	0	0	0	0	0	0	0	0	0	0	0
		81	Influence public policies on areas such as growth and land and water management by testifying, lobbying, or preparing written documents for public distribution	0.73	0.75	0	1	0	0	0	0	0	0	0	0	1	0

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COMPETENCIES	Design, Planning, and Management at Various Scales and Applications	82	Develop a design program based on users' needs and clients' goals and resources	2.13	0.75	0	0	0	0	0	0	0	0	0	0	0	0
		83	Analyze relationships among design elements by determining opportunities and constraints	2.33	0.62	0	0	0	0	0	0	0	0	0	0	0	0
		84	Develop conceptual design, planning, and management solutions	2.39	0.61	0	0	0	0	0	0	0	0	0	0	0	0
		85	Evaluate design alternatives to determine the appropriate solution	2.45	0.59	0	0	0	0	0	0	0	0	0	0	0	0
	Site Design and Engineering: Materials, Methods, Technologies and Applications	86	Design for protection and management of land resources (e.g. land forms, vegetation, habitat, erosion and sedimentation control)	2.13	0.64	0	0	0	0	0	0	0	0	0	0	0	0
		87	Design for protection and management of water resources (e.g. storm water, water supply, ground water)	2.05	0.66	0	0	0	0	0	0	0	0	0	0	0	0
		88	Design pedestrian, vehicular, and non-motorized circulation systems	2.28	0.62	0	0	0	0	0	0	0	0	0	0	0	0
		89	Design elements for construction considering materials, structural issues, and construction technologies	1.94	0.69	0	0	0	0	0	0	0	0	0	0	0	0
	Construction Documentation and Administration	90	Prepare construction documents including plans, working drawings, and technical specifications	1.87	0.77	0	0	0	0	0	0	0	0	0	0	0	0
		91	Prepare contract documents including agreements, general conditions, and bid documents	1.24	0.82	0	0	0	0	0	0	0	0	0	0	0	0
		92	Manage the bidding/tendering process	0.72	0.7	0	0	0	0	0	0	0	0	0	0	0	0
		93	Provide construction administration and observation throughout the project	0.83	0.78	0	0	0	0	0	0	0	0	0	0	0	0
		94	Conduct project closure including review and distribution of close-out documents	0.67	0.73	0	0	0	0	0	0	0	0	0	0	0	0
		95	Perform post construction evaluation	0.91	0.79	0	0	0	0	0	0	0	0	0	0	0	0
		96	Perform construction services including design-build	0.67	0.7	0	0	0	0	0	0	0	0	0	0	0	0
		97	Prepare management and maintenance manuals and documents	0.81	0.7	0	0	0	0	0	0	0	0	0	0	0	0
	Communication	98	Maintain clear communication among collaborators through correspondence and project coordination	1.51	0.9	0	0	0	0	0	0	0	0	0	0	0	0
		99	Develop written documentation, such as projects reports, grant proposals, and promotional materials	1.43	0.84	0	0	0	0	0	0	0	0	0	0	0	0
		100	Create graphic materials in a variety of media	2.19	0.76	0	0	0	0	0	0	0	0	0	0	0	0
		101	Prepare and deliver oral presentations such as meetings, demonstrations, and outreach	2.18	0.72	0	0	0	0	0	0	0	0	0	0	0	0
		102	Conduct project and public meetings including preparing of meeting agendas and notes, and facilitation of the meeting	1.34	0.89	0	0	0	0	0	0	0	0	0	0	0	0
		103	Review and critique peer work	1.79	0.88	0	0	0	0	0	0	0	0	0	0	0	0

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COMPETENCIES	Values and Ethics in Practice	104	Manage business practices and organizations	0.81	0.74	0	0	0	0	0	0	0	0	0	0	0	0
		105	Manage risk and liability	0.86	0.81	0	0	1	0	0	0	0	0	0	0	0	0
		106	Negotiate and prepare client and consultant agreements	0.74	0.79	0	0	0	0	0	0	0	0	0	0	0	0
		107	Participate in life-long learning (e.g., a professional organization, continuing education activities)	1.56	1.03	0	0	0	0	0	0	0	0	0	0	0	0
		108	Participate in professional and public service activities	1.58	0.83	0	0	0	0	0	0	0	0	0	0	0	0
		109	Train, educate and mentor other professionals	0.96	0.91	0	0	0	0	0	0	0	0	0	0	0	0
		110	Maintain and promote professional and ethical standards	2.12	0.86	0	0	0	0	0	0	0	0	0	0	0	0
					Sum	0	1	3	2	1	2	2	0	0	7	1	2
					Average	0.00	0.01	0.03	0.02	0.01	0.02	0.02	0.00	0.00	0.06	0.01	0.02

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KNOWLEDGE STATEMENTS	Landscape Architecture History and Criticism	1	history of landscape architecture and allied professions	2.15	0.69	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0.00
		2	historic preservation principles	1.69	0.83	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0.00
	Natural and Cultural Systems	3	land information sources	2.55	0.77	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0.00
		4	patterns of land use and built form	2.43	0.76	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0.00
		5	natural site conditions and ecosystems	2.76	0.66	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0.00
		6	social and cultural influences on design	2.19	0.81	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0.00
		7	regional hazard design considerations	2.1	0.87	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0.00
	Design and Planning Theories and Methodologies	8	creativity and process including design theory and problem –solving strategies	2.83	0.64	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0.00
		9	aesthetic principles of design	2.78	0.71	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0.00
		10	human factors such as behavior, perception, psychological and sensory response	2.33	0.76	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0.00
		11	natural factors such as ecological relationships	2.53	0.75	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0.00
		12	relationship between human and natural systems such as resource conservation, habitat restoration and creation, and urban ecology	2.36	0.79	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0.00
		13	influence of context on design, planning, and management decisions	2.45	0.76	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0.00
		14	research methods including data collection, interpretation, and application of results	2.37	0.93	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0.00
		15	therapeutic aspects of design	1.66	0.88	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0.00
		16	communication and education methods, including sharing knowledge and evaluating outcomes	2.15	0.99	0	0	0	0	1	0	0	0	0	0	0	0	0		1	0.04
	Public Policy and Regulation	17	governmental policies and laws that affect the use and development of land	1.8	0.85	0	0	0	0	0	0	0	0	0	0	0	0	0		3	0.12
		18	political and regulatory approval processes	1.67	0.92	0	0	0	0	0	0	0	0	0	0	0	0	0		2	0.08
		19	land and development economics	1.47	0.83	0	0	0	0	0	0	0	0	0	0	0	0	0		2	0.08
		20	emerging trends and issues	1.65	0.83	0	0	0	0	0	0	0	0	0	0	0	0	0		2	0.08

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KNOWLEDGE STATEMENTS	Design, Planning and Management at Various Scales and Applications	21	photogrammetry and remote sensing	1.47	0.84	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0.00
		22	visual resource assessment	1.91	0.88	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0.00
		23	agricultural and rural landscape analysis	1.68	0.85	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0.00
		24	urban landscape	2.17	0.71	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0.00
		25	planning principles including regional community and neighborhood planning	2.12	0.76	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0.00
		26	conservation of natural resources	2.33	0.8	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0.00
		27	historic preservation	1.73	0.76	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0.00
		28	ecological planning principles	2.23	0.8	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0.00
		29	Water resource management	1.91	0.84	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0.00
		30	wetland	1.78	0.83	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0.00
		31	floodplain management	1.8	0.86	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0.00
		32	land and water reclamation procedures including quarry, mine and landfill reclamation	1.43	0.84	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0.00
		33	treatment of toxic materials	1.05	0.86	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0.00
	Site Design and Engineering: Materials, Methods, Technologies and Applications	34	design needs for special populations	1.91	0.78	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0.00
		35	accessibility regulations	2.28	0.87	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0.00
		36	roadway design principles	2.15	0.83	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0.00
		37	elements of vehicular and pedestrian circulation systems and their design requirements	2.57	0.72	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0.00
		38	landscape maintenance techniques, materials, equipment, and practices	1.93	0.87	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0.00
		39	noise attenuation and mitigation techniques	1.66	0.82	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0.00
		40	sustainable construction practices	1.82	0.84	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0.00
		41	construction equipment and technologies	1.76	0.87	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0.00
		42	grading, drainage and stormwater treatment	2.78	0.57	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0.00
		43	biofiltration and other alternative drainage methods	1.91	0.84	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0.00
		44	erosion and sedimentation control	2.28	0.82	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0.00
		45	utility systems	1.77	0.77	0	0	0	0	0	0	0	0	0	0	0	0	0		1	0.04
		46	Irrigation systems	1.75	0.88	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0.00
		47	lighting systems	1.7	0.79	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0.00
		48	structural considerations	2.06	0.82	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0.00

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						GIS&T and Society															
						GS4			GS5					GS6		GS7					
Knowledge Statement / Competency Division	Domains		Knowledge Statements / Competencies	Mean	Standard Deviation	Property Regimes	Mechanisms of Control of Geospatial Information	Enforcing Control	Incentives & Barriers to Sharing Geospatial Information	Data Sharing Among Organizations & Individuals	Legal Mechanisms for Sharing Geospatial Information	Balancing Security & open Access to Geospatial Information	Ethics & Geospatial Information	Codes of Ethics for Geospatial Professionals	Epistemological Critiques	Ethical Critiques	Feminist Critiques	Social Critiques		Sum	Average
KNOWLEDGE STATEMENTS	Construction Documentation and Administration	49	quality control procedures for construction, such as delivery, storage, testing, etc.	1.27	0.87	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0.00
		50	sequencing of design, approval, permitting, and construction activities	1.68	0.92	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0.00
		51	the life-cycle cost-analysis process	1.32	0.86	0	0	0	0	0	0	0	0	0	0	0	0	0		1	0.04
		52	geographic coordinate systems and layout techniques and conventions	1.9	0.9	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0.00
		53	specification types and components for a project	1.89	0.83	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0.00
		54	general and supplemental conditions, special provisions, and technical specifications and their organizations	1.64	0.88	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0.00
		55	construction administration and details	1.73	0.92	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0.00
		56	basic construction law	1.48	0.84	0	0	1	0	0	0	0	0	0	0	0	0	0		1	0.04
		57	construction contracts	1.55	0.88	0	0	1	0	0	0	0	0	0	0	0	0	0		1	0.04
	Communication	58	determination of user values such as focus groups and surveys	1.52	0.83	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0.00
		59	consensus and team building	1.74	0.91	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0.00
		60	techniques for conducting meetings	1.59	0.97	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0.00
		61	the roles of visual communication, including photographic and video documentation	2.25	0.85	0	0	0	0	0	0	0	0	0	0	0	0	0		2	0.08
		62	graphic presentation techniques, systems and symbols	2.71	0.73	0	0	0	0	0	0	0	0	0	0	0	0	0		1	0.04
		63	interpretive methods and techniques such as information displays and brochures	1.82	0.98	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0.00
		64	public relations, outreach, and image development	1.49	0.97	0	0	0	0	0	0	0	0	0	0	0	0	0		1	0.04
	Values and Ethics in Practice	65	environmental ethics	2.08	0.82	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0.00
		66	social responsibility in design	2.1	0.78	0	0	0	0	0	0	0	0	0	0	0	0	0		1	0.04
		67	organizational management principles such as leadership principles and landscape architect career cycle	1.61	0.93	0	0	0	0	0	0	0	1	0	0	0	0	0		1	0.04
		68	resolving moral and ethical dilemmas	1.89	0.93	0	0	0	0	0	0	0	1	0	0	0	0	0		1	0.04

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COMPETENCIES	Landscape Architecture History & Criticism	69	Develop an understanding of design as exemplified by historically significant works of landscape architecture, urban planning, civic design, and architecture	2.02	0.73	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0.00
		70	Examine economic, political, social, ecological and esthetic relationships and their influence on the development of the profession of landscape architecture	1.65	0.78	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0.00
		71	Demonstrate an understanding of the evolution of landscape architecture as an art and a profession through knowledge of its terminology, literature, personalities, and concepts	1.85	0.76	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0.00
		72	Demonstrate the ability to critique prior work and understand the relevance in addressing current issues and problems	1.89	0.74	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0.00
		73	Develop an ability to synthesize and make connections between aspects of landscape architecture and disciplines outside of landscape architecture	1.98	0.73	0	0	0	0	0	1	0	0	0	0	0	0	0		1	0.04
	Natural & Cultural Systems	74	Conduct field investigations to identify significant natural and cultural features, characteristics, and systems	2.06	0.74	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0.00
		75	Perform quantitative analyses to evaluate the interactions of natural and cultural features, characteristics, and systems	1.64	0.78	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0.00
		76	Perform qualitative analyses to evaluate the relationship between the natural and cultural features, characteristics, and systems	1.79	0.78	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0.00
		77	Predict implications of design, planning, and management proposals on natural cultural systems both within the site and in the larger context	1.88	0.76	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0.00
	Public Policy and Regulation	78	Identify and collect regulatory information, applicable data and required approvals governing a project (e.g., relevant laws, codes, and regulations)	1.31	0.74	0	1	0	0	0	0	0	0	0	0	0	0	0		2	0.08
		79	Confirm code compliance (e.g. zoning, environment, and accessibility)	1.37	0.81	0	0	0	0	0	0	0	0	0	0	0	0	0		1	0.04
		80	Assist in the preparation of ordinances, regulations, covenants, standards, and guidelines	0.77	0.69	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0.00
		81	Influence public policies on areas such as growth and land and water management by testifying, lobbying, or preparing written documents for public distribution	0.73	0.75	0	0	0	0	0	0	0	0	0	0	0	0	0		2	0.08

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COMPETENCIES	Design, Planning, and Management at Various Scales and Applications	82	Develop a design program based on users' needs and clients' goals and resources	2.13	0.75	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0.00
		83	Analyze relationships among design elements by determining opportunities and constraints	2.33	0.62	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0.00
		84	Develop conceptual design, planning, and management solutions	2.39	0.61	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0.00
		85	Evaluate design alternatives to determine the appropriate solution	2.45	0.59	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0.00
	Site Design and Engineering: Materials, Methods, Technologies and Applications	86	Design for protection and management of land resources (e.g. land forms, vegetation, habitat, erosion and sedimentation control)	2.13	0.64	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0.00
		87	Design for protection and management of water resources (e.g. storm water, water supply, ground water)	2.05	0.66	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0.00
		88	Design pedestrian, vehicular, and non-motorized circulation systems	2.28	0.62	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0.00
		89	Design elements for construction considering materials, structural issues, and construction technologies	1.94	0.69	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0.00
	Construction Documentation and Administration	90	Prepare construction documents including plans, working drawings, and technical specifications	1.87	0.77	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0.00
		91	Prepare contract documents including agreements, general conditions, and bid documents	1.24	0.82	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0.00
		92	Manage the bidding/tendering process	0.72	0.7	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0.00
		93	Provide construction administration and observation throughout the project	0.83	0.78	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0.00
		94	Conduct project closure including review and distribution of close-out documents	0.67	0.73	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0.00
		95	Perform post construction evaluation	0.91	0.79	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0.00
		96	Perform construction services including design-build	0.67	0.7	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0.00
		97	Prepare management and maintenance manuals and documents	0.81	0.7	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0.00
	Communication	98	Maintain clear communication among collaborators through correspondence and project coordination	1.51	0.9	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0.00
		99	Develop written documentation, such as projects reports, grant proposals, and promotional materials	1.43	0.84	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0.00
		100	Create graphic materials in a variety of media	2.19	0.76	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0.00
		101	Prepare and deliver oral presentations such as meetings, demonstrations, and outreach	2.18	0.72	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0.00
		102	Conduct project and public meetings including preparing of meeting agendas and notes, and facilitation of the meeting	1.34	0.89	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0.00
		103	Review and critique peer work	1.79	0.88	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0.00

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COMPETENCIES	Values and Ethics in Practice	104	Manage business practices and organizations	0.81	0.74	0	1	0	0	0	0	0	0	0	0	0	0	0		1	0.04
		105	Manage risk and liability	0.86	0.81	0	0	0	0	0	0	0	0	0	0	0	0	0		1	0.04
		106	Negotiate and prepare client and consultant agreements	0.74	0.79	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0.00
		107	Participate in life-long learning (e.g., a professional organization, continuing education activities)	1.56	1.03	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0.00
		108	Participate in professional and public service activities	1.58	0.83	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0.00
		109	Train, educate and mentor other professionals	0.96	0.91	0	0	0	0	1	0	0	0	0	0	0	0	0		1	0.04
		110	Maintain and promote professional and ethical standards	2.12	0.86	0	0	0	0	0	0	0	1	0	0	0	0	0		1	0.04
					Sum	0	2	2	0	2	1	0	3	0	0	0	0	0			
					Average	0.00	0.02	0.02	0.00	0.02	0.01	0.00	0.03	0.00	0.00	0.00	0.00	0.00			

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						Organizational & Institutional Aspects																	
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Knowledge Statement / Competency Division	Domains		Knowledge Statements / Competencies	Mean	Standard Deviation	Public Sector Origins	Private Sector Origins	Academic Origins	Learning from Experience	Future Trends	Managing the GI System Operations & Infrastructure	Ongoing GI System Revisions	Budgeting for GI System Management	Database Administration	System Management	User Support	Organizational Models for GI System Management	Organizational Models for Geocoding GI Systems and/or Program Participants & Stakeholders	Integrating GIS&T with Management Information Systems (MIS)	GIS&T Staff Development	GIS&T Positions & Qualifications	GIS&T Training & Education	Incorporating GIS&T into Existing Job Classifications
KNOWLEDGE STATEMENTS	Landscape Architecture History and Criticism	1	history of landscape architecture and allied professions	2.15	0.69	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		2	historic preservation principles	1.69	0.83	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Natural and Cultural Systems	3	land information sources	2.55	0.77	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		4	patterns of land use and built form	2.43	0.76	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		5	natural site conditions and ecosystems	2.76	0.66	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		6	social and cultural influences on design	2.19	0.81	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		7	regional hazard design considerations	2.1	0.87	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Design and Planning Theories and Methodologies	8	creativity and process including design theory and problem –solving strategies	2.83	0.64	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		9	aesthetic principles of design	2.78	0.71	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		10	human factors such as behavior, perception, psychological and sensory response	2.33	0.76	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		11	natural factors such as ecological relationships	2.53	0.75	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		12	relationship between human and natural systems such as resource conservation, habitat restoration and creation, and urban ecology	2.36	0.79	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		13	influence of context on design, planning, and management decisions	2.45	0.76	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		14	research methods including data collection, interpretation, and application of results	2.37	0.93	0	0	0	0	0	0	1	1	1	0	0	0	0	0	0	0	0	0
		15	therapeutic aspects of design	1.66	0.88	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		16	communication and education methods, including sharing knowledge and evaluating outcomes	2.15	0.99	0	0	0	1	0	0	0	1	0	1	1	1	1	0	0	0	0	0
	Public Policy and Regulation	17	governmental policies and laws that affect the use and development of land	1.8	0.85	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		18	political and regulatory approval processes	1.67	0.92	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		19	land and development economics	1.47	0.83	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		20	emerging trends and issues	1.65	0.83	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

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KNOWLEDGE STATEMENTS	Design, Planning and Management at Various Scales and Applications	21	photogrammetry and remote sensing	1.47	0.84	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		22	visual resource assessment	1.91	0.88	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		23	agricultural and rural landscape analysis	1.68	0.85	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		24	urban landscape	2.17	0.71	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		25	planning principles including regional community and neighborhood planning	2.12	0.76	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		26	conservation of natural resources	2.33	0.8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		27	historic preservation	1.73	0.76	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		28	ecological planning principles	2.23	0.8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		29	Water resource management	1.91	0.84	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		30	wetland	1.78	0.83	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		31	floodplain management	1.8	0.86	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		32	land and water reclamation procedures including quarry, mine and landfill reclamation	1.43	0.84	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		33	treatment of toxic materials	1.05	0.86	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Site Design and Engineering: Materials, Methods, Technologies and Applications	34	design needs for special populations	1.91	0.78	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		35	accessibility regulations	2.28	0.87	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		36	roadway design principles	2.15	0.83	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		37	elements of vehicular and pedestrian circulation systems and their design requirements	2.57	0.72	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		38	landscape maintenance techniques, materials, equipment, and practices	1.93	0.87	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		39	noise attenuation and mitigation techniques	1.66	0.82	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		40	sustainable construction practices	1.82	0.84	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		41	construction equipment and technologies	1.76	0.87	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		42	grading, drainage and stormwater treatment	2.78	0.57	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		43	biofiltration and other alternative drainage methods	1.91	0.84	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		44	erosion and sedimentation control	2.28	0.82	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		45	utility systems	1.77	0.77	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		46	Irrigation systems	1.75	0.88	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		47	lighting systems	1.7	0.79	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		48	structural considerations	2.06	0.82	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

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KNOWLEDGE STATEMENTS	Construction Documentation and Administration	49	quality control procedures for construction, such as delivery, storage, testing, etc.	1.27	0.87	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		50	sequencing of design, approval, permitting, and construction activities	1.68	0.92	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		51	the life-cycle cost-analysis process	1.32	0.86	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		52	geographic coordinate systems and layout techniques and conventions	1.9	0.9	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		53	specification types and components for a project	1.89	0.83	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		54	general and supplemental conditions, special provisions, and technical specifications and their organizations	1.64	0.88	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		55	construction administration and details	1.73	0.92	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		56	basic construction law	1.48	0.84	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		57	construction contracts	1.55	0.88	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Communication	58	determination of user values such as focus groups and surveys	1.52	0.83	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		59	consensus and team building	1.74	0.91	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		60	techniques for conducting meetings	1.59	0.97	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		61	the roles of visual communication, including photographic and video documentation	2.25	0.85	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		62	graphic presentation techniques, systems and symbols	2.71	0.73	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0
		63	interpretive methods and techniques such as information displays and brochures	1.82	0.98	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		64	public relations, outreach, and image development	1.49	0.97	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Values and Ethics in Practice	65	environmental ethics	2.08	0.82	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		66	social responsibility in design	2.1	0.78	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		67	organizational management principles such as leadership principles and landscape architect career cycle	1.61	0.93	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		68	resolving moral and ethical dilemmas	1.89	0.93	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

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COMPETENCIES	Landscape Architecture History & Criticism	69	Develop an understanding of design as exemplified by historically significant works of landscape architecture, urban planning, civic design, and architecture	2.02	0.73	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		70	Examine economic, political, social, ecological and esthetic relationships and their influence on the development of the profession of landscape architecture	1.65	0.78	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		71	Demonstrate an understanding of the evolution of landscape architecture as an art and a profession through knowledge of its terminology, literature, personalities, and concepts	1.85	0.76	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		72	Demonstrate the ability to critique prior work and understand the relevance in addressing current issues and problems	1.89	0.74	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		73	Develop an ability to synthesize and make connections between aspects of landscape architecture and disciplines outside of landscape architecture	1.98	0.73	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Natural & Cultural Systems	74	Conduct field investigations to identify significant natural and cultural features, characteristics, and systems	2.06	0.74	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		75	Perform quantitative analyses to evaluate the interactions of natural and cultural features, characteristics, and systems	1.64	0.78	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		76	Perform qualitative analyses to evaluate the relationship between the natural and cultural features, characteristics, and systems	1.79	0.78	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		77	Predict implications of design, planning, and management proposals on natural cultural systems both within the site and in the larger context	1.88	0.76	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Public Policy and Regulation	78	Identify and collect regulatory information, applicable data and required approvals governing a project (e.g., relevant laws, codes, and regulations)	1.31	0.74	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		79	Confirm code compliance (e.g. zoning, environment, and accessibility)	1.37	0.81	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		80	Assist in the preparation of ordinances, regulations, covenants, standards, and guidelines	0.77	0.69	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		81	Influence public policies on areas such as growth and land and water management by testifying, lobbying, or preparing written documents for public distribution	0.73	0.75	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

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COMPETENCIES	Design, Planning, and Management at Various Scales and Applications	82	Develop a design program based on users' needs and clients' goals and resources	2.13	0.75	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		83	Analyze relationships among design elements by determining opportunities and constraints	2.33	0.62	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		84	Develop conceptual design, planning, and management solutions	2.39	0.61	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		85	Evaluate design alternatives to determine the appropriate solution	2.45	0.59	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Site Design and Engineering: Materials, Methods, Technologies and Applications	86	Design for protection and management of land resources (e.g. land forms, vegetation, habitat, erosion and sedimentation control)	2.13	0.64	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		87	Design for protection and management of water resources (e.g. storm water, water supply, ground water)	2.05	0.66	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		88	Design pedestrian, vehicular, and non-motorized circulation systems	2.28	0.62	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		89	Design elements for construction considering materials, structural issues, and construction technologies	1.94	0.69	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Construction Documentation and Administration	90	Prepare construction documents including plans, working drawings, and technical specifications	1.87	0.77	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		91	Prepare contract documents including agreements, general conditions, and bid documents	1.24	0.82	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		92	Manage the bidding/tendering process	0.72	0.7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		93	Provide construction administration and observation throughout the project	0.83	0.78	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		94	Conduct project closure including review and distribution of close-out documents	0.67	0.73	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		95	Perform post construction evaluation	0.91	0.79	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		96	Perform construction services including design-build	0.67	0.7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		97	Prepare management and maintenance manuals and documents	0.81	0.7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Communication	98	Maintain clear communication among collaborators through correspondence and project coordination	1.51	0.9	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		99	Develop written documentation, such as projects reports, grant proposals, and promotional materials	1.43	0.84	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		100	Create graphic materials in a variety of media	2.19	0.76	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		101	Prepare and deliver oral presentations such as meetings, demonstrations, and outreach	2.18	0.72	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		102	Conduct project and public meetings including preparing of meeting agendas and notes, and facilitation of the meeting	1.34	0.89	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		103	Review and critique peer work	1.79	0.88	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

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COMPETENCIES	Values and Ethics in Practice	104	Manage business practices and organizations	0.81	0.74	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		105	Manage risk and liability	0.86	0.81	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		106	Negotiate and prepare client and consultant agreements	0.74	0.79	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		107	Participate in life-long learning (e.g., a professional organization, continuing education activities)	1.56	1.03	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0
		108	Participate in professional and public service activities	1.58	0.83	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		109	Train, educate and mentor other professionals	0.96	0.91	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		110	Maintain and promote professional and ethical standards	2.12	0.86	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
					Sum	0	0	0	1	0	0	2	3	1	1	1	1	1	0	0	0	1	0	
					Average	0.00	0.00	0.00	0.01	0.00	0.00	0.02	0.03	0.01	0.01	0.01	0.01	0.01	0.00	0.00	0.00	0.01	0.00	

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KNOWLEDGE STATEMENTS	Landscape Architecture History and Criticism	1	history of landscape architecture and allied professions	2.15	0.69	0	0	0	0	0	0	0	0	1	0	1	0	0	0	2	0.06
		2	historic preservation principles	1.69	0.83	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00
	Natural and Cultural Systems	3	land information sources	2.55	0.77	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00
		4	patterns of land use and built form	2.43	0.76	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00
		5	natural site conditions and ecosystems	2.76	0.66	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00
		6	social and cultural influences on design	2.19	0.81	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00
		7	regional hazard design considerations	2.1	0.87	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00
	Design and Planning Theories and Methodologies	8	creativity and process including design theory and problem –solving strategies	2.83	0.64	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00
		9	aesthetic principles of design	2.78	0.71	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00
		10	human factors such as behavior, perception, psychological and sensory response	2.33	0.76	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00
		11	natural factors such as ecological relationships	2.53	0.75	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00
		12	relationship between human and natural systems such as resource conservation, habitat restoration and creation, and urban ecology	2.36	0.79	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00
		13	influence of context on design, planning, and management decisions	2.45	0.76	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00
		14	research methods including data collection, interpretation, and application of results	2.37	0.93	0	0	0	1	0	0	0	0	0	0	0	0	0	0	4	0.13
		15	therapeutic aspects of design	1.66	0.88	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00
		16	communication and education methods, including sharing knowledge and evaluating outcomes	2.15	0.99	0	0	0	0	0	1	0	0	0	0	0	0	1	0	8	0.25
	Public Policy and Regulation	17	governmental policies and laws that affect the use and development of land	1.8	0.85	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00
		18	political and regulatory approval processes	1.67	0.92	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00
		19	land and development economics	1.47	0.83	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00
		20	emerging trends and issues	1.65	0.83	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00

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KNOWLEDGE STATEMENTS	Design, Planning and Management at Various Scales and Applications	21	photogrammetry and remote sensing	1.47	0.84	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0.00
		22	visual resource assessment	1.91	0.88	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0.00
		~~23~~	~~agricultural and rural landscape analysis~~	~~1.68~~	~~0.85~~	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0.00
		24	urban landscape	2.17	0.71	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0.00
		25	planning principles including regional community and neighborhood planning	2.12	0.76	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0.00
		26	conservation of natural resources	2.33	0.8	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0.00
		27	historic preservation	1.73	0.76	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0.00
		28	ecological planning principles	2.23	0.8	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0.00
		29	Water resource management	1.91	0.84	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0.00
		30	wetland	1.78	0.83	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0.00
		31	floodplain management	1.8	0.86	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0.00
		32	land and water reclamation procedures including quarry, mine and landfill reclamation	1.43	0.84	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0.00
		33	treatment of toxic materials	1.05	0.86	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0.00
	Site Design and Engineering: Materials, Methods, Technologies and Applications	34	design needs for special populations	1.91	0.78	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0.00
		35	accessibility regulations	2.28	0.87	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0.00
		36	roadway design principles	2.15	0.83	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0.00
		37	elements of vehicular and pedestrian circulation systems and their design requirements	2.57	0.72	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0.00
		38	landscape maintenance techniques, materials, equipment, and practices	1.93	0.87	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0.00
		39	noise attenuation and mitigation techniques	1.66	0.82	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0.00
		40	sustainable construction practices	1.82	0.84	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0.00
		41	construction equipment and technologies	1.76	0.87	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0.00
		42	grading, drainage and stormwater treatment	2.78	0.57	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0.00
		43	biofiltration and other alternative drainage methods	1.91	0.84	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0.00
		44	erosion and sedimentation control	2.28	0.82	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0.00
		45	utility systems	1.77	0.77	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0.00
		46	Irrigation systems	1.75	0.88	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0.00
		47	lighting systems	1.7	0.79	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0.00
		48	structural considerations	2.06	0.82	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0.00

LABOK						GIS&T BOK																
				Command of Knowledge at time of Degree		Organizational & Institutional Aspects																
						OI5								OI6								
Knowledge Statement / Competency Division	Domains		Knowledge Statements / Competencies	Mean	Standard Deviation	Spatial Data Infrastructures	Adoption of Standards	Technology Transfer	Spatial Data Sharing Among Organizations	Openness	Balancing Data Access, Security, & Privacy	Implications of Distributed GIS&T	Interorganizational & Vector GI Systems	Federal Agencies & National & International Organizations & Programs	State & Regional Coordinating Bodies	Professional Organizations	Publications	The Geospatial Community	The Geospatial Industry		Sum	Average
KNOWLEDGE STATEMENTS	Construction Documentation and Administration	49	quality control procedures for construction, such as delivery, storage, testing, etc.	1.27	0.87	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0.00
		50	sequencing of design, approval, permitting, and construction activities	1.68	0.92	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0.00
		51	the life-cycle cost-analysis process	1.32	0.86	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0.00
		52	geographic coordinate systems and layout techniques and conventions	1.9	0.9	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0.00
		53	specification types and components for a project	1.89	0.83	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0.00
		54	general and supplemental conditions, special provisions, and technical specifications and their organizations	1.64	0.88	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0.00
		55	construction administration and details	1.73	0.92	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0.00
		56	basic construction law	1.48	0.84	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0.00
		57	construction contracts	1.55	0.88	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0.00
	Communication	58	determination of user values such as focus groups and surveys	1.52	0.83	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0.00
		59	consensus and team building	1.74	0.91	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0.00
		60	techniques for conducting meetings	1.59	0.97	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0.00
		61	the roles of visual communication, including photographic and video documentation	2.25	0.85	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0.00
		62	graphic presentation techniques, systems and symbols	2.71	0.73	0	0	0	0	0	0	0	0	0	0	0	0	0		2	0.06
		63	interpretive methods and techniques such as information displays and brochures	1.82	0.98	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0.00
		64	public relations, outreach, and image development	1.49	0.97	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0.00
	Values and Ethics in Practice	65	environmental ethics	2.08	0.82	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0.00
		66	social responsibility in design	2.1	0.78	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0.00
		67	organizational management principles such as leadership principles and landscape architect career cycle	1.61	0.93	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0.00
		68	resolving moral and ethical dilemmas	1.89	0.93	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0.00

LABOK						GIS&T BOK																
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						OI5								OI6								
Knowledge Statement / Competency Division	Domains		Knowledge Statements / Competencies	Mean	Standard Deviation	Spatial Data Infrastructures	Adoption of Standards	Technology Transfer	Spatial Data Sharing Among Organizations	Openness	Balancing Data Access, Security, & Privacy	Implications of Distributed GIS&T	Interorganizational & Vector GI Systems	Federal Agencies & National & International Organizations & Programs	State & Regional Coordinating Bodies	Professional Organizations	Publications	The Geospatial Community	The Geospatial Industry		Sum	Average
COMPETENCIES	Landscape Architecture History & Criticism	69	Develop an understanding of design as exemplified by historically significant works of landscape architecture, urban planning, civic design, and architecture	2.02	0.73	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0.00
		70	Examine economic, political, social, ecological and esthetic relationships and their influence on the development of the profession of landscape architecture	1.65	0.78	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0.00
		71	Demonstrate an understanding of the evolution of landscape architecture as an art and a profession through knowledge of its terminology, literature, personalities, and concepts	1.85	0.76	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0.00
		72	Demonstrate the ability to critique prior work and understand the relevance in addressing current issues and problems	1.89	0.74	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0.00
		73	Develop an ability to synthesize and make connections between aspects of landscape architecture and disciplines outside of landscape architecture	1.98	0.73	0	0	0	1	0	0	0	0	0	0	0	0	0		1	0.03
	Natural & Cultural Systems	74	Conduct field investigations to identify significant natural and cultural features, characteristics, and systems	2.06	0.74	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0.00
		75	Perform quantitative analyses to evaluate the interactions of natural and cultural features, characteristics, and systems	1.64	0.78	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0.00
		76	Perform qualitative analyses to evaluate the relationship between the natural and cultural features, characteristics, and systems	1.79	0.78	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0.00
		77	Predict implications of design, planning, and management proposals on natural cultural systems both within the site and in the larger context	1.88	0.76	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0.00
	Public Policy and Regulation	78	Identify and collect regulatory information, applicable data and required approvals governing a project (e.g., relevant laws, codes, and regulations)	1.31	0.74	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0.00
		79	Confirm code compliance (e.g. zoning, environment, and accessibility)	1.37	0.81	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0.00
		80	Assist in the preparation of ordinances, regulations, covenants, standards, and guidelines	0.77	0.69	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0.00
		81	Influence public policies on areas such as growth and land and water management by testifying, lobbying, or preparing written documents for public distribution	0.73	0.75	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0.00

LABOK						GIS&T BOK																
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						OI5									OI6							
Knowledge Statement / Competency Division	Domains		Knowledge Statements / Competencies	Mean	Standard Deviation	Spatial Data Infrastructures	Adoption of Standards	Technology Transfer	Spatial Data Sharing Among Organizations	Openness	Balancing Data Access, Security, & Privacy	Implications of Distributed GIS&T	Interorganizational & Vector GI Systems	Federal Agencies & National & International Organizations & Programs	State & Regional Coordinating Bodies	Professional Organizations	Publications	The Geospatial Community	The Geospatial Industry		Sum	Average
COMPETENCIES	Design, Planning, and Management at Various Scales and Applications	82	Develop a design program based on users' needs and clients' goals and resources	2.13	0.75	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0.00
		83	Analyze relationships among design elements by determining opportunities and constraints	2.33	0.62	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0.00
		84	Develop conceptual design, planning, and management solutions	2.39	0.61	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0.00
		85	Evaluate design alternatives to determine the appropriate solution	2.45	0.59	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0.00
	Site Design and Engineering: Materials, Methods, Technologies and Applications	86	Design for protection and management of land resources (e.g. land forms, vegetation, habitat, erosion and sedimentation control)	2.13	0.64	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0.00
		87	Design for protection and management of water resources (e.g. storm water, water supply, ground water)	2.05	0.66	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0.00
		88	Design pedestrian, vehicular, and non-motorized circulation systems	2.28	0.62	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0.00
		89	Design elements for construction considering materials, structural issues, and construction technologies	1.94	0.69	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0.00
	Construction Documentation and Administration	90	Prepare construction documents including plans, working drawings, and technical specifications	1.87	0.77	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0.00
		91	Prepare contract documents including agreements, general conditions, and bid documents	1.24	0.82	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0.00
		92	Manage the bidding/tendering process	0.72	0.7	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0.00
		93	Provide construction administration and observation throughout the project	0.83	0.78	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0.00
		94	Conduct project closure including review and distribution of close-out documents	0.67	0.73	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0.00
		95	Perform post construction evaluation	0.91	0.79	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0.00
		96	Perform construction services including design-build	0.67	0.7	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0.00
		97	Prepare management and maintenance manuals and documents	0.81	0.7	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0.00
	Communication	98	Maintain clear communication among collaborators through correspondence and project coordination	1.51	0.9	1	0	0	0	0	0	0	0	0	0	0	0	0		1	0.03
		99	Develop written documentation, such as projects reports, grant proposals, and promotional materials	1.43	0.84	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0.00
		100	Create graphic materials in a variety of media	2.19	0.76	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0.00
		101	Prepare and deliver oral presentations such as meetings, demonstrations, and outreach	2.18	0.72	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0.00
		102	Conduct project and public meetings including preparing of meeting agendas and notes, and facilitation of the meeting	1.34	0.89	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0.00
		103	Review and critique peer work	1.79	0.88	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0.00

LABOK						GIS&T BOK															
				Command of Knowledge at time of Degree		Organizational & Institutional Aspects															
						OI5								OI6							
Knowledge Statement / Competency Division	Domains		Knowledge Statements / Competencies	Mean	Standard Deviation	Spatial Data Infrastructures	Adoption of Standards	Technology Transfer	Spatial Data Sharing Among Organizations	Openness	Balancing Data Access, Security, & Privacy	Implications of Distributed GIS&T	Interorganizational & Vector GI Systems	Federal Agencies & National & International Organizations & Programs	State & Regional Coordinating Bodies	Professional Organizations	Publications	The Geospatial Community	The Geospatial Industry		Sum	Average
COMPETENCIES	Values and Ethics in Practice	104	Manage business practices and organizations	0.81	0.74	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0.00
		105	Manage risk and liability	0.86	0.81	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0.00
		106	Negotiate and prepare client and consultant agreements	0.74	0.79	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0.00
		107	Participate in life-long learning (e.g., a professional organization, continuing education activities)	1.56	1.03	0	0	0	0	0	0	0	0	0	0	0	0	0		1	0.03
		108	Participate in professional and public service activities	1.58	0.83	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0.00
		109	Train, educate and mentor other professionals	0.96	0.91	0	0	0	1	0	0	0	0	0	0	0	0	0		1	0.03
		110	Maintain and promote professional and ethical standards	2.12	0.86	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0.00
					Sum	1	0	0	3	0	1	0	0	1	0	1	0	1	0			
					Average	0.01	0.00	0.00	0.03	0.00	0.01	0.00	0.00	0.01	0.00	0.01	0.00	0.01	0.00			

Appendix F - Matrix Analysis (1b)

LABOK						GIS&T BOK Knowledge Areas										Knowledge Statements and Competency (Horizontal) Sum
Knowledge Statement / Competency Division	Domains		Knowledge Statements / Competencies	Command of Knowledge at time of Degree		AM Sum	CF Sum	CV Sum	DA Sum	DM Sum	DN Sum	GC Sum	GD Sum	GS Sum	OI Sum	
				Mean	Standard Deviation											
KNOWLEDGE STATEMENTS	Landscape Architecture History and Criticism	1	history of landscape architecture and allied professions	2.15	0.69	0	6	2	0	0	0	0	4	0	2	14
		2	historic preservation principles	1.69	0.83	1	3	0	0	0	0	0	0	0	0	4
	Natural and Cultural Systems	3	land information sources	2.55	0.77	3	2	0	0	0	0	0	0	0	0	5
		4	patterns of land use and built form	2.43	0.76	26	2	0	0	0	1	1	3	0	0	33
		5	natural site conditions and ecosystems	2.76	0.66	20	4	0	0	0	0	1	0	0	0	25
		6	social and cultural influences on design	2.19	0.81	4	2	0	1	0	0	0	0	0	0	7
		7	regional hazard design considerations	2.1	0.87	5	0	0	0	0	0	0	0	0	0	5
	Design and Planning Theories and Methodologies	8	creativity and process including design theory and problem –solving strategies	2.83	0.64	4	2	0	3	0	0	1	0	0	0	10
		9	aesthetic principles of design	2.78	0.71	8	1	1	0	0	0	0	0	0	0	10
		10	sensory response	2.33	0.76	5	2	2	0	0	0	0	0	0	0	9
		11	natural factors such as ecological relationships	2.53	0.75	19	2	0	0	0	1	1	0	0	0	23
		12	relationship between human and natural systems such as resource conservation, habitat restoration and creation, and urban ecology	2.36	0.79	15	3	0	0	0	1	0	0	0	0	19
		13	influence of context on design, planning, and management decisions	2.45	0.76	12	1	0	0	0	1	0	0	0	0	14
		14	research methods including data collection, interpretation, and application of results	2.37	0.93	7	3	2	0	0	3	0	0	0	4	19
		15	therapeutic aspects of design	1.66	0.88	2	1	0	0	0	0	0	0	0	0	3
		16	communication and education methods, including sharing knowledge and evaluating outcomes	2.15	0.99	4	1	5	3	0	2	0	0	1	8	24
	Public Policy and Regulation	17	governmental policies and laws that affect the use and development of land	1.8	0.85	1	1	0	1	0	1	0	2	3	0	9
		18	political and regulatory approval processes	1.67	0.92	0	1	0	1	0	0	0	0	2	0	4
		19	land and development economics	1.47	0.83	5	1	0	0	0	0	0	0	2	0	8
		20	emerging trends and issues	1.65	0.83	0	2	0	0	0	0	0	0	2	0	4
	Design, Planning and Management at Various Scales and Applications	21	photogrammetry and remote sensing	1.47	0.84	10	1	6	1	0	3	0	9	0	0	30
		22	visual resource assessment	1.91	0.88	12	2	14	0	0	4	2	8	0	0	42
		23	agricultural and rural landscape analysis	1.68	0.85	15	1	2	1	0	0	1	0	0	0	20
		24	urban landscape	2.17	0.71	13	1	1	0	0	0	0	0	0	0	15
		25	planning principles including regional community and neighborhood planning	2.12	0.76	10	0	1	0	0	1	0	0	0	0	12
		26	conservation of natural resources	2.33	0.8	13	2	0	0	0	0	0	0	0	0	15
		27	historic preservation	1.73	0.76	1	3	0	0	0	0	0	0	0	0	4
		28	ecological planning principles	2.23	0.8	8	2	0	0	0	0	0	0	0	0	10
		29	Water resource management	1.91	0.84	7	3	0	0	0	0	0	0	0	0	10
		30	wetland	1.78	0.83	13	1	0	0	0	0	0	0	0	0	14
		31	floodplain management	1.8	0.86	13	2	0	0	0	0	0	0	0	0	15
		32	land and water reclamation procedures including quarry, mine and landfill reclamation	1.43	0.84	6	2	0	0	0	0	0	0	0	0	8
		33	treatment of toxic materials	1.05	0.86	5	1	0	0	0	0	0	0	0	0	6

LABOK																				
Knowledge Statement / Competency Division	Domains	Knowledge Statements / Competencies		Command of Knowledge at time of Degree		GIS&T BOK Knowledge Areas														Knowledge Statements and Competency (Horizontal) Sum
				Mean	Standard Deviation	AM Sum	CF Sum	CV Sum	DA Sum	DM Sum	DN Sum	GC Sum	GD Sum	GS Sum	OI Sum					
KNOWLEDGE STATEMENTS	Site Design and Engineering: Materials, Methods, Technologies and Applications	34	design needs for special populations	1.91	0.78	1	1	0	0	0	0	0	0	0	0					2
		35	accessibility regulations	2.28	0.87	2	1	0	0	1	0	0	0	0	0					4
		36	roadway design principles	2.15	0.83	17	0	1	0	1	0	0	0	0	0					19
		37	elements of vehicular and pedestrian circulation systems and their design requirements	2.57	0.72	14	0	0	0	0	0	0	0	0	0					14
		38	landscape maintenance techniques, materials, equipment, and practices	1.93	0.87	1	0	0	0	0	0	0	0	0	0					1
		39	noise attenuation and mitigation techniques	1.66	0.82	2	0	0	0	0	0	0	0	0	0					2
		40	sustainable construction practices	1.82	0.84	4	0	0	0	0	0	0	0	0	0					4
		41	construction equipment and technologies	1.76	0.87	1	0	0	0	0	0	0	0	0	0					1
		42	grading, drainage and stormwater treatment	2.78	0.57	10	0	2	0	0	0	0	0	0	0					12
		43	biofiltration and other alternative drainage methods	1.91	0.84	4	0	1	0	0	0	1	0	0	0					6
		44	erosion and sedimentation control	2.28	0.82	6	0	1	0	0	0	0	0	0	0					7
		45	utility systems	1.77	0.77	9	0	1	0	0	0	1	0	1	0					12
		46	Irrigation systems	1.75	0.88	8	0	1	0	0	0	1	0	0	0					10
		47	lighting systems	1.7	0.79	8	0	1	0	0	0	1	0	0	0					10
		48	structural considerations	2.06	0.82	3	0	1	0	0	0	0	0	0	0					4
	Construction Documentation and Administration	49	quality control procedures for construction, such as delivery, storage, testing, etc.	1.27	0.87	3	0	0	0	0	0	0	0	0	0					3
		50	sequencing of design, approval, permitting, and construction activities	1.68	0.92	0	0	0	0	0	0	0	0	0	0					0
		51	the life-cycle cost-analysis process	1.32	0.86	0	0	0	0	0	0	0	0	1	0					1
		52	geographic coordinate systems and layout techniques and conventions	1.9	0.9	2	2	9	0	2	4	2	17	0	0					38
		53	specification types and components for a project	1.89	0.83	0	0	0	0	0	0	0	0	0	0					0
		54	general and supplemental conditions, special provisions, and technical specifications and their organizations	1.64	0.88	0	0	0	0	0	0	0	0	0	0					0
		55	construction administration and details	1.73	0.92	0	0	0	0	0	0	0	0	0	0					0
		56	basic construction law	1.48	0.84	0	1	0	0	0	0	0	0	1	0					2
		57	construction contracts	1.55	0.88	0	1	0	0	0	0	0	0	1	0					2
	Communication	58	determination of user values such as focus groups and surveys	1.52	0.83	0	0	1	1	0	0	0	0	0	0					2
		59	consensus and team building	1.74	0.91	0	0	0	0	0	0	0	0	0	0					0
		60	techniques for conducting meetings	1.59	0.97	0	0	0	0	0	0	0	0	0	0					0
		61	the roles of visual communication, including photographic and video documentation	2.25	0.85	3	0	14	1	4	0	1	1	2	0					26
		62	graphic presentation techniques, systems and symbols	2.71	0.73	6	1	16	4	4	1	3	17	1	2					55
		63	interpretive methods and techniques such as information displays and brochures	1.82	0.98	3	1	2	0	0	0	0	0	0	0					6
		64	public relations, outreach, and image development	1.49	0.97	0	1	0	0	0	0	0	0	1	0					2
	Values and Ethics in Practice	65	environmental ethics	2.08	0.82	2	1	0	0	0	0	0	0	0	0					3
		66	social responsibility in design	2.1	0.78	0	1	0	0	0	0	0	0	1	0					2
		67	organizational management principles such as leadership principles and landscape architect career cycle	1.61	0.93	0	0	0	0	0	0	0	0	1	0					1
		68	resolving moral and ethical dilemmas	1.89	0.93	0	1	0	0	0	0	0	0	1	0					2

LABOK						GIS&T BOK Knowledge Areas										Knowledge Statements and Competency (Horizontal) Sum
Knowledge Statement / Competency Division	Domains		Knowledge Statements / Competencies	Command of Knowledge at time of Degree		AM Sum	CF Sum	CV Sum	DA Sum	DM Sum	DN Sum	GC Sum	GD Sum	GS Sum	OI Sum	
				Mean	Standard Deviation											
COMPETENCIES	Landscape Architecture History & Criticism	69	Develop an understanding of design as exemplified by historically significant works of landscape architecture, urban planning, civic design, and architecture	2.02	0.73	3	0	0	0	0	0	0	0	0	0	3
		70	Examine economic, political, social, ecological and esthetic relationships and their influence on the development of the profession of landscape architecture	1.65	0.78	4	1	0	1	0	0	0	0	0	0	6
		71	Demonstrate an understanding of the evolution of landscape architecture as an art and a profession through knowledge of its terminology,literature, personalities, and concepts	1.85	0.76	1	0	0	0	0	0	0	0	0	0	1
		72	Demonstrate the ability to critique prior work and understand the relevance in addressing current issues and problems	1.89	0.74	0	0	0	0	0	0	0	0	0	0	0
		73	Develop an ability to synthesize and make connections between aspects of landscape architecture and disciplines outside of landscape architecture	1.98	0.73	4	2	1	0	0	0	0	0	1	1	9
	Natural & Cultural Ststems	74	Conduct field investigations to identify significant natural and cultural features, characteristics, and systems	2.06	0.74	13	0	0	0	0	0	0	0	0	0	13
		75	Perform quantitative analyses to evaluate the interactions of natural and cultural features, characteristics, and systems	1.64	0.78	9	1	0	0	0	0	0	0	0	0	10
		76	Perform qualitative analyses to evaluate the relationship between the natural and cultural features, characteristics, and systems	1.79	0.78	10	1	0	0	0	0	0	0	0	0	11
		77	Predict implications of design, planning, and management proposals on natural cultural systems both within the site and in the larger context	1.88	0.76	8	0	0	1	0	0	0	0	0	0	9
	Public Policy and Regulation	78	Identify and collect regulatory information, applicable data and required approvals governing a project (e.g., relevant laws, codes, and regulations)	1.31	0.74	3	1	0	0	0	0	0	0	2	0	6
		79	Confirm code compliance (e.g. zoning, environment, and accessibility)	1.37	0.81	3	2	0	0	0	0	0	0	1	0	6
		80	Assist in the preparation of ordinances, regulations, covenants, standards, and guidelines	0.77	0.69	2	1	0	0	0	0	0	0	0	0	3
		81	Influence public policies on areas such as growth and land and water management by testifying, lobbying, or preparing written documents for public distribution	0.73	0.75	2	2	0	0	0	1	0	0	2	0	7
	Design, Planning, and Management at Various Scales and Applications	82	Develop a design program based on users' needs and clients' goals and resources	2.13	0.75	2	0	0	0	0	0	0	0	0	0	2
		83	Analyze relationships among design elements by determining opportunities and constraints	2.33	0.62	8	0	0	0	0	0	0	0	0	0	8
		84	Develop conceptual design, planning, and management solutions	2.39	0.61	4	0	0	0	0	0	0	0	0	0	4
		85	Evaluate design alternatives to determine the appropriate solution	2.45	0.59	4	0	0	0	0	0	1	0	0	0	5

LABOK																	
Knowledge Statement / Competency Division	Domains		Knowledge Statements / Competencies	Command of Knowledge at time of Degree		GIS&T BOK Knowledge Areas											Knowledge Statements and Competency (Horizontal) Sum
				Mean	Standard Deviation	AM Sum	CF Sum	CV Sum	DA Sum	DM Sum	DN Sum	GC Sum	GD Sum	GS Sum	OI Sum		
COMPETENCIES	Site Design and Engineering: Materials, Methods, Technologies and Applications	86	Design for protection and management of land resources (e.g. land forms, vegetation, habitat, erosion and sedimentation control)	2.13	0.64	15	3	1	0	0	0	0	0	0	0		19
		87	Design for protection and management of water resources (e.g. storm water, water supply, ground water)	2.05	0.66	11	2	1	0	0	0	0	0	0	0		14
		88	Design pedestrian, vehicular, and non-motorized circulation systems	2.28	0.62	12	0	1	0	1	0	0	0	0	0		14
		89	Design elements for construction considering materials, structural issues, and construction technologies	1.94	0.69	2	0	1	0	0	0	0	0	0	0		3
	Construction Documentation and Administration	90	Prepare construction documents including plans, working drawings, and technical specifications	1.87	0.77	1	0	0	0	0	0	0	0	0	0		1
		91	Prepare contract documents including agreements, general conditions, and bid documents	1.24	0.82	0	0	0	0	0	0	0	0	0	0		0
		92	Manage the bidding/tendering process	0.72	0.7	0	0	0	0	0	0	0	0	0	0		0
		93	Provide construction administration and observation throughout the project	0.83	0.78	0	0	0	0	0	0	0	0	0	0		0
		94	Conduct project closure including review and distribution of close-out documents	0.67	0.73	0	0	0	0	0	0	0	0	0	0		0
		95	Perform post construction evaluation	0.91	0.79	0	0	0	0	0	0	0	0	0	0		0
		96	Perform construction services including design-build	0.67	0.7	0	0	0	0	0	0	0	0	0	0		0
		97	Prepare management and maintenance manuals and documents	0.81	0.7	0	0	0	0	0	0	0	0	0	0		0
	Communication	98	Maintain clear communication among collaborators through correspondence and project coordination	1.51	0.9	0	0	0	0	0	0	0	0	0	1		1
		99	Develop written documentation, such as projects reports, grant proposals, and promotional materials	1.43	0.84	0	0	0	0	0	0	0	0	0	0		0
		100	Create graphic materials in a variety of media	2.19	0.76	3	0	5	4	4	2	1	1	0	0		20
		101	Prepare and deliver oral presentations such as meetings, demonstrations, and outreach	2.18	0.72	0	0	1	0	0	0	0	0	0	0		1
		102	Conduct project and public meetings including preparing of meeting agendas and notes, and facilitation of the meeting	1.34	0.89	0	0	0	0	0	0	0	0	0	0		0
		103	Review and critique peer work	1.79	0.88	0	0	0	0	0	0	0	0	0	0		0
	Values and Ethics in Practice	104	Manage business practices and organizations	0.81	0.74	0	0	0	0	0	0	0	0	1	0		1
		105	Manage risk and liability	0.86	0.81	0	0	0	0	0	0	0	0	1	0		1
		106	Negotiate and prepare client and consultant agreements	0.74	0.79	0	0	0	0	0	0	0	0	0	0		0
		107	Participate in life-long learning (e.g., a professional organization, continuing education activities)	1.56	1.03	0	0	0	0	0	0	0	0	0	1		1
		108	Participate in professional and public service activities	1.58	0.83	0	0	0	0	0	0	0	0	0	0		0
		109	Train, educate and mentor other professionals	0.96	0.91	0	0	0	2	0	0	0	0	1	1		4
		110	Maintain and promote professional and ethical standards	2.12	0.86	0	0	0	0	0	0	0	0	1	0		1
			SUM GIS&T Knowledge Areas			500	89	98	25	17	26	19	62	30	20		887
			# GIS&T topics			59	30	27	32	23	14	40	47	25	32		329

Appendix G - Matrix Synthesis (1c)

LABOK				Command of Knowledge at time of Degree		GIS&T BOK: Analytical Methods													
						AM1		AM2		AM3						AM4			
Knowledge Statement / Competency Division	Domains		Knowledge Statements / Competencies	Mean	Standard Deviation	Academic Foundations	Analytical Approaches	Structured Query & Language	Spatial Queries	Distance & Lengths	Direction	Shape	Area	Proximity & Distance Decay	Adjacency & Connectivity	Buffers	Overlay	Neighborhoods	Map Algebra
KNOWLEDGE STATEMENTS	Landscape Architecture History and Criticism	1	history of landscape architecture and allied professions	2.15	0.69	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		2	historic preservation principles	1.69	0.83	0	0	0	0	0	0	0	0	1	0	0	0	0	0
	Natural and Cultural Systems	3	land information sources	2.55	0.77	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		4	patterns of land use and built form	2.43	0.76	1	1	0	0	0	0	1	0	1	1	1	1	0	0
		5	natural site conditions and ecosystems	2.76	0.66	0	1	0	0	0	1	0	0	0	0	1	1	0	0
		6	social and cultural influences on design	2.19	0.81	0	0	0	0	0	0	0	0	1	0	0	0	0	0
		7	regional hazard design considerations	2.1	0.87	0	0	0	0	0	0	0	0	0	0	1	1	0	0
	Design and Planning Theories and Methodologies	8	creativity and process including design theory and problem –solving strategies	2.83	0.64	0	0	0	0	0	0	0	0	0	0	1	0	0	0
		9	aesthetic principles of design	2.78	0.71	0	0	0	0	1	1	1	1	0	0	1	0	0	1
		10	human factors such as behavior, perception, psychological and sensory response	2.33	0.76	0	0	0	0	0	0	0	0	1	0	1	0	0	0
		11	natural factors such as ecological relationships	2.53	0.75	0	1	0	0	0	0	0	0	0	1	1	0	1	1
		12	relationship between human and natural systems such as resource conservation, habitat restoration and creation, and urban ecology	2.36	0.79	1	0	0	0	0	0	0	0	1	0	1	0	1	0
		13	influence of context on design, planning, and management decisions	2.45	0.76	1	0	0	0	0	1	0	0	1	0	1	0	0	0
		14	research methods including data collection, interpretation, and application of results	2.37	0.93	1	0	0	0	0	0	0	0	0	0	1	0	0	0
		15	therapeutic aspects of design	1.66	0.88	0	0	0	0	0	1	0	0	0	0	1	0	0	0
		16	communication and education methods, including sharing knowledge and evaluating outcomes	2.15	0.99	1	0	1	0	0	0	0	0	0	0	0	0	0	0
	Public Policy and Regulation	17	governmental policies and laws that affect the use and development of land	1.8	0.85	0	0	0	0	0	0	0	0	0	0	1	0	0	0
		18	political and regulatory approval processes	1.67	0.92	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		19	land and development economics	1.47	0.83	0	0	0	0	1	0	0	0	1	0	1	0	0	0
		20	emerging trends and issues	1.65	0.83	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Design, Planning and Management at Various Scales and Applications	21	photogrammetry and remote sensing	1.47	0.84	0	1	0	1	0	1	1	0	0	0	0	0	0	0
		22	visual resource assessment	1.91	0.88	0	1	0	0	1	0	1	0	0	0	0	1	0	0
		23	agricultural and rural landscape analysis	1.68	0.85	0	1	0	0	0	0	1	0	0	0	1	0	0	0
		24	urban landscape	2.17	0.71	0	0	0	0	1	0	1	0	1	0	1	0	1	1
		25	planning principles including regional community and neighborhood planning	2.12	0.76	0	0	0	0	1	0	0	0	1	1	1	0	0	0
		26	conservation of natural resources	2.33	0.8	1	0	0	1	0	0	0	0	0	0	1	0	0	1
		27	historic preservation	1.73	0.76	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		28	ecological planning principles	2.23	0.8	0	0	0	0	0	0	0	0	0	0	1	0	0	1
		29	Water resource management	1.91	0.84	1	0	0	0	0	0	0	0	0	0	0	0	0	1
		30	wetland	1.78	0.83	0	0	0	0	0	0	0	0	0	0	1	0	0	1
		31	floodplain management	1.8	0.86	0	0	0	0	0	0	0	0	0	0	1	0	0	1
		32	land and water reclamation procedures including quarry, mine and landfill reclamation	1.43	0.84	0	0	0	0	0	0	0	0	0	0	0	0	0	1
		33	treatment of toxic materials	1.05	0.86	0	0	0	0	0	0	0	0	0	0	1	0	0	0

LABOK						GIS&T BOK													
						Analytical Methods													
				Command of Knowledge at time of Degree		AM1		AM2		AM3						AM4			
Knowledge Statement / Competency Division	Domains		Knowledge Statements / Competencies	Mean	Standard Deviation	Academic Foundations	Analytical Approaches	Structured Query & Language	Spatial Queries	Distance & Lengths	Direction	Shape	Area	Proximity & Distance Decay	Adjacency & Connectivity	Buffers	Overlay	Neighborhoods	Map Algebra
KNOWLEDGE STATEMENTS	Site Design and Engineering: Materials, Methods, Technologies and Applications	34	design needs for special populations	1.91	0.78	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		35	accessibility regulations	2.28	0.87	0	0	0	0	0	0	0	0	0	1	0	0	0	0
		36	roadway design principles	2.15	0.83	0	0	0	0	1	1	1	1	1	1	1	1	0	0
		37	elements of vehicular and pedestrian circulation systems and their design requirements	2.57	0.72	0	0	0	0	1	1	1	0	1	1	1	0	0	0
		38	landscape maintenance techniques, materials, equipment, and practices	1.93	0.87	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		39	noise attenuation and mitigation techniques	1.66	0.82	0	0	0	0	0	0	0	0	0	0	1	0	0	0
		40	sustainable construction practices	1.82	0.84	0	0	0	0	0	0	0	0	0	0	1	0	0	0
		41	construction equipment and technologies	1.76	0.87	0	0	0	0	1	0	0	0	0	0	0	0	0	0
		42	grading, drainage and stormwater treatment	2.78	0.57	0	0	0	0	1	1	0	1	0	0	1	0	0	0
		43	biofiltration and other alternative drainage methods	1.91	0.84	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		44	erosion and sedimentation control	2.28	0.82	0	0	0	0	0	0	0	0	0	0	1	0	0	0
		45	utility systems	1.77	0.77	0	0	0	1	1	1	0	0	1	0	0	1	0	1
		46	Irrigation systems	1.75	0.88	0	0	0	1	1	1	0	0	1	0	0	1	0	0
		47	lighting systems	1.7	0.79	0	0	0	1	1	1	0	0	1	0	0	1	0	0
		48	structural considerations	2.06	0.82	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Construction Documentation and Administration	49	quality control procedures for construction, such as delivery, storage, testing, etc.	1.27	0.87	0	0	0	0	0	0	0	0	1	1	0	0	0	0
		51	the life-cycle cost-analysis process	1.32	0.86	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		52	geographic coordinate systems and layout techniques and conventions	1.9	0.9	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		56	basic construction law	1.48	0.84	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		57	construction contracts	1.55	0.88	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Communication	58	determination of user values such as focus groups and surveys	1.52	0.83	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		61	the roles of visual communication, including photographic and video documentation	2.25	0.85	0	0	0	0	0	0	0	0	0	0	1	0	0	0
		62	graphic presentation techniques, systems and symbols	2.71	0.73	0	1	0	0	0	1	0	0	0	0	0	0	0	0
		63	interpretive methods and techniques such as information displays and brochures	1.82	0.98	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		64	public relations, outreach, and image development	1.49	0.97	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Values and Ethics in Practice	65	environmental ethics	2.08	0.82	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		66	social responsibility in design	2.1	0.78	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		67	organizational management principles such as leadership principles and landscape architect career cycle	1.61	0.93	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		68	resolving moral and ethical dilemmas	1.89	0.93	0	0	0	0	0	0	0	0	0	0	0	0	0	0

LABOK				Command of Knowledge at time of Degree		GIS&T BOK: Analytical Methods													
						AM1		AM2		AM3						AM4			
Knowledge Statement / Competency Division	Domains		Knowledge Statements / Competencies	Mean	Standard Deviation	Academic Foundations	Analytical Approaches	Structured Query & Language	Spatial Queries	Distance & Lengths	Direction	Shape	Area	Proximity & Distance Decay	Adjacency & Connectivity	Buffers	Overlay	Neighborhoods	Map Algebra
COMPETENCIES	Landscape Architecture History & Criticism	69	Develop an understanding of design as exemplified by historically significant works of landscape architecture, urban planning, civic design, and architecture	2.02	0.73	0	0	0	0	0	0	0	0	0	1	1	0	0	0
		70	Examine economic, political, social, ecological and esthetic relationships and their influence on the development of the profession of landscape architecture	1.65	0.78	0	0	0	0	0	0	0	0	0	0	0	0	1	0
		71	Demonstrate an understanding of the evolution of landscape architecture as an art and a profession through knowledge of its terminology, literature, personalities, and concepts	1.85	0.76	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		73	Develop an ability to synthesize and make connections between aspects of landscape architecture and disciplines outside of landscape architecture	1.98	0.73	0	0	0	0	0	0	0	0	0	1	0	0	0	0
	Natural & Cultural Systems	74	Conduct field investigations to identify significant natural and cultural features, characteristics, and systems	2.06	0.74	1	1	0	1	0	0	0	0	0	0	1	0	0	1
		75	Perform quantitative analyses to evaluate the interactions of natural and cultural features, characteristics, and systems	1.64	0.78	0	0	0	0	0	0	0	0	0	0	0	0	0	1
		76	Perform qualitative analyses to evaluate the relationship between the natural and cultural features, characteristics, and systems	1.79	0.78	0	0	0	0	0	0	0	0	0	0	0	0	0	1
		77	Predict implications of design, planning, and management proposals on natural cultural systems both within the site and in the larger context	1.88	0.76	0	0	0	0	0	0	0	0	1	0	1	0	0	0
	Public Policy and Regulation	78	Identify and collect regulatory information, applicable data and required approvals governing a project (e.g., relevant laws, codes, and regulations)	1.31	0.74	1	0	0	0	1	0	0	0	0	0	0	0	0	0
		79	Confirm code compliance (e.g. zoning, environment, and accessibility)	1.37	0.81	0	0	0	0	1	0	0	0	1	0	0	0	0	0
		80	Assist in the preparation of ordinances, regulations, covenants, standards, and guidelines	0.77	0.69	0	0	0	0	0	0	0	0	0	0	0	1	0	0
		81	Influence public policies on areas such as growth and land and water management by testifying, lobbying, or preparing written documents for public distribution	0.73	0.75	0	0	0	0	0	0	0	0	0	0	0	1	0	0
	Design, Planning, and Management at Various Scales and Applications	82	Develop a design program based on users' needs and clients' goals and resources	2.13	0.75	0	0	0	1	0	0	0	0	0	1	0	0	0	0
		83	Analyze relationships among design elements by determining opportunities and constraints	2.33	0.62	0	0	0	0	0	0	1	0	0	0	0	1	0	1
		84	Develop conceptual design, planning, and management solutions	2.39	0.61	0	0	0	0	0	0	0	0	1	1	0	1	0	0
		85	Evaluate design alternatives to determine the appropriate solution	2.45	0.59	0	0	0	0	1	0	0	0	1	1	0	0	0	0
	Site Design and Engineering: Materials, Methods, Technologies and Applications	86	Design for protection and management of land resources (e.g. land forms, vegetation, habitat, erosion and sedimentation control)	2.13	0.64	0	0	0	1	0	0	0	0	0	1	1	1	0	1
		87	Design for protection and management of water resources (e.g. storm water, water supply, ground water)	2.05	0.66	0	0	0	0	0	0	0	0	0	1	1	1	0	1
		88	Design pedestrian, vehicular, and non-motorized circulation systems	2.28	0.62	0	0	0	0	1	1	0	0	1	1	0	1	0	1
		89	Design elements for construction considering materials, structural issues, and construction technologies	1.94	0.69	0	0	0	0	0	0	0	0	0	0	0	1	0	0
	Construction Documentation and Administration	90	Prepare construction documents including plans, working drawings, and technical specifications	1.87	0.77	0	0	0	0	1	0	0	0	0	0	0	0	0	0

LABOK				Command of Knowledge at time of Degree		GIS&T BOK													
						Analytical Methods													
						AM1		AM2		AM3						AM4			
Knowledge Statement / Competency Division	Domains		Knowledge Statements / Competencies	Mean	Standard Deviation	Academic Foundations	Analytical Approaches	Structured Query & Language	Spatial Queries	Distance & Lengths	Direction	Shape	Area	Proximity & Distance Decay	Adjacency & Connectivity	Buffers	Overlay	Neighborhoods	Map Algebra
COMPETENCIES	Communication	98	Maintain clear communication among collaborators through correspondence and project coordination	1.51	0.9	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		100	Create graphic materials in a variety of media	2.19	0.76	0	0	0	0	0	0	0	0	0	0	0	1	0	0
		101	Prepare and deliver oral presentations such as meetings, demonstrations, and outreach	2.18	0.72	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Values and Ethics in Practice	104	Manage business practices and organizations	0.81	0.74	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		105	Manage risk and liability	0.86	0.81	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		107	Participate in life-long learning (e.g., a professional organization, continuing education activities)	1.56	1.03	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		109	Train, educate and mentor other professionals	0.96	0.91	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		110	Maintain and promote professional and ethical standards	2.12	0.86	0	0	0	0	0	0	0	0	0	0	0	0	0	0
					Sum	9	8	1	8	17	13	9	3	20	15	33	17	4	17
					Average	0.10	0.09	0.01	0.09	0.19	0.14	0.10	0.03	0.22	0.16	0.36	0.19	0.04	0.19

LABOK				Command of Knowledge at time of Degree		GIS&T BOK: Analytical Methods																
						AM5							AM6				AM7	AM8				
Knowledge Statement / Competency Division	Domains		Knowledge Statements / Competencies	Mean	Standard Deviation	Point Pattern Analysis	Spatial Cluster Analysis	Spatial Interaction	Analyzing Multidimensional	Cartographic Modeling	Multi-criteria Evaluation	Spatial Process Models	Calculating Surface Derivatives	Interpretation of Surfaces	Surface Features	Indivisibility	Graphical Methods	Spatial Sampling for Statistical Analysis	Principles of Semi-variogram Construction	Semi-variogram Modeling	Principles of Kriging	Kriging Variants
KNOWLEDGE STATEMENTS	Landscape Architecture History and Criticism	1	history of landscape architecture and allied professions	2.15	0.69	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		2	historic preservation principles	1.69	0.83	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Natural and Cultural Systems	3	land information sources	2.55	0.77	0	0	0	0	0	0	0	1	1	1	0	0	0	0	0	0	0
		4	patterns of land use and built form	2.43	0.76	1	1	1	1	0	0	1	1	1	1	0	1	1	0	0	1	1
		5	natural site conditions and ecosystems	2.76	0.66	0	0	1	1	0	1	1	1	1	1	0	1	1	1	0	1	1
		6	social and cultural influences on design	2.19	0.81	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		7	regional hazard design considerations	2.1	0.87	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	0	0
	Design and Planning Theories and Methodologies	8	creativity and process including design theory and problem –solving strategies	2.83	0.64	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0
		9	aesthetic principles of design	2.78	0.71	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0
		10	human factors such as behavior, perception, psychological and sensory response	2.33	0.76	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0
		11	natural factors such as ecological relationships	2.53	0.75	0	1	1	0	0	0	1	1	1	1	0	0	1	0	0	1	1
		12	relationship between human and natural systems such as resource conservation, habitat restoration and creation, and urban ecology	2.36	0.79	0	0	1	1	0	0	1	1	0	0	0	0	1	1	0	0	0
		13	influence of context on design, planning, and management decisions	2.45	0.76	0	0	1	0	0	0	1	1	0	0	0	0	1	1	0	0	0
		14	research methods including data collection, interpretation, and application of results	2.37	0.93	0	0	0	0	0	0	0	1	0	0	0	1	1	0	0	0	0
		15	therapeutic aspects of design	1.66	0.88	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		16	communication and education methods, including sharing knowledge and evaluating outcomes	2.15	0.99	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0
	Public Policy and Regulation	17	governmental policies and laws that affect the use and development of land	1.8	0.85	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		18	political and regulatory approval processes	1.67	0.92	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		19	land and development economics	1.47	0.83	0	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0	0
		20	emerging trends and issues	1.65	0.83	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Design, Planning and Management at Various Scales and Applications	21	photogrammetry and remote sensing	1.47	0.84	0	0	0	1	0	0	0	0	0	0	1	0	0	0	0	1	1
		22	visual resource assessment	1.91	0.88	0	0	0	0	1	0	0	1	1	0	1	1	0	0	0	1	1
		23	agricultural and rural landscape analysis	1.68	0.85	0	0	1	1	0	0	1	1	1	1	1	1	0	0	0	1	1
		24	urban landscape	2.17	0.71	1	0	1	0	0	0	1	1	1	0	1	0	0	0	0	0	0
		25	planning principles including regional community and neighborhood planning	2.12	0.76	0	0	1	0	0	1	0	1	1	0	0	0	0	0	0	0	0
		26	conservation of natural resources	2.33	0.8	0	0	1	0	1	1	0	1	1	1	1	0	0	0	0	1	1
		27	historic preservation	1.73	0.76	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0
		28	ecological planning principles	2.23	0.8	0	0	1	0	1	1	0	1	1	1	0	0	0	0	0	0	0
		29	Water resource management	1.91	0.84	0	0	1	0	0	1	0	1	1	1	0	0	0	0	0	0	0
		30	wetland	1.78	0.83	0	0	1	0	0	1	0	1	1	1	0	0	1	0	0	1	1
		31	floodplain management	1.8	0.86	0	0	1	0	0	1	0	1	1	1	0	0	1	0	0	1	1
		32	land and water reclamation procedures including quarry, mine and landfill reclamation	1.43	0.84	0	0	1	0	0	0	0	1	1	1	0	0	1	0	0	0	0
		33	treatment of toxic materials	1.05	0.86	0	0	1	0	0	1	0	1	1	0	0	0	0	0	0	0	0

LABOK						GIS&T BOK																
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Knowledge Statement / Competency Division	Domains		Knowledge Statements / Competencies	Mean	Standard Deviation	Point Pattern Analysis	Spatial Cluster Analysis	Spatial Interaction	Analyzing Multidimensional	Cartographic Modeling	Multi-criteria Evaluation	Spatial Process Models	Calculating Surface Derivatives	Interpretation of Surfaces	Surface Features	Indivisibility	Graphical Methods	Spatial Sampling for Statistical Analysis	Principles of Semi-variogram Construction	Semi-variogram Modeling	Principles of Kriging	Kriging Variants
KNOWLEDGE STATEMENTS	Site Design and Engineering: Materials, Methods, Technologies and Applications	34	design needs for special populations	1.91	0.78	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0
		35	accessibility regulations	2.28	0.87	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		36	roadway design principles	2.15	0.83	0	0	1	0	0	0	0	1	1	1	0	0	0	0	0	0	0
		37	elements of vehicular and pedestrian circulation systems and their design requirements	2.57	0.72	0	0	1	0	0	0	0	1	1	0	0	0	0	0	0	0	0
		38	landscape maintenance techniques, materials, equipment, and practices	1.93	0.87	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0
		39	noise attenuation and mitigation techniques	1.66	0.82	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		40	sustainable construction practices	1.82	0.84	0	0	0	0	0	0	0	1	1	0	1	0	0	0	0	0	0
		41	construction equipment and technologies	1.76	0.87	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		42	grading, drainage and stormwater treatment	2.78	0.57	0	0	0	0	0	0	0	1	1	1	1	0	0	0	0	0	0
		43	biofiltration and other alternative drainage methods	1.91	0.84	0	0	0	0	0	0	0	1	1	1	0	0	0	0	0	0	0
		44	erosion and sedimentation control	2.28	0.82	0	0	0	0	0	0	0	1	1	1	0	0	0	0	0	0	0
		45	utility systems	1.77	0.77	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0
		46	Irrigation systems	1.75	0.88	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0
		47	lighting systems	1.7	0.79	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0
		48	structural considerations	2.06	0.82	0	0	0	0	0	0	0	1	1	0	1	0	0	0	0	0	0
	Construction Documentation and Administration	49	quality control procedures for construction, such as delivery, storage, testing, etc.	1.27	0.87	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		51	the life-cycle cost-analysis process	1.32	0.86	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		52	geographic coordinate systems and layout techniques and conventions	1.9	0.9	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0
		56	basic construction law	1.48	0.84	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		57	construction contracts	1.55	0.88	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Communication	58	determination of user values such as focus groups and surveys	1.52	0.83	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		61	the roles of visual communication, including photographic and video documentation	2.25	0.85	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0
		62	graphic presentation techniques, systems and symbols	2.71	0.73	0	0	0	0	0	0	0	0	0	0	1	1	1	0	0	0	0
		63	interpretive methods and techniques such as information displays and brochures	1.82	0.98	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0
		64	public relations, outreach, and image development	1.49	0.97	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Values and Ethics in Practice	65	environmental ethics	2.08	0.82	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0
		66	social responsibility in design	2.1	0.78	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		67	organizational management principles such as leadership principles and landscape architect career cycle	1.61	0.93	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		68	resolving moral and ethical dilemmas	1.89	0.93	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

LABOK						GIS&T BOK																	
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						AM5							AM6				AM7	AM8					
Knowledge Statement / Competency Division	Domains		Knowledge Statements / Competencies	Mean	Standard Deviation	Point Pattern Analysis	Spatial Cluster Analysis	Spatial Interaction	Analyzing Multidimensional	Cartographic Modeling	Multi-criteria Evaluation	Spatial Process Models	Calculating Surface Derivatives	Interpretation of Surfaces	Surface Features	Indivisibility	Graphical Methods	Spatial Sampling for Statistical Analysis	Principles of Semi-variogram Construction	Semi-variogram Modeling	Principles of Kriging	Kriging Variants
COMPETENCIES	Landscape Architecture History & Criticism	69	Develop an understanding of design as exemplified by historically significant works of landscape architecture, urban planning, civic design, and architecture	2.02	0.73	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		70	Examine economic, political, social, ecological and esthetic relationships and their influence on the development of the profession of landscape architecture	1.65	0.78	0	0	1	0	0	1	0	1	0	0	0	0	0	0	0	0	0	0
		71	Demonstrate an understanding of the evolution of landscape architecture as an art and a profession through knowledge of its terminology, literature, personalities, and concepts	1.85	0.76	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0
		73	Develop an ability to synthesize and make connections between aspects of landscape architecture and disciplines outside of landscape architecture	1.98	0.73	0	0	0	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0
	Natural & Cultural Systems	74	Conduct field investigations to identify significant natural and cultural features, characteristics, and systems	2.06	0.74	0	0	1	0	0	0	0	1	0	1	1	0	1	0	0	0	0	0
		75	Perform quantitative analyses to evaluate the interactions of natural and cultural features, characteristics, and systems	1.64	0.78	0	0	1	0	0	1	0	1	1	1	1	1	0	0	0	0	0	0
		76	Perform qualitative analyses to evaluate the relationship between the natural and cultural features, characteristics, and systems	1.79	0.78	0	0	1	0	0	1	0	1	1	1	1	1	1	0	0	0	0	0
		77	Predict implications of design, planning, and management proposals on natural cultural systems both within the site and in the larger context	1.88	0.76	0	0	0	0	0	0	0	1	0	1	1	1	1	0	0	0	0	0
	Public Policy and Regulation	78	Identify and collect regulatory information, applicable data and required approvals governing a project (e.g., relevant laws, codes, and regulations)	1.31	0.74	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		79	Confirm code compliance (e.g. zoning, environment, and accessibility)	1.37	0.81	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0
		80	Assist in the preparation of ordinances, regulations, covenants, standards, and guidelines	0.77	0.69	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0
		81	Influence public policies on areas such as growth and land and water management by testifying, lobbying, or preparing written documents for public distribution	0.73	0.75	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0
	Design, Planning, and Management at Various Scales and Applications	82	Develop a design program based on users' needs and clients' goals and resources	2.13	0.75	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		83	Analyze relationships among design elements by determining opportunities and constraints	2.33	0.62	0	0	1	0	0	0	0	1	0	0	0	1	0	0	0	0	0	0
		84	Develop conceptual design, planning, and management solutions	2.39	0.61	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0
		85	Evaluate design alternatives to determine the appropriate solution	2.45	0.59	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0
	Site Design and Engineering: Materials, Methods, Technologies and Applications	86	Design for protection and management of land resources (e.g. land forms, vegetation, habitat, erosion and sedimentation control)	2.13	0.64	0	0	1	0	0	1	0	1	1	1	1	0	1	0	0	0	0	0
		87	Design for protection and management of water resources (e.g. storm water, water supply, ground water)	2.05	0.66	0	0	1	0	0	0	0	1	0	1	1	0	1	0	0	0	0	0
		88	Design pedestrian, vehicular, and non-motorized circulation systems	2.28	0.62	0	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0	0	0
		89	Design elements for construction considering materials, structural issues, and construction technologies	1.94	0.69	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0
	Construction Documentation and Administration	90	Prepare construction documents including plans, working drawings, and technical specifications	1.87	0.77	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

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						AM5							AM6				AM7	AM8					
Knowledge Statement / Competency Division	Domains		Knowledge Statements / Competencies	Mean	Standard Deviation	Point Pattern Analysis	Spatial Cluster Analysis	Spatial Interaction	Analyzing Multidimensional	Cartographic Modeling	Multi-criteria Evaluation	Spatial Process Models	Calculating Surface Derivatives	Interpretation of Surfaces	Surface Features	Indivisibility	Graphical Methods	Spatial Sampling for Statistical Analysis	Principles of Semi-variogram Construction	Semi-variogram Modeling	Principles of Kriging	Kriging Variants
COMPETENCIES	Communication	98	Maintain clear communication among collaborators through correspondence and project coordination	1.51	0.9	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		~~100~~	~~Create graphic materials in a variety of media~~	~~2.19~~	~~0.76~~	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0
		101	Prepare and deliver oral presentations such as meetings, demonstrations, and outreach	2.18	0.72	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Values and Ethics in Practice	104	Manage business practices and organizations	0.81	0.74	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		105	Manage risk and liability	0.86	0.81	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		107	Participate in life-long learning (e.g., a professional organization, continuing education activities)	1.56	1.03	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		109	Train, educate and mentor other professionals	0.96	0.91	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		110	Maintain and promote professional and ethical standards	2.12	0.86	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
					Sum	2	2	27	5	6	13	9	50	29	22	19	14	17	3	0	9	9	
					Average	0.02	0.02	0.30	0.05	0.07	0.14	0.10	0.55	0.32	0.24	0.21	0.15	0.19	0.03	0.00	0.10	0.10	

LABOK						GIS&T BOK								
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						AM10		AM11						AM12
Knowledge Statement / Competency Division	Domains		Knowledge Statements / Competencies	Mean	Standard Deviation	Knowledge Discovery	Pattern Recognition & Matching	Networks Defined	Graphic Theoretic (descriptive) Measures	Least-cost (shortest) Path	Classic Transportation Problem	Other Classic Network Problems	Accessibility Modeling	Operations Research Modeling & Location Modeling Principles
KNOWLEDGE STATEMENTS	Landscape Architecture History and Criticism	1	history of landscape architecture and allied professions	2.15	0.69	0	0	0	0	0	0	0	0	0
		2	historic preservation principles	1.69	0.83	0	0	0	0	0	0	0	0	0
	Natural and Cultural Systems	3	land information sources	2.55	0.77	0	0	0	0	0	0	0	0	0
		4	patterns of land use and built form	2.43	0.76	0	1	1	1	0	1	1	1	1
		5	natural site conditions and ecosystems	2.76	0.66	0	1	1	1	0	0	0	1	0
		6	social and cultural influences on design	2.19	0.81	0	0	0	0	0	1	0	1	0
		7	regional hazard design considerations	2.1	0.87	0	1	0	0	0	0	0	0	0
	Design and Planning Theories and Methodologies	8	creativity and process including design theory and problem –solving strategies	2.83	0.64	1	0	0	0	0	0	0	1	0
		9	aesthetic principles of design	2.78	0.71	0	0	0	0	0	0	0	0	0
		10	human factors such as behavior, perception, psychological and sensory response	2.33	0.76	0	0	0	0	0	0	0	1	0
		11	natural factors such as ecological relationships	2.53	0.75	0	1	1	1	0	0	1	1	0
		12	relationship between human and natural systems such as resource conservation, habitat restoration and creation, and urban ecology	2.36	0.79	0	0	1	1	0	0	1	1	1
		13	influence of context on design, planning, and management decisions	2.45	0.76	0	0	0	0	0	1	0	1	1
		14	research methods including data collection, interpretation, and application of results	2.37	0.93	1	0	0	0	1	0	0	0	0
		15	therapeutic aspects of design	1.66	0.88	0	0	0	0	0	0	0	0	0
		16	communication and education methods, including sharing knowledge and evaluating outcomes	2.15	0.99	1	0	0	0	0	0	0	0	0
	Public Policy and Regulation	17	governmental policies and laws that affect the use and development of land	1.8	0.85	0	0	0	0	0	0	0	0	0
		18	political and regulatory approval processes	1.67	0.92	0	0	0	0	0	0	0	0	0
		19	land and development economics	1.47	0.83	0	0	0	0	0	0	0	0	0
		20	emerging trends and issues	1.65	0.83	0	0	0	0	0	0	0	0	0
	Design, Planning and Management at Various Scales and Applications	21	photogrammetry and remote sensing	1.47	0.84	0	0	0	0	1	0	0	0	1
		22	visual resource assessment	1.91	0.88	0	0	0	0	1	0	0	0	0
		23	agricultural and rural landscape analysis	1.68	0.85	0	0	0	0	1	0	0	0	0
		24	urban landscape	2.17	0.71	0	0	0	0	0	1	0	0	0
		25	planning principles including regional community and neighborhood planning	2.12	0.76	0	0	1	1	0	0	0	0	0
		26	conservation of natural resources	2.33	0.8	0	0	0	0	0	0	0	0	0
		27	historic preservation	1.73	0.76	0	0	0	0	0	0	0	0	0
		28	ecological planning principles	2.23	0.8	0	0	0	0	0	0	0	0	0
		29	Water resource management	1.91	0.84	0	0	0	0	0	0	0	0	0
		30	wetland	1.78	0.83	0	1	1	1	0	0	0	0	0
		31	floodplain management	1.8	0.86	0	1	1	1	0	0	0	0	0
		32	land and water reclamation procedures including quarry, mine and landfill reclamation	1.43	0.84	0	0	0	0	0	0	0	0	0
		33	treatment of toxic materials	1.05	0.86	0	0	0	0	0	0	0	0	0

LABOK						GIS&T BOK								
						Analytical Methods								
				Command of Knowledge at time of Degree		AM10		AM11						AM12
Knowledge Statement / Competency Division	Domains		Knowledge Statements / Competencies	Mean	Standard Deviation	Knowledge Discovery	Pattern Recognition & Matching	Networks Defined	Graphic Theoretic (descriptive) Measures	Least-cost (shortest) Path	Classic Transportation Problem	Other Classic Network Problems	Accessibility Modeling	Operations Research Modeling & Location Modeling Principles
KNOWLEDGE STATEMENTS	Site Design and Engineering: Materials, Methods, Technologies and Applications	34	design needs for special populations	1.91	0.78	0	0	0	0	0	0	0	0	0
		35	accessibility regulations	2.28	0.87	0	0	0	0	0	0	0	1	0
		36	roadway design principles	2.15	0.83	0	0	1	1	0	1	1	1	0
		37	elements of vehicular and pedestrian circulation systems and their design requirements	2.57	0.72	0	0	1	1	0	1	1	1	0
		38	landscape maintenance techniques, materials, equipment, and practices	1.93	0.87	0	0	0	0	0	0	0	0	0
		39	noise attenuation and mitigation techniques	1.66	0.82	0	0	0	0	0	0	0	0	0
		40	sustainable construction practices	1.82	0.84	0	0	0	0	0	0	0	0	0
		41	construction equipment and technologies	1.76	0.87	0	0	0	0	0	0	0	0	0
		42	grading, drainage and stormwater treatment	2.78	0.57	0	0	1	1	0	0	0	0	0
		43	biofiltration and other alternative drainage methods	1.91	0.84	0	0	0	0	0	0	0	1	0
		44	erosion and sedimentation control	2.28	0.82	0	0	1	1	0	0	0	0	0
		45	utility systems	1.77	0.77	0	0	0	0	0	0	1	0	0
		46	Irrigation systems	1.75	0.88	0	0	0	0	0	0	1	0	0
		47	lighting systems	1.7	0.79	0	0	0	0	0	0	1	0	0
		48	structural considerations	2.06	0.82	0	0	0	0	0	0	0	0	0
	Construction Documentation and Administration	49	quality control procedures for construction, such as delivery, storage, testing, etc.	1.27	0.87	0	0	0	0	0	1	0	0	0
		51	the life-cycle cost-analysis process	1.32	0.86	0	0	0	0	0	0	0	0	0
		52	geographic coordinate systems and layout techniques and conventions	1.9	0.9	0	0	0	0	1	0	0	0	0
		56	basic construction law	1.48	0.84	0	0	0	0	0	0	0	0	0
		57	construction contracts	1.55	0.88	0	0	0	0	0	0	0	0	0
	Communication	58	determination of user values such as focus groups and surveys	1.52	0.83	0	0	0	0	0	0	0	0	0
		61	the roles of visual communication, including photographic and video documentation	2.25	0.85	0	0	0	0	1	0	0	0	0
		62	graphic presentation techniques, systems and symbols	2.71	0.73	0	0	0	0	1	0	0	0	0
		63	interpretive methods and techniques such as information displays and brochures	1.82	0.98	0	0	0	0	1	0	0	0	0
		64	public relations, outreach, and image development	1.49	0.97	0	0	0	0	0	0	0	0	0
	Values and Ethics in Practice	65	environmental ethics	2.08	0.82	0	0	0	0	0	0	0	0	0
		66	social responsibility in design	2.1	0.78	0	0	0	0	0	0	0	0	0
		67	organizational management principles such as leadership principles and landscape architect career cycle	1.61	0.93	0	0	0	0	0	0	0	0	0
		68	resolving moral and ethical dilemmas	1.89	0.93	0	0	0	0	0	0	0	0	0

LABOK						GIS&T BOK								
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Knowledge Statement / Competency Division	Domains		Knowledge Statements / Competencies	Mean	Standard Deviation	Knowledge Discovery	Pattern Recognition & Matching	Networks Defined	Graphic Theoretic (descriptive) Measures	Least-cost (shortest) Path	Classic Transportation Problem	Other Classic Network Problems	Accessibility Modeling	Operations Research Modeling & Location Modeling Principles
COMPETENCIES	Landscape Architecture History & Criticism	69	Develop an understanding of design as exemplified by historically significant works of landscape architecture, urban planning, civic design, and architecture	2.02	0.73	0	0	0	0	0	0	0	0	0
		70	Examine economic, political, social, ecological and esthetic relationships and their influence on the development of the profession of landscape architecture	1.65	0.78	0	0	0	0	0	0	0	0	0
		71	Demonstrate an understanding of the evolution of landscape architecture as an art and a profession through knowledge of its terminology, literature, personalities, and concepts	1.85	0.76	0	0	0	0	0	0	0	0	0
		73	Develop an ability to synthesize and make connections between aspects of landscape architecture and disciplines outside of landscape architecture	1.98	0.73	0	0	0	0	0	0	0	1	0
	Natural & Cultural Systems	74	Conduct field investigations to identify significant natural and cultural features, characteristics, and systems	2.06	0.74	0	1	1	1	0	0	0	0	0
		75	Perform quantitative analyses to evaluate the interactions of natural and cultural features, characteristics, and systems	1.64	0.78	0	1	0	0	0	0	0	0	0
		76	Perform qualitative analyses to evaluate the relationship between the natural and cultural features, characteristics, and systems	1.79	0.78	0	1	0	0	0	0	0	0	0
		77	Predict implications of design, planning, and management proposals on natural cultural systems both within the site and in the larger context	1.88	0.76	0	1	0	0	0	0	0	0	0
	Public Policy and Regulation	78	Identify and collect regulatory information, applicable data and required approvals governing a project (e.g., relevant laws, codes, and regulations)	1.31	0.74	1	0	0	0	0	0	0	0	0
		79	Confirm code compliance (e.g. zoning, environment, and accessibility)	1.37	0.81	0	0	0	0	0	0	0	0	0
		80	Assist in the preparation of ordinances, regulations, covenants, standards, and guidelines	0.77	0.69	0	0	0	0	0	0	0	0	0
		81	Influence public policies on areas such as growth and land and water management by testifying, lobbying, or preparing written documents for public distribution	0.73	0.75	0	0	0	0	0	0	0	0	0
	Design, Planning, and Management at Various Scales and Applications	82	Develop a design program based on users' needs and clients' goals and resources	2.13	0.75	0	0	0	0	0	0	0	0	0
		83	Analyze relationships among design elements by determining opportunities and constraints	2.33	0.62	0	0	0	0	0	0	1	1	0
		84	Develop conceptual design, planning, and management solutions	2.39	0.61	0	0	0	0	0	0	0	0	0
		85	Evaluate design alternatives to determine the appropriate solution	2.45	0.59	0	0	0	0	0	0	0	0	0
	Site Design and Engineering: Materials, Methods, Technologies and Applications	86	Design for protection and management of land resources (e.g. land forms, vegetation, habitat, erosion and sedimentation control)	2.13	0.64	0	0	1	1	0	0	0	1	0
		87	Design for protection and management of water resources (e.g. storm water, water supply, ground water)	2.05	0.66	0	0	1	1	0	0	0	0	0
		88	Design pedestrian, vehicular, and non-motorized circulation systems	2.28	0.62	0	0	1	1	0	1	0	1	0
		89	Design elements for construction considering materials, structural issues, and construction technologies	1.94	0.69	0	0	0	0	0	0	0	0	0
	Construction Documentation and Administration	90	Prepare construction documents including plans, working drawings, and technical specifications	1.87	0.77	0	0	0	0	0	0	0	0	0

LABOK						GIS&T BOK								
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						AM10		AM11						AM12
Knowledge Statement / Competency Division	Domains		Knowledge Statements / Competencies	Mean	Standard Deviation	Knowledge Discovery	Pattern Recognition & Matching	Networks Defined	Graphic Theoretic (descriptive) Measures	Least-cost (shortest) Path	Classic Transportation Problem	Other Classic Network Problems	Accessibility Modeling	Operations Research Modeling & Location Modeling Principles
COMPETENCIES	Communication	98	Maintain clear communication among collaborators through correspondence and project coordination	1.51	0.9	0	0	0	0	0	0	0	0	0
		~~100~~	~~Create graphic materials in a variety of media~~	~~2.19~~	~~0.76~~	0	0	0	0	1	0	0	0	0
		101	Prepare and deliver oral presentations such as meetings, demonstrations, and outreach	2.18	0.72	0	0	0	0	0	0	0	0	0
	Values and Ethics in Practice	104	Manage business practices and organizations	0.81	0.74	0	0	0	0	0	0	0	0	0
		105	Manage risk and liability	0.86	0.81	0	0	0	0	0	0	0	0	0
		107	Participate in life-long learning (e.g., a professional organization, continuing education activities)	1.56	1.03	0	0	0	0	0	0	0	0	0
		109	Train, educate and mentor other professionals	0.96	0.91	0	0	0	0	0	0	0	0	0
		110	Maintain and promote professional and ethical standards	2.12	0.86	0	0	0	0	0	0	0	0	0
					Sum	4	10	15	15	9	8	9	16	4
					Average	0.04	0.11	0.16	0.16	0.10	0.09	0.10	0.18	0.04

LABOK				Command of Knowledge at time of Degree		GIS&T BOK														
						Conceptual Foundations														
						CF1			CF2					CF3	CF4			CF5		
Knowledge Statement / Competency Division	Domains		Knowledge Statements / Competencies	Mean	Standard Deviation	Metaphysics & Ontology	Epistemology	Philosophical Perspectives	From Concepts to Data	Place & Landscape	Common-sense Geographies	Cultural Influences	Political Influences	Properties	Events & Processes	Fields in Space & Time	Integrated Models	Spatial Distribution	Region	Spatial Integration
KNOWLEDGE STATEMENTS	Landscape Architecture History and Criticism	1	history of landscape architecture and allied professions	2.15	0.69	1	0	1	0	1	0	1	0	0	1	0	0	0	0	1
		2	historic preservation principles	1.69	0.83	0	0	0	0	1	0	1	1	0	0	0	0	0	0	0
	Natural and Cultural Systems	3	land information sources	2.55	0.77	0	0	0	0	0	0	0	0	0	0	0	1	0	1	0
		4	patterns of land use and built form	2.43	0.76	0	0	0	0	0	0	0	0	0	0	0	1	0	1	0
		5	natural site conditions and ecosystems	2.76	0.66	0	0	0	0	0	0	0	0	0	0	1	1	1	1	0
		6	social and cultural influences on design	2.19	0.81	0	0	0	0	1	0	0	0	0	0	0	0	0	1	0
		7	regional hazard design considerations	2.1	0.87	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Design and Planning Theories and Methodologies	8	creativity and process including design theory and problem –solving strategies	2.83	0.64	1	0	0	0	0	0	0	0	0	0	0	0	0	1	0
		9	aesthetic principles of design	2.78	0.71	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0
		10	human factors such as behavior, perception, psychological and sensory response	2.33	0.76	0	0	0	0	1	0	1	0	0	0	0	0	0	0	0
		11	natural factors such as ecological relationships	2.53	0.75	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0
		12	relationship between human and natural systems such as resource conservation, habitat restoration and creation, and urban ecology	2.36	0.79	0	0	0	0	1	0	0	0	0	0	1	1	0	0	0
		13	influence of context on design, planning, and management decisions	2.45	0.76	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0
		14	research methods including data collection, interpretation, and application of results	2.37	0.93	1	1	0	1	0	0	0	0	0	0	0	0	0	0	0
		15	therapeutic aspects of design	1.66	0.88	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0
		16	communication and education methods, including sharing knowledge and evaluating outcomes	2.15	0.99	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0
	Public Policy and Regulation	17	governmental policies and laws that affect the use and development of land	1.8	0.85	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0
		18	political and regulatory approval processes	1.67	0.92	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0
		19	land and development economics	1.47	0.83	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0
		20	emerging trends and issues	1.65	0.83	0	0	0	0	0	0	0	1	0	0	0	0	1	0	0
	Design, Planning and Management at Various Scales and Applications	21	photogrammetry and remote sensing	1.47	0.84	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0
		22	visual resource assessment	1.91	0.88	0	0	0	1	0	0	0	0	0	0	0	0	1	0	0
		23	agricultural and rural landscape analysis	1.68	0.85	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0
		24	urban landscape	2.17	0.71	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0
		25	planning principles including regional community and neighborhood planning	2.12	0.76	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		26	conservation of natural resources	2.33	0.8	0	0	0	0	0	0	0	1	0	0	0	1	0	0	0
		27	historic preservation	1.73	0.76	0	0	0	0	0	0	1	1	0	0	0	1	0	0	0
		28	ecological planning principles	2.23	0.8	0	0	0	0	0	0	0	1	0	0	0	1	0	0	0
		29	Water resource management	1.91	0.84	0	0	0	0	0	0	0	1	0	0	0	1	0	1	0
		30	wetland	1.78	0.83	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0
		31	floodplain management	1.8	0.86	0	0	0	0	0	0	0	1	0	0	0	1	0	0	0
		32	land and water reclamation procedures including quarry, mine and landfill reclamation	1.43	0.84	0	0	0	0	0	0	0	1	0	0	0	1	0	0	0
		33	treatment of toxic materials	1.05	0.86	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0

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						CF1			CF2					CF3	CF4			CF5		
Knowledge Statement / Competency Division	Domains		Knowledge Statements / Competencies	Mean	Standard Deviation	Metaphysics & Ontology	Epistemology	Philosophical Perspectives	From Concepts to Data	Place & Landscape	Common-sense Geographies	Cultural Influences	Political Influences	Properties	Events & Processes	Fields in Space & Time	Integrated Models	Spatial Distribution	Region	Spatial Integration
KNOWLEDGE STATEMENTS	Site Design and Engineering: Materials, Methods, Technologies and Applications	34	design needs for special populations	1.91	0.78	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0
		35	accessibility regulations	2.28	0.87	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0
		36	roadway design principles	2.15	0.83	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		37	elements of vehicular and pedestrian circulation systems and their design requirements	2.57	0.72	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		38	landscape maintenance techniques, materials, equipment, and practices	1.93	0.87	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		39	noise attenuation and mitigation techniques	1.66	0.82	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		40	sustainable construction practices	1.82	0.84	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		41	construction equipment and technologies	1.76	0.87	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		42	grading, drainage and stormwater treatment	2.78	0.57	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		43	biofiltration and other alternative drainage methods	1.91	0.84	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		44	erosion and sedimentation control	2.28	0.82	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		45	utility systems	1.77	0.77	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		46	Irrigation systems	1.75	0.88	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		47	lighting systems	1.7	0.79	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		48	structural considerations	2.06	0.82	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Construction Documentation and Administration	49	quality control procedures for construction, such as delivery, storage, testing, etc.	1.27	0.87	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		51	the life-cycle cost-analysis process	1.32	0.86	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		52	geographic coordinate systems and layout techniques and conventions	1.9	0.9	0	0	0	1	0	0	0	0	0	0	0	0	0	1	0
		56	basic construction law	1.48	0.84	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0
		57	construction contracts	1.55	0.88	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0
	Communication	58	determination of user values such as focus groups and surveys	1.52	0.83	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		61	the roles of visual communication, including photographic and video documentation	2.25	0.85	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		62	graphic presentation techniques, systems and symbols	2.71	0.73	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0
		63	interpretive methods and techniques such as information displays and brochures	1.82	0.98	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		64	public relations, outreach, and image development	1.49	0.97	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0
	Values and Ethics in Practice	65	environmental ethics	2.08	0.82	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		66	social responsibility in design	2.1	0.78	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0
		67	organizational management principles such as leadership principles and landscape architect career cycle	1.61	0.93	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		68	resolving moral and ethical dilemmas	1.89	0.93	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0

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Knowledge Statement / Competency Division	Domains		Knowledge Statements / Competencies	Mean	Standard Deviation	Metaphysics & Ontology	Epistemology	Philosophical Perspectives	From Concepts to Data	Place & Landscape	Common-sense Geographies	Cultural Influences	Political Influences	Properties	Events & Processes	Fields in Space & Time	Integrated Models	Spatial Distribution	Region	Spatial Integration
COMPETENCIES	Landscape Architecture History & Criticism	69	Develop an understanding of design as exemplified by historically significant works of landscape architecture, urban planning, civic design, and architecture	2.02	0.73	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		70	Examine economic, political, social, ecological and esthetic relationships and their influence on the development of the profession of landscape architecture	1.65	0.78	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0
		71	Demonstrate an understanding of the evolution of landscape architecture as an art and a profession through knowledge of its terminology, literature, personalities, and concepts	1.85	0.76	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		73	Develop an ability to synthesize and make connections between aspects of landscape architecture and disciplines outside of landscape architecture	1.98	0.73	1	0	0	0	0	0	1	0	0	0	0	0	0	0	0
	Natural & Cultural Systems	74	Conduct field investigations to identify significant natural and cultural features, characteristics, and systems	2.06	0.74	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		75	Perform quantitative analyses to evaluate the interactions of natural and cultural features, characteristics, and systems	1.64	0.78	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0
		76	Perform qualitative analyses to evaluate the relationship between the natural and cultural features, characteristics, and systems	1.79	0.78	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0
		77	Predict implications of design, planning, and management proposals on natural cultural systems both within the site and in the larger context	1.88	0.76	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Public Policy and Regulation	78	Identify and collect regulatory information, applicable data and required approvals governing a project (e.g., relevant laws, codes, and regulations)	1.31	0.74	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0
		79	Confirm code compliance (e.g. zoning, environment, and accessibility)	1.37	0.81	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0
		80	Assist in the preparation of ordinances, regulations, covenants, standards, and guidelines	0.77	0.69	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0
		81	Influence public policies on areas such as growth and land and water management by testifying, lobbying, or preparing written documents for public distribution	0.73	0.75	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0
	Design, Planning, and Management at Various Scales and Applications	82	Develop a design program based on users' needs and clients' goals and resources	2.13	0.75	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		83	Analyze relationships among design elements by determining opportunities and constraints	2.33	0.62	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		84	Develop conceptual design, planning, and management solutions	2.39	0.61	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		85	Evaluate design alternatives to determine the appropriate solution	2.45	0.59	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Site Design and Engineering: Materials, Methods, Technologies and Applications	86	Design for protection and management of land resources (e.g. land forms, vegetation, habitat, erosion and sedimentation control)	2.13	0.64	0	0	0	0	0	0	0	1	0	0	0	1	1	0	0
		87	Design for protection and management of water resources (e.g. storm water, water supply, ground water)	2.05	0.66	0	0	0	0	0	0	0	1	0	0	0	1	0	0	0
		88	Design pedestrian, vehicular, and non-motorized circulation systems	2.28	0.62	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		89	Design elements for construction considering materials, structural issues, and construction technologies	1.94	0.69	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Construction Documentation and Administration	90	Prepare construction documents including plans, working drawings, and technical specifications	1.87	0.77	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

LABOK						GIS&T BOK														
				Command of Knowledge at time of Degree		Conceptual Foundations														
						CF1			CF2					CF3	CF4			CF5		
Knowledge Statement / Competency Division	Domains		Knowledge Statements / Competencies	Mean	Standard Deviation	Metaphysics & Ontology	Epistemology	Philosophical Perspectives	From Concepts to Data	Place & Landscape	Common-sense Geographies	Cultural Influences	Political Influences	Properties	Events & Processes	Fields in Space & Time	Integrated Models	Spatial Distribution	Region	Spatial Integration
COMPETENCIES	Communication	98	Maintain clear communication among collaborators through correspondence and project coordination	1.51	0.9	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		~~100~~	~~Create graphic materials in a variety of media~~	~~2.19~~	~~0.76~~	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		101	Prepare and deliver oral presentations such as meetings, demonstrations, and outreach	2.18	0.72	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Values and Ethics in Practice	104	Manage business practices and organizations	0.81	0.74	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		105	Manage risk and liability	0.86	0.81	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		107	Participate in life-long learning (e.g., a professional organization, continuing education activities)	1.56	1.03	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		109	Train, educate and mentor other professionals	0.96	0.91	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		110	Maintain and promote professional and ethical standards	2.12	0.86	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
					Sum	6	2	1	4	6	2	8	24	3	1	3	15	6	7	1
					Average	0.07	0.02	0.01	0.04	0.07	0.02	0.09	0.26	0.03	0.01	0.03	0.16	0.07	0.08	0.01

LABOK				Command of Knowledge at time of Degree		GIS&T BOK																			
						Cartography & Visualization																			
						CV1		CV2		CV3				CV4							CV5		CV6			
Knowledge Statement / Competency Division	Domains		Knowledge Statements / Competencies	Mean	Standard Deviation	History of Cartography	Technological Transformations	Source Materials for Mapping	Projections as a Map Design Issue	Map Design Fundamentals	Basic Concepts of Symbolization	Color for Cartography & Visualization	Typography for Cartography &	Basic Thematic Mapping Methods	Multivariate Displays	Dynamic & Interactive Displays	Representing Terrain	Virtual & Immersive Environments	Visualization of Temporal Geographic	Visualization of Uncertainty	Map Production	Map Reproduction	Map Reading	Map Interpretation	Map Analysis	Evaluation & Testing
KNOWLEDGE STATEMENTS	Landscape Architecture History and Criticism	1	history of landscape architecture and allied professions	2.15	0.69	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		2	historic preservation principles	1.69	0.83	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Natural and Cultural Systems	3	land information sources	2.55	0.77	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		4	patterns of land use and built form	2.43	0.76	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		5	natural site conditions and ecosystems	2.76	0.66	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		6	social and cultural influences on design	2.19	0.81	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		7	regional hazard design considerations	2.1	0.87	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Design and Planning Theories and Methodologies	8	creativity and process including design theory and problem –solving strategies	2.83	0.64	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		9	aesthetic principles of design	2.78	0.71	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		10	human factors such as behavior, perception, psychological and sensory response	2.33	0.76	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		11	natural factors such as ecological relationships	2.53	0.75	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		12	relationship between human and natural systems such as resource conservation, habitat restoration and creation, and urban ecology	2.36	0.79	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		13	influence of context on design, planning, and management decisions	2.45	0.76	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		14	research methods including data collection, interpretation, and application of results	2.37	0.93	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		15	therapeutic aspects of design	1.66	0.88	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		16	communication and education methods, including sharing knowledge and evaluating outcomes	2.15	0.99	1	1	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	1
	Public Policy and Regulation	17	governmental policies and laws that affect the use and development of land	1.8	0.85	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		18	political and regulatory approval processes	1.67	0.92	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		19	land and development economics	1.47	0.83	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		20	emerging trends and issues	1.65	0.83	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Design, Planning and Management at Various Scales and Applications	21	photogrammetry and remote sensing	1.47	0.84	0	1	1	0	0	0	1	0	0	0	0	0	0	0	1	0	0	1	1	0
		22	visual resource assessment	1.91	0.88	0	1	1	0	0	0	1	1	1	0	1	1	1	1	0	1	1	1	1	0
		23	agricultural and rural landscape analysis	1.68	0.85	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0
		24	urban landscape	2.17	0.71	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		25	planning principles including regional community and neighborhood planning	2.12	0.76	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		26	conservation of natural resources	2.33	0.8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		27	historic preservation	1.73	0.76	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		28	ecological planning principles	2.23	0.8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		29	Water resource management	1.91	0.84	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		30	wetland	1.78	0.83	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		31	floodplain management	1.8	0.86	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		32	land and water reclamation procedures including quarry, mine and landfill reclamation	1.43	0.84	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		33	treatment of toxic materials	1.05	0.86	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

LABOK						GIS&T BOK																					
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						CV1		CV2		CV3				CV4							CV5		CV6				
Knowledge Statement / Competency Division	Domains		Knowledge Statements / Competencies	Mean	Standard Deviation	History of Cartography	Technological Transformations	Source Materials for Mapping	Projections as a Map Design Issue	Map Design Fundamentals	Basic Concepts of Symbolization	Color for Cartography & Visualization	Typography for Cartography &	Basic Thematic Mapping Methods	Multivariate Displays	Dynamic & Interactive Displays	Representing Terrain	Virtual & Immersive Environments	Visualization of Temporal Geographic	Visualization of Uncertainty	Map Production	Map Reproduction	Map Reading	Map Interpretation	Map Analysis	Evaluation & Testing
KNOWLEDGE STATEMENTS	Site Design and Engineering: Materials, Methods, Technologies and Applications	34	design needs for special populations	1.91	0.78	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		35	accessibility regulations	2.28	0.87	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		36	roadway design principles	2.15	0.83	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		37	elements of vehicular and pedestrian circulation systems and their design requirements	2.57	0.72	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		38	landscape maintenance techniques, materials, equipment, and practices	1.93	0.87	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		39	noise attenuation and mitigation techniques	1.66	0.82	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		40	sustainable construction practices	1.82	0.84	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		41	construction equipment and technologies	1.76	0.87	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		42	grading, drainage and stormwater treatment	2.78	0.57	0	0	0	0	1	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0
		43	biofiltration and other alternative drainage methods	1.91	0.84	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		44	erosion and sedimentation control	2.28	0.82	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		45	utility systems	1.77	0.77	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		46	Irrigation systems	1.75	0.88	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		47	lighting systems	1.7	0.79	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		48	structural considerations	2.06	0.82	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Construction Documentation and Administration	49	quality control procedures for construction, such as delivery, storage, testing, etc.	1.27	0.87	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		51	the life-cycle cost-analysis process	1.32	0.86	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		52	geographic coordinate systems and layout techniques and conventions	1.9	0.9	0	0	1	1	0	1	1	1	1	1	1	0	0	0	0	0	0	0	0	1	0	0
		56	basic construction law	1.48	0.84	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		57	construction contracts	1.55	0.88	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Communication	58	determination of user values such as focus groups and surveys	1.52	0.83	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
		61	the roles of visual communication, including photographic and video documentation	2.25	0.85	1	1	1	1	1	0	1	1	1	0	1	1	0	1	0	0	0	1	1	0	1
		62	graphic presentation techniques, systems and symbols	2.71	0.73	1	1	1	1	0	1	1	1	1	1	1	1	0	1	1	1	0	1	0	0	1
		63	interpretive methods and techniques such as information displays and brochures	1.82	0.98	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0
		64	public relations, outreach, and image development	1.49	0.97	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Values and Ethics in Practice	65	environmental ethics	2.08	0.82	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		66	social responsibility in design	2.1	0.78	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		67	organizational management principles such as leadership principles and landscape architect career cycle	1.61	0.93	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		68	resolving moral and ethical dilemmas	1.89	0.93	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

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						CV1		CV2		CV3				CV4							CV5		CV6			
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COMPETENCIES	Landscape Architecture History & Criticism	69	Develop an understanding of design as exemplified by historically significant works of landscape architecture, urban planning, civic design, and architecture	2.02	0.73	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		70	Examine economic, political, social, ecological and esthetic relationships and their influence on the development of the profession of landscape architecture	1.65	0.78	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		71	Demonstrate an understanding of the evolution of landscape architecture as an art and a profession through knowledge of its terminology, literature, personalities, and concepts	1.85	0.76	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		73	Develop an ability to synthesize and make connections between aspects of landscape architecture and disciplines outside of landscape architecture	1.98	0.73	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Natural & Cultural Systems	74	Conduct field investigations to identify significant natural and cultural features, characteristics, and systems	2.06	0.74	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		75	Perform quantitative analyses to evaluate the interactions of natural and cultural features, characteristics, and systems	1.64	0.78	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		76	Perform qualitative analyses to evaluate the relationship between the natural and cultural features, characteristics, and systems	1.79	0.78	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		77	Predict implications of design, planning, and management proposals on natural cultural systems both within the site and in the larger context	1.88	0.76	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Public Policy and Regulation	78	Identify and collect regulatory information, applicable data and required approvals governing a project (e.g., relevant laws, codes, and regulations)	1.31	0.74	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		79	Confirm code compliance (e.g. zoning, environment, and accessibility)	1.37	0.81	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		80	Assist in the preparation of ordinances, regulations, covenants, standards, and guidelines	0.77	0.69	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		81	Influence public policies on areas such as growth and land and water management by testifying, lobbying, or preparing written documents for public distribution	0.73	0.75	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Design, Planning, and Management at Various Scales and Applications	82	Develop a design program based on users' needs and clients' goals and resources	2.13	0.75	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		83	Analyze relationships among design elements by determining opportunities and constraints	2.33	0.62	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		84	Develop conceptual design, planning, and management solutions	2.39	0.61	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		85	Evaluate design alternatives to determine the appropriate solution	2.45	0.59	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Site Design and Engineering: Materials, Methods, Technologies and Applications	86	Design for protection and management of land resources (e.g. land forms, vegetation, habitat, erosion and sedimentation control)	2.13	0.64	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		87	Design for protection and management of water resources (e.g. storm water, water supply, ground water)	2.05	0.66	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		88	Design pedestrian, vehicular, and non-motorized circulation systems	2.28	0.62	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		89	Design elements for construction considering materials, structural issues, and construction technologies	1.94	0.69	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Construction Documentation and Administration	90	Prepare construction documents including plans, working drawings, and technical specifications	1.87	0.77	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

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COMPETENCIES	Communication	98	Maintain clear communication among collaborators through correspondence and project coordination	1.51	0.9	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		~~100~~	~~Create graphic materials in a variety of media~~	~~2.19~~	~~0.76~~	0	0	1	1	1	0	0	0	0	0	0	1	0	0	0	1	0	0	0	0
		101	Prepare and deliver oral presentations such as meetings, demonstrations, and outreach	2.18	0.72	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0
	Values and Ethics in Practice	104	Manage business practices and organizations	0.81	0.74	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		105	Manage risk and liability	0.86	0.81	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		107	Participate in life-long learning (e.g., a professional organization, continuing education activities)	1.56	1.03	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		109	Train, educate and mentor other professionals	0.96	0.91	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		110	Maintain and promote professional and ethical standards	2.12	0.86	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
					Sum	6	8	6	6	17	2	5	4	4	3	5	6	2	3	1	3	3	3	4	3	4
					Average	0.07	0.09	0.07	0.07	0.19	0.02	0.05	0.04	0.04	0.03	0.05	0.07	0.02	0.03	0.01	0.03	0.03	0.03	0.04	0.03	0.04

LABOK				Command of Knowledge at time of Degree		GIS&T BOK													
						Design Aspects													
						DA2				DA3		DA4			DA5			DA6	DA7
Knowledge Statement / Competency Division	Domains		Knowledge Statements / Competencies	Mean	Standard Deviation	Planning for Design	Application/ User Assessment	Requirements Analysis	Social, Political, & Cultural Issues	Data Costs	Labor Management	Conceptual Models	Logical Models	Physical Models	Recognizing Analytical Components	Identifying & Designing Analytical Procedures	Formalizing a Procedure Design	User Interfaces	Implementation Planning
KNOWLEDGE STATEMENTS	Landscape Architecture History and Criticism	1	history of landscape architecture and allied professions	2.15	0.69	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		2	historic preservation principles	1.69	0.83	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Natural and Cultural Systems	3	land information sources	2.55	0.77	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		4	patterns of land use and built form	2.43	0.76	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		5	natural site conditions and ecosystems	2.76	0.66	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		6	social and cultural influences on design	2.19	0.81	0	0	0	1	0	0	0	0	0	0	0	0	0	0
		7	regional hazard design considerations	2.1	0.87	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Design and Planning Theories and Methodologies	8	creativity and process including design theory and problem –solving strategies	2.83	0.64	0	0	0	0	0	0	1	1	1	0	0	0	0	0
		9	aesthetic principles of design	2.78	0.71	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		10	human factors such as behavior, perception, psychological and sensory response	2.33	0.76	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		11	natural factors such as ecological relationships	2.53	0.75	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		12	relationship between human and natural systems such as resource conservation, habitat restoration and creation, and urban ecology	2.36	0.79	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		13	influence of context on design, planning, and management decisions	2.45	0.76	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		14	research methods including data collection, interpretation, and application of results	2.37	0.93	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		15	therapeutic aspects of design	1.66	0.88	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		16	communication and education methods, including sharing knowledge and evaluating outcomes	2.15	0.99	1	1	0	0	0	1	0	0	0	0	0	0	0	0
	Public Policy and Regulation	17	governmental policies and laws that affect the use and development of land	1.8	0.85	0	0	0	1	0	0	0	0	0	0	0	0	0	0
		18	political and regulatory approval processes	1.67	0.92	0	0	0	1	0	0	0	0	0	0	0	0	0	0
		19	land and development economics	1.47	0.83	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		20	emerging trends and issues	1.65	0.83	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Design, Planning and Management at Various Scales and Applications	21	photogrammetry and remote sensing	1.47	0.84	0	0	0	0	1	0	0	0	0	0	0	0	0	0
		22	visual resource assessment	1.91	0.88	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		23	agricultural and rural landscape analysis	1.68	0.85	0	0	0	0	0	0	0	0	0	0	1	0	0	0
		24	urban landscape	2.17	0.71	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		25	planning principles including regional community and neighborhood planning	2.12	0.76	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		26	conservation of natural resources	2.33	0.8	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		27	historic preservation	1.73	0.76	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		28	ecological planning principles	2.23	0.8	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		29	Water resource management	1.91	0.84	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		30	wetland	1.78	0.83	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		31	floodplain management	1.8	0.86	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		32	land and water reclamation procedures including quarry, mine and landfill reclamation	1.43	0.84	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		33	treatment of toxic materials	1.05	0.86	0	0	0	0	0	0	0	0	0	0	0	0	0	0

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Knowledge Statement / Competency Division	Domains		Knowledge Statements / Competencies	Mean	Standard Deviation	Planning for Design	Application/ User Assessment	Requirements Analysis	Social, Political, & Cultural Issues	Data Costs	Labor Management	Conceptual Models	Logical Models	Physical Models	Recognizing Analytical Components	Identifying & Designing Analytical Procedures	Formalizing a Procedure Design	User Interfaces	Implementation Planning
KNOWLEDGE STATEMENTS	Site Design and Engineering: Materials, Methods, Technologies and Applications	34	design needs for special populations	1.91	0.78	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		35	accessibility regulations	2.28	0.87	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		36	roadway design principles	2.15	0.83	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		37	elements of vehicular and pedestrian circulation systems and their design requirements	2.57	0.72	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		38	landscape maintenance techniques, materials, equipment, and practices	1.93	0.87	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		39	noise attenuation and mitigation techniques	1.66	0.82	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		40	sustainable construction practices	1.82	0.84	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		41	construction equipment and technologies	1.76	0.87	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		42	grading, drainage and stormwater treatment	2.78	0.57	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		43	biofiltration and other alternative drainage methods	1.91	0.84	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		44	erosion and sedimentation control	2.28	0.82	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		45	utility systems	1.77	0.77	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		46	Irrigation systems	1.75	0.88	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		47	lighting systems	1.7	0.79	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		48	structural considerations	2.06	0.82	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Construction Documentation and Administration	49	quality control procedures for construction, such as delivery, storage, testing, etc.	1.27	0.87	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		51	the life-cycle cost-analysis process	1.32	0.86	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		52	geographic coordinate systems and layout techniques and conventions	1.9	0.9	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		56	basic construction law	1.48	0.84	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		57	construction contracts	1.55	0.88	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Communication	58	determination of user values such as focus groups and surveys	1.52	0.83	0	0	1	0	0	0	0	0	0	0	0	0	0	0
		61	the roles of visual communication, including photographic and video documentation	2.25	0.85	0	0	0	0	0	0	0	0	0	0	0	1	0	0
		62	graphic presentation techniques, systems and symbols	2.71	0.73	0	0	0	0	0	0	1	1	1	1	0	0	0	0
		63	interpretive methods and techniques such as information displays and brochures	1.82	0.98	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		64	public relations, outreach, and image development	1.49	0.97	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Values and Ethics in Practice	65	environmental ethics	2.08	0.82	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		66	social responsibility in design	2.1	0.78	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		67	organizational management principles such as leadership principles and landscape architect career cycle	1.61	0.93	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		68	resolving moral and ethical dilemmas	1.89	0.93	0	0	0	0	0	0	0	0	0	0	0	0	0	0

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Knowledge Statement / Competency Division	Domains		Knowledge Statements / Competencies	Mean	Standard Deviation	Planning for Design	Application/ User Assessment	Requirements Analysis	Social, Political, & Cultural Issues	Data Costs	Labor Management	Conceptual Models	Logical Models	Physical Models	Recognizing Analytical Components	Identifying & Designing Analytical Procedures	Formalizing a Procedure Design	User Interfaces	Implementation Planning
COMPETENCIES	Landscape Architecture History & Criticism	69	Develop an understanding of design as exemplified by historically significant works of landscape architecture, urban planning, civic design, and architecture	2.02	0.73	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		70	Examine economic, political, social, ecological and esthetic relationships and their influence on the development of the profession of landscape architecture	1.65	0.78	0	0	0	1	0	0	0	0	0	0	0	0	0	0
		71	Demonstrate an understanding of the evolution of landscape architecture as an art and a profession through knowledge of its terminology, literature, personalities, and concepts	1.85	0.76	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		73	Develop an ability to synthesize and make connections between aspects of landscape architecture and disciplines outside of landscape architecture	1.98	0.73	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Natural & Cultural Systems	74	Conduct field investigations to identify significant natural and cultural features, characteristics, and systems	2.06	0.74	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		75	Perform quantitative analyses to evaluate the interactions of natural and cultural features, characteristics, and systems	1.64	0.78	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		76	Perform qualitative analyses to evaluate the relationship between the natural and cultural features, characteristics, and systems	1.79	0.78	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		77	Predict implications of design, planning, and management proposals on natural cultural systems both within the site and in the larger context	1.88	0.76	0	0	0	0	0	0	0	0	0	0	0	0	0	1
	Public Policy and Regulation	78	Identify and collect regulatory information, applicable data and required approvals governing a project (e.g., relevant laws, codes, and regulations)	1.31	0.74	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		79	Confirm code compliance (e.g. zoning, environment, and accessibility)	1.37	0.81	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		80	Assist in the preparation of ordinances, regulations, covenants, standards, and guidelines	0.77	0.69	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		81	Influence public policies on areas such as growth and land and water management by testifying, lobbying, or preparing written documents for public distribution	0.73	0.75	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Design, Planning, and Management at Various Scales and Applications	82	Develop a design program based on users' needs and clients' goals and resources	2.13	0.75	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		83	Analyze relationships among design elements by determining opportunities and constraints	2.33	0.62	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		84	Develop conceptual design, planning, and management solutions	2.39	0.61	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		85	Evaluate design alternatives to determine the appropriate solution	2.45	0.59	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Site Design and Engineering: Materials, Methods, Technologies and Applications	86	Design for protection and management of land resources (e.g. land forms, vegetation, habitat, erosion and sedimentation control)	2.13	0.64	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		87	Design for protection and management of water resources (e.g. storm water, water supply, ground water)	2.05	0.66	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		88	Design pedestrian, vehicular, and non-motorized circulation systems	2.28	0.62	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		89	Design elements for construction considering materials, structural issues, and construction technologies	1.94	0.69	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Construction Documentation and Administration	90	Prepare construction documents including plans, working drawings, and technical specifications	1.87	0.77	0	0	0	0	0	0	0	0	0	0	0	0	0	0

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						DA2				DA3		DA4			DA5			DA6	DA7	
Knowledge Statement / Competency Division	Domains	Knowledge Statements / Competencies		Mean	Standard Deviation	Planning for Design	Application/ User Assessment	Requirements Analysis	Social, Political, & Cultural Issues	Data Costs	Labor Management	Conceptual Models	Logical Models	Physical Models	Recognizing Analytical Components	Identifying & Designing Analytical Procedures	Formalizing a Procedure Design	User Interfaces	Implementation Planning	
COMPETENCIES	Communication	98	Maintain clear communication among collaborators through correspondence and project coordination	1.51	0.9	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
		~~100~~	~~Create graphic materials in a variety of media~~	~~2.19~~	~~0.76~~	0	0	0	0	0	0	1	1	1	0	0	0	1	0	
		101	Prepare and deliver oral presentations such as meetings, demonstrations, and outreach	2.18	0.72	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	Values and Ethics in Practice	104	Manage business practices and organizations	0.81	0.74	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
		105	Manage risk and liability	0.86	0.81	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
		107	Participate in life-long learning (e.g., a professional organization, continuing education activities)	1.56	1.03	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
		109	Train, educate and mentor other professionals	0.96	0.91	1	1	0	0	0	0	0	0	0	0	0	0	0	0	
		110	Maintain and promote professional and ethical standards	2.12	0.86	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
					Sum	2	2	1	4	1	1	3	3	3	1	1	1	1	1	
					Average	0.02	0.02	0.01	0.04	0.01	0.01	0.03	0.03	0.03	0.01	0.01	0.01	0.01	0.01	

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						Data Modeling									Data Manipulation								
						DM3				DM4				DM5	DN1						DN2		DN3
Knowledge Statement / Competency Division	Domains		Knowledge Statements / Competencies	Mean	Standard Deviation	The Raster Model	*Grid Compression Methods	Triangulated Irregular Network (TIN) Model	Resolution	Geometric Primitives	The Topological Model	The Network Model	Linear Referencing	Modeling Three-dimensional Entities	Impacts of Transformations	Data Model & Format Conversion	Interpolation	Vector-to-Raster & Raster-to-Vector	Raster Resembling	Coordinate Transformations	Scale & Generalization	Aggregation of Spatial Entities	Database Change
KNOWLEDGE STATEMENTS	Landscape Architecture History and Criticism	1	history of landscape architecture and allied professions	2.15	0.69	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		2	historic preservation principles	1.69	0.83	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Natural and Cultural Systems	3	land information sources	2.55	0.77	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		4	patterns of land use and built form	2.43	0.76	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0
		5	natural site conditions and ecosystems	2.76	0.66	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		6	social and cultural influences on design	2.19	0.81	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		7	regional hazard design considerations	2.1	0.87	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Design and Planning Theories and Methodologies	8	creativity and process including design theory and problem –solving strategies	2.83	0.64	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		9	aesthetic principles of design	2.78	0.71	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		10	human factors such as behavior, perception, psychological and sensory response	2.33	0.76	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		11	natural factors such as ecological relationships	2.53	0.75	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0
		12	relationship between human and natural systems such as resource conservation, habitat restoration and creation, and urban ecology	2.36	0.79	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0
		13	influence of context on design, planning, and management decisions	2.45	0.76	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0
		14	research methods including data collection, interpretation, and application of results	2.37	0.93	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	1
		15	therapeutic aspects of design	1.66	0.88	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		16	communication and education methods, including sharing knowledge and evaluating outcomes	2.15	0.99	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0
	Public Policy and Regulation	17	governmental policies and laws that affect the use and development of land	1.8	0.85	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0
		18	political and regulatory approval processes	1.67	0.92	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		19	land and development economics	1.47	0.83	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		20	emerging trends and issues	1.65	0.83	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Design, Planning and Management at Various Scales and Applications	21	photogrammetry and remote sensing	1.47	0.84	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	1	0	0
		22	visual resource assessment	1.91	0.88	0	0	0	0	0	0	0	0	0	1	0	0	1	1	0	1	0	0
		23	agricultural and rural landscape analysis	1.68	0.85	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		24	urban landscape	2.17	0.71	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		25	planning principles including regional community and neighborhood planning	2.12	0.76	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0
		26	conservation of natural resources	2.33	0.8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		27	historic preservation	1.73	0.76	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		28	ecological planning principles	2.23	0.8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		29	Water resource management	1.91	0.84	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		30	wetland	1.78	0.83	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		31	floodplain management	1.8	0.86	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		32	land and water reclamation procedures including quarry, mine and landfill reclamation	1.43	0.84	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		33	treatment of toxic materials	1.05	0.86	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

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						DM3				DM4				DM5	DN1						DN2		DN3	
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KNOWLEDGE STATEMENTS	Site Design and Engineering: Materials, Methods, Technologies and Applications	34	design needs for special populations	1.91	0.78	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		35	accessibility regulations	2.28	0.87	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0
		36	roadway design principles	2.15	0.83	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0
		37	elements of vehicular and pedestrian circulation systems and their design requirements	2.57	0.72	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		38	landscape maintenance techniques, materials, equipment, and practices	1.93	0.87	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		39	noise attenuation and mitigation techniques	1.66	0.82	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		40	sustainable construction practices	1.82	0.84	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		41	construction equipment and technologies	1.76	0.87	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		42	grading, drainage and stormwater treatment	2.78	0.57	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		43	biofiltration and other alternative drainage methods	1.91	0.84	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		44	erosion and sedimentation control	2.28	0.82	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		45	utility systems	1.77	0.77	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		46	Irrigation systems	1.75	0.88	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		47	lighting systems	1.7	0.79	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		48	structural considerations	2.06	0.82	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Construction Documentation and Administration	49	quality control procedures for construction, such as delivery, storage, testing, etc.	1.27	0.87	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		51	the life-cycle cost-analysis process	1.32	0.86	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		52	geographic coordinate systems and layout techniques and conventions	1.9	0.9	1	0	0	0	0	0	0	1	0	1	1	1	0	0	1	0	0	0	0
		56	basic construction law	1.48	0.84	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		57	construction contracts	1.55	0.88	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Communication	58	determination of user values such as focus groups and surveys	1.52	0.83	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		61	the roles of visual communication, including photographic and video documentation	2.25	0.85	1	0	0	1	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0
		62	graphic presentation techniques, systems and symbols	2.71	0.73	0	0	1	0	1	1	0	0	1	0	0	1	0	0	0	0	0	0	0
		63	interpretive methods and techniques such as information displays and brochures	1.82	0.98	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		64	public relations, outreach, and image development	1.49	0.97	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Values and Ethics in Practice	65	environmental ethics	2.08	0.82	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		66	social responsibility in design	2.1	0.78	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		67	organizational management principles such as leadership principles and landscape architect career cycle	1.61	0.93	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		68	resolving moral and ethical dilemmas	1.89	0.93	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

LABOK						GIS&T BOK																		
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						DM3				DM4				DM5	DN1						DN2		DN3
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COMPETENCIES	Landscape Architecture History & Criticism	69	Develop an understanding of design as exemplified by historically significant works of landscape architecture, urban planning, civic design, and architecture	2.02	0.73	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		70	Examine economic, political, social, ecological and esthetic relationships and their influence on the development of the profession of landscape architecture	1.65	0.78	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		71	Demonstrate an understanding of the evolution of landscape architecture as an art and a profession through knowledge of its terminology, literature, personalities, and concepts	1.85	0.76	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		73	Develop an ability to synthesize and make connections between aspects of landscape architecture and disciplines outside of landscape architecture	1.98	0.73	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Natural & Cultural Systems	74	Conduct field investigations to identify significant natural and cultural features, characteristics, and systems	2.06	0.74	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		75	Perform quantitative analyses to evaluate the interactions of natural and cultural features, characteristics, and systems	1.64	0.78	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		76	Perform qualitative analyses to evaluate the relationship between the natural and cultural features, characteristics, and systems	1.79	0.78	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		77	Predict implications of design, planning, and management proposals on natural cultural systems both within the site and in the larger context	1.88	0.76	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Public Policy and Regulation	78	Identify and collect regulatory information, applicable data and required approvals governing a project (e.g., relevant laws, codes, and regulations)	1.31	0.74	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		79	Confirm code compliance (e.g. zoning, environment, and accessibility)	1.37	0.81	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		80	Assist in the preparation of ordinances, regulations, covenants, standards, and guidelines	0.77	0.69	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		81	Influence public policies on areas such as growth and land and water management by testifying, lobbying, or preparing written documents for public distribution	0.73	0.75	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0
	Design, Planning, and Management at Various Scales and Applications	82	Develop a design program based on users' needs and clients' goals and resources	2.13	0.75	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		83	Analyze relationships among design elements by determining opportunities and constraints	2.33	0.62	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		84	Develop conceptual design, planning, and management solutions	2.39	0.61	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		85	Evaluate design alternatives to determine the appropriate solution	2.45	0.59	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Site Design and Engineering: Materials, Methods, Technologies and Applications	86	Design for protection and management of land resources (e.g. land forms, vegetation, habitat, erosion and sedimentation control)	2.13	0.64	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		87	Design for protection and management of water resources (e.g. storm water, water supply, ground water)	2.05	0.66	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		88	Design pedestrian, vehicular, and non-motorized circulation systems	2.28	0.62	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0
		89	Design elements for construction considering materials, structural issues, and construction technologies	1.94	0.69	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Construction Documentation and Administration	90	Prepare construction documents including plans, working drawings, and technical specifications	1.87	0.77	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

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COMPETENCIES	Communication	98	Maintain clear communication among collaborators through correspondence and project coordination	1.51	0.9	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		~~100~~	~~Create graphic materials in a variety of media~~	~~2.19~~	~~0.76~~	1	1	0	0	0	1	0	0	1	0	0	1	1	0	0	0	0	0
		101	Prepare and deliver oral presentations such as meetings, demonstrations, and outreach	2.18	0.72	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Values and Ethics in Practice	104	Manage business practices and organizations	0.81	0.74	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		105	Manage risk and liability	0.86	0.81	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		107	Participate in life-long learning (e.g., a professional organization, continuing education activities)	1.56	1.03	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		109	Train, educate and mentor other professionals	0.96	0.91	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		110	Maintain and promote professional and ethical standards	2.12	0.86	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
					Sum	3	1	1	1	2	2	3	1	3	4	3	3	3	2	1	3	6	1
					Average	0.03	0.01	0.01	0.01	0.02	0.02	0.03	0.01	0.03	0.04	0.03	0.03	0.03	0.02	0.01	0.03	0.07	0.01

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						GC2	GC7	GC8			GD1		GD2		GD3			GD4	
Knowledge Statement / Competency Division	Domains		Knowledge Statements / Competencies	Mean	Standard Deviation	Pattern Recognition	Simulation Modeling	Conceptual Model of Uncertainty	Error	Problems of Currency, Source, & Scale	History of Understanding Earth's Shape	Spheres & Ellipses	Unsystematic Methods	Systematic Methods	Geographic Coordinate Systems	Plane Coordinate Systems	Linear Referencing Systems	Horizontal Datum's	Vertical Datum's
KNOWLEDGE STATEMENTS	Landscape Architecture History and Criticism	1	history of landscape architecture and allied professions	2.15	0.69	0	0	0	0	0	1	0	1	1	0	0	0	0	0
		2	historic preservation principles	1.69	0.83	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Natural and Cultural Systems	3	land information sources	2.55	0.77	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		4	patterns of land use and built form	2.43	0.76	1	0	0	0	0	1	0	1	1	0	0	0	0	0
		5	natural site conditions and ecosystems	2.76	0.66	0	0	1	0	0	0	0	0	0	0	0	0	0	0
		6	social and cultural influences on design	2.19	0.81	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		7	regional hazard design considerations	2.1	0.87	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Design and Planning Theories and Methodologies	8	creativity and process including design theory and problem –solving strategies	2.83	0.64	0	1	0	0	0	0	0	0	0	0	0	0	0	0
		9	aesthetic principles of design	2.78	0.71	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		10	human factors such as behavior, perception, psychological and sensory response	2.33	0.76	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		11	natural factors such as ecological relationships	2.53	0.75	0	0	1	0	0	0	0	0	0	0	0	0	0	0
		12	relationship between human and natural systems such as resource conservation, habitat restoration and creation, and urban ecology	2.36	0.79	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		13	influence of context on design, planning, and management decisions	2.45	0.76	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		14	research methods including data collection, interpretation, and application of results	2.37	0.93	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		15	therapeutic aspects of design	1.66	0.88	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		16	communication and education methods, including sharing knowledge and evaluating outcomes	2.15	0.99	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Public Policy and Regulation	17	governmental policies and laws that affect the use and development of land	1.8	0.85	0	0	0	0	0	0	0	1	1	0	0	0	0	0
		18	political and regulatory approval processes	1.67	0.92	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		19	land and development economics	1.47	0.83	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		20	emerging trends and issues	1.65	0.83	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Design, Planning and Management at Various Scales and Applications	21	photogrammetry and remote sensing	1.47	0.84	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		22	visual resource assessment	1.91	0.88	0	1	1	0	0	0	0	0	0	0	0	0	0	0
		23	agricultural and rural landscape analysis	1.68	0.85	1	0	0	0	0	0	0	0	0	0	0	0	0	0
		24	urban landscape	2.17	0.71	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		25	planning principles including regional community and neighborhood planning	2.12	0.76	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		26	conservation of natural resources	2.33	0.8	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		27	historic preservation	1.73	0.76	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		28	ecological planning principles	2.23	0.8	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		29	Water resource management	1.91	0.84	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		30	wetland	1.78	0.83	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		31	floodplain management	1.8	0.86	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		32	land and water reclamation procedures including quarry, mine and landfill reclamation	1.43	0.84	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		33	treatment of toxic materials	1.05	0.86	0	0	0	0	0	0	0	0	0	0	0	0	0	0

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KNOWLEDGE STATEMENTS	Site Design and Engineering: Materials, Methods, Technologies and Applications	34	design needs for special populations	1.91	0.78	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		35	accessibility regulations	2.28	0.87	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		36	roadway design principles	2.15	0.83	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		37	elements of vehicular and pedestrian circulation systems and their design requirements	2.57	0.72	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		38	landscape maintenance techniques, materials, equipment, and practices	1.93	0.87	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		39	noise attenuation and mitigation techniques	1.66	0.82	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		40	sustainable construction practices	1.82	0.84	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		41	construction equipment and technologies	1.76	0.87	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		42	grading, drainage and stormwater treatment	2.78	0.57	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		43	biofiltration and other alternative drainage methods	1.91	0.84	1	0	0	0	0	0	0	0	0	0	0	0	0	0
		44	erosion and sedimentation control	2.28	0.82	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		45	utility systems	1.77	0.77	1	0	0	0	0	0	0	0	0	0	0	0	0	0
		46	Irrigation systems	1.75	0.88	1	0	0	0	0	0	0	0	0	0	0	0	0	0
		47	lighting systems	1.7	0.79	1	0	0	0	0	0	0	0	0	0	0	0	0	0
		48	structural considerations	2.06	0.82	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Construction Documentation and Administration	49	quality control procedures for construction, such as delivery, storage, testing, etc.	1.27	0.87	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		51	the life-cycle cost-analysis process	1.32	0.86	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		52	geographic coordinate systems and layout techniques and conventions	1.9	0.9	0	0	0	1	1	1	1	1	1	1	1	1	1	1
		56	basic construction law	1.48	0.84	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		57	construction contracts	1.55	0.88	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Communication	58	determination of user values such as focus groups and surveys	1.52	0.83	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		61	the roles of visual communication, including photographic and video documentation	2.25	0.85	0	1	0	0	0	0	0	0	0	0	0	0	0	0
		62	graphic presentation techniques, systems and symbols	2.71	0.73	0	0	1	1	1	1	1	0	0	1	1	1	1	1
		63	interpretive methods and techniques such as information displays and brochures	1.82	0.98	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		64	public relations, outreach, and image development	1.49	0.97	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Values and Ethics in Practice	65	environmental ethics	2.08	0.82	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		66	social responsibility in design	2.1	0.78	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		67	organizational management principles such as leadership principles and landscape architect career cycle	1.61	0.93	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		68	resolving moral and ethical dilemmas	1.89	0.93	0	0	0	0	0	0	0	0	0	0	0	0	0	0

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COMPETENCIES	Landscape Architecture History & Criticism	69	Develop an understanding of design as exemplified by historically significant works of landscape architecture, urban planning, civic design, and architecture	2.02	0.73	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		70	Examine economic, political, social, ecological and esthetic relationships and their influence on the development of the profession of landscape architecture	1.65	0.78	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		71	Demonstrate an understanding of the evolution of landscape architecture as an art and a profession through knowledge of its terminology, literature, personalities, and concepts	1.85	0.76	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		73	Develop an ability to synthesize and make connections between aspects of landscape architecture and disciplines outside of landscape architecture	1.98	0.73	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Natural & Cultural Systems	74	Conduct field investigations to identify significant natural and cultural features, characteristics, and systems	2.06	0.74	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		75	Perform quantitative analyses to evaluate the interactions of natural and cultural features, characteristics, and systems	1.64	0.78	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		76	Perform qualitative analyses to evaluate the relationship between the natural and cultural features, characteristics, and systems	1.79	0.78	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		77	Predict implications of design, planning, and management proposals on natural cultural systems both within the site and in the larger context	1.88	0.76	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Public Policy and Regulation	78	Identify and collect regulatory information, applicable data and required approvals governing a project (e.g., relevant laws, codes, and regulations)	1.31	0.74	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		79	Confirm code compliance (e.g. zoning, environment, and accessibility)	1.37	0.81	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		80	Assist in the preparation of ordinances, regulations, covenants, standards, and guidelines	0.77	0.69	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		81	Influence public policies on areas such as growth and land and water management by testifying, lobbying, or preparing written documents for public distribution	0.73	0.75	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Design, Planning, and Management at Various Scales and Applications	82	Develop a design program based on users' needs and clients' goals and resources	2.13	0.75	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		83	Analyze relationships among design elements by determining opportunities and constraints	2.33	0.62	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		84	Develop conceptual design, planning, and management solutions	2.39	0.61	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		85	Evaluate design alternatives to determine the appropriate solution	2.45	0.59	0	1	0	0	0	0	0	0	0	0	0	0	0	0
	Site Design and Engineering: Materials, Methods, Technologies and Applications	86	Design for protection and management of land resources (e.g. land forms, vegetation, habitat, erosion and sedimentation control)	2.13	0.64	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		87	Design for protection and management of water resources (e.g. storm water, water supply, ground water)	2.05	0.66	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		88	Design pedestrian, vehicular, and non-motorized circulation systems	2.28	0.62	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		89	Design elements for construction considering materials, structural issues, and construction technologies	1.94	0.69	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Construction Documentation and Administration	90	Prepare construction documents including plans, working drawings, and technical specifications	1.87	0.77	0	0	0	0	0	0	0	0	0	0	0	0	0	0

LABOK						GIS&T BOK														
				Command of Knowledge at time of Degree		Geocomputation					Geospatial Data									
						GC2	GC7	GC8			GD1		GD2		GD3			GD4		
Knowledge Statement / Competency Division	Domains		Knowledge Statements / Competencies	Mean	Standard Deviation	Pattern Recognition	Simulation Modeling	Conceptual Model of Uncertainty	Error	Problems of Currency, Source, & Scale	History of Understanding Earth's Shape	Spheres & Ellipses	Unsystematic Methods	Systematic Methods	Geographic Coordinate Systems	Plane Coordinate Systems	Linear Referencing Systems	Horizontal Datum's	Vertical Datum's
COMPETENCIES	Communication	98	Maintain clear communication among collaborators through correspondence and project coordination	1.51	0.9	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		~~100~~	~~Create graphic materials in a variety of media~~	~~2.19~~	~~0.76~~	0	1	0	0	0	0	0	0	0	0	0	0	0	0
		101	Prepare and deliver oral presentations such as meetings, demonstrations, and outreach	2.18	0.72	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Values and Ethics in Practice	104	Manage business practices and organizations	0.81	0.74	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		105	Manage risk and liability	0.86	0.81	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		107	Participate in life-long learning (e.g., a professional organization, continuing education activities)	1.56	1.03	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		109	Train, educate and mentor other professionals	0.96	0.91	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		110	Maintain and promote professional and ethical standards	2.12	0.86	0	0	0	0	0	0	0	0	0	0	0	0	0	0
					Sum	6	5	4	2	2	4	2	4	4	2	2	2	2	2
					Average	0.07	0.05	0.04	0.02	0.02	0.04	0.02	0.04	0.04	0.02	0.02	0.02	0.02	0.02

LABOK				Command of Knowledge at time of Degree		GIS&T BOK																		
						Geospatial Data																		
						GD5				GD6			GD7	GD8		GD9	GD10				GD11		GD12	
Knowledge Statement / Competency Division	Domains		Knowledge Statements / Competencies	Mean	Standard Deviation	Map Projection Properties	Map Projection Classes	Map Projection Parameters	Georegistration	Thematic Accuracy	Resolution	Primary & Secondary Sources	Survey Theory & Electro-optical Methods	Tablet Digitizing	Scanning & Automated Vectorization	Spatial Sample Types	Nature of Aerial Imagery Data	Aerial Image Interpretation	Stereoscopy & Orthoimagery	Vector Data Extraction	Nature of Multispectral Image Data	Platforms & Sensors	Metadata	Spatial Data Infrastructures
KNOWLEDGE STATEMENTS	Landscape Architecture History and Criticism	1	history of landscape architecture and allied professions	2.15	0.69	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
		2	historic preservation principles	1.69	0.83	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Natural and Cultural Systems	3	land information sources	2.55	0.77	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		4	patterns of land use and built form	2.43	0.76	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		5	natural site conditions and ecosystems	2.76	0.66	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		6	social and cultural influences on design	2.19	0.81	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		7	regional hazard design considerations	2.1	0.87	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Design and Planning Theories and Methodologies	8	creativity and process including design theory and problem –solving strategies	2.83	0.64	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		9	aesthetic principles of design	2.78	0.71	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		10	human factors such as behavior, perception, psychological and sensory response	2.33	0.76	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		11	natural factors such as ecological relationships	2.53	0.75	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		12	relationship between human and natural systems such as resource conservation, habitat restoration and creation, and urban ecology	2.36	0.79	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		13	influence of context on design, planning, and management decisions	2.45	0.76	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		14	research methods including data collection, interpretation, and application of results	2.37	0.93	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		15	therapeutic aspects of design	1.66	0.88	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		16	communication and education methods, including sharing knowledge and evaluating outcomes	2.15	0.99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Public Policy and Regulation	17	governmental policies and laws that affect the use and development of land	1.8	0.85	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		18	political and regulatory approval processes	1.67	0.92	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		19	land and development economics	1.47	0.83	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		20	emerging trends and issues	1.65	0.83	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Design, Planning and Management at Various Scales and Applications	21	photogrammetry and remote sensing	1.47	0.84	1	0	0	0	0	1	1	0	0	0	0	1	1	1	1	1	1	0	0
		22	visual resource assessment	1.91	0.88	1	0	0	0	0	1	1	0	1	1	0	1	1	0	0	1	0	0	0
		23	agricultural and rural landscape analysis	1.68	0.85	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		24	urban landscape	2.17	0.71	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		25	planning principles including regional community and neighborhood planning	2.12	0.76	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		26	conservation of natural resources	2.33	0.8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		27	historic preservation	1.73	0.76	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		28	ecological planning principles	2.23	0.8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		29	Water resource management	1.91	0.84	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		30	wetland	1.78	0.83	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		31	floodplain management	1.8	0.86	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		32	land and water reclamation procedures including quarry, mine and landfill reclamation	1.43	0.84	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		33	treatment of toxic materials	1.05	0.86	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

LABOK						GIS&T BOK																			
						Geospatial Data																			
				Command of Knowledge at time of Degree		GD5				GD6			GD7	GD8		GD9	GD10				GD11		GD12	
Knowledge Statement / Competency Division	Domains		Knowledge Statements / Competencies	Mean	Standard Deviation	Map Projection Properties	Map Projection Classes	Map Projection Parameters	Georegistration	Thematic Accuracy	Resolution	Primary & Secondary Sources	Survey Theory & Electro-optical Methods	Tablet Digitizing	Scanning & Automated Vectorization	Spatial Sample Types	Nature of Aerial Imagery Data	Aerial Image Interpretation	Stereoscopy & Orthoimagery	Vector Data Extraction	Nature of Multispectral Image Data	Platforms & Sensors	Metadata	Spatial Data Infrastructures
KNOWLEDGE STATEMENTS	Site Design and Engineering: Materials, Methods, Technologies and Applications	34	design needs for special populations	1.91	0.78	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		35	accessibility regulations	2.28	0.87	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		36	roadway design principles	2.15	0.83	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		37	elements of vehicular and pedestrian circulation systems and their design requirements	2.57	0.72	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		38	landscape maintenance techniques, materials, equipment, and practices	1.93	0.87	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		39	noise attenuation and mitigation techniques	1.66	0.82	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		40	sustainable construction practices	1.82	0.84	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		41	construction equipment and technologies	1.76	0.87	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		42	grading, drainage and stormwater treatment	2.78	0.57	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		43	biofiltration and other alternative drainage methods	1.91	0.84	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		44	erosion and sedimentation control	2.28	0.82	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		45	utility systems	1.77	0.77	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		46	Irrigation systems	1.75	0.88	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		47	lighting systems	1.7	0.79	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		48	structural considerations	2.06	0.82	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Construction Documentation and Administration	49	quality control procedures for construction, such as delivery, storage, testing, etc.	1.27	0.87	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		51	the life-cycle cost-analysis process	1.32	0.86	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		52	geographic coordinate systems and layout techniques and conventions	1.9	0.9	1	1	1	1	1	0	0	1	0	0	0	0	0	0	0	0	0	1	1	
		56	basic construction law	1.48	0.84	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		57	construction contracts	1.55	0.88	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Communication	58	determination of user values such as focus groups and surveys	1.52	0.83	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		61	the roles of visual communication, including photographic and video documentation	2.25	0.85	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		62	graphic presentation techniques, systems and symbols	2.71	0.73	1	1	1	1	1	1	0	0	1	1	1	0	0	0	0	0	0	1	0	
		63	interpretive methods and techniques such as information displays and brochures	1.82	0.98	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		64	public relations, outreach, and image development	1.49	0.97	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Values and Ethics in Practice	65	environmental ethics	2.08	0.82	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		66	social responsibility in design	2.1	0.78	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		67	organizational management principles such as leadership principles and landscape architect career cycle	1.61	0.93	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		68	resolving moral and ethical dilemmas	1.89	0.93	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

LABOK						GIS&T BOK																		
						Geospatial Data																		
				Command of Knowledge at time of Degree		GD5				GD6			GD7	GD8		GD9	GD10				GD11		GD12	
Knowledge Statement / Competency Division	Domains		Knowledge Statements / Competencies	Mean	Standard Deviation	Map Projection Properties	Map Projection Classes	Map Projection Parameters	Georegistration	Thematic Accuracy	Resolution	Primary & Secondary Sources	Survey Theory & Electro-optical Methods	Tablet Digitizing	Scanning & Automated Vectorization	Spatial Sample Types	Nature of Aerial Imagery Data	Aerial Image Interpretation	Stereoscopy & Orthoimagery	Vector Data Extraction	Nature of Multispectral Image Data	Platforms & Sensors	Metadata	Spatial Data Infrastructures
COMPETENCIES	Landscape Architecture History & Criticism	69	Develop an understanding of design as exemplified by historically significant works of landscape architecture, urban planning, civic design, and architecture	2.02	0.73	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		70	Examine economic, political, social, ecological and esthetic relationships and their influence on the development of the profession of landscape architecture	1.65	0.78	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		71	Demonstrate an understanding of the evolution of landscape architecture as an art and a profession through knowledge of its terminology, literature, personalities, and concepts	1.85	0.76	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		73	Develop an ability to synthesize and make connections between aspects of landscape architecture and disciplines outside of landscape architecture	1.98	0.73	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Natural & Cultural Systems	74	Conduct field investigations to identify significant natural and cultural features, characteristics, and systems	2.06	0.74	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		75	Perform quantitative analyses to evaluate the interactions of natural and cultural features, characteristics, and systems	1.64	0.78	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		76	Perform qualitative analyses to evaluate the relationship between the natural and cultural features, characteristics, and systems	1.79	0.78	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		77	Predict implications of design, planning, and management proposals on natural cultural systems both within the site and in the larger context	1.88	0.76	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Public Policy and Regulation	78	Identify and collect regulatory information, applicable data and required approvals governing a project (e.g., relevant laws, codes, and regulations)	1.31	0.74	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		79	Confirm code compliance (e.g. zoning, environment, and accessibility)	1.37	0.81	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		80	Assist in the preparation of ordinances, regulations, covenants, standards, and guidelines	0.77	0.69	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		81	Influence public policies on areas such as growth and land and water management by testifying, lobbying, or preparing written documents for public distribution	0.73	0.75	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Design, Planning, and Management at Various Scales and Applications	82	Develop a design program based on users' needs and clients' goals and resources	2.13	0.75	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		83	Analyze relationships among design elements by determining opportunities and constraints	2.33	0.62	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		84	Develop conceptual design, planning, and management solutions	2.39	0.61	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		85	Evaluate design alternatives to determine the appropriate solution	2.45	0.59	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Site Design and Engineering: Materials, Methods, Technologies and Applications	86	Design for protection and management of land resources (e.g. land forms, vegetation, habitat, erosion and sedimentation control)	2.13	0.64	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		87	Design for protection and management of water resources (e.g. storm water, water supply, ground water)	2.05	0.66	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		88	Design pedestrian, vehicular, and non-motorized circulation systems	2.28	0.62	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		89	Design elements for construction considering materials, structural issues, and construction technologies	1.94	0.69	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Construction Documentation and Administration	90	Prepare construction documents including plans, working drawings, and technical specifications	1.87	0.77	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

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				Command of Knowledge at time of Degree		GD5				GD6			GD7	GD8		GD9	GD10				GD11		GD12	
Knowledge Statement / Competency Division	Domains		Knowledge Statements / Competencies	Mean	Standard Deviation	Map Projection Properties	Map Projection Classes	Map Projection Parameters	Georegistration	Thematic Accuracy	Resolution	Primary & Secondary Sources	Survey Theory & Electro-optical Methods	Tablet Digitizing	Scanning & Automated Vectorization	Spatial Sample Types	Nature of Aerial Imagery Data	Aerial Image Interpretation	Stereoscopy & Orthoimagery	Vector Data Extraction	Nature of Multispectral Image Data	Platforms & Sensors	Metadata	Spatial Data Infrastructures
COMPETENCIES	Communication	98	Maintain clear communication among collaborators through correspondence and project coordination	1.51	0.9	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		~~100~~	~~Create graphic materials in a variety of media~~	~~2.19~~	~~0.76~~	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0
		101	Prepare and deliver oral presentations such as meetings, demonstrations, and outreach	2.18	0.72	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Values and Ethics in Practice	104	Manage business practices and organizations	0.81	0.74	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		105	Manage risk and liability	0.86	0.81	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		107	Participate in life-long learning (e.g., a professional organization, continuing education activities)	1.56	1.03	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		109	Train, educate and mentor other professionals	0.96	0.91	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		110	Maintain and promote professional and ethical standards	2.12	0.86	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
					Sum	4	2	2	2	2	4	2	1	2	2	1	2	2	1	1	2	1	3	2
					Average	0.04	0.02	0.02	0.02	0.02	0.04	0.02	0.01	0.02	0.02	0.01	0.02	0.02	0.01	0.01	0.02	0.01	0.03	0.02

LABOK				Command of Knowledge at time of Degree		GIS&T BOK													
						GIS&T and Society													
						GS1			GS2			GS3			GS4		GS5		GS6
Knowledge Statement / Competency Division	Domains		Knowledge Statements / Competencies	Mean	Standard Deviation	Contract Law	Liability	Privacy	Economics & the role of Information	Valuing & Measuring Benefits	Models of Benefits	Uses of Geospatial Information in	Public Participation in Governing	Public Participation GIS	Mechanisms of Control of Geospatial Information	Enforcing Control	Data Sharing Among Organizations &	Legal Mechanisms for Sharing Geospatial	Ethics & Geospatial Information
KNOWLEDGE STATEMENTS	Landscape Architecture History and Criticism	1	history of landscape architecture and allied professions	2.15	0.69	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		2	historic preservation principles	1.69	0.83	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Natural and Cultural Systems	3	land information sources	2.55	0.77	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		4	patterns of land use and built form	2.43	0.76	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		5	natural site conditions and ecosystems	2.76	0.66	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		6	social and cultural influences on design	2.19	0.81	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		7	regional hazard design considerations	2.1	0.87	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Design and Planning Theories and Methodologies	8	creativity and process including design theory and problem –solving strategies	2.83	0.64	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		9	aesthetic principles of design	2.78	0.71	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		10	human factors such as behavior, perception, psychological and sensory response	2.33	0.76	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		11	natural factors such as ecological relationships	2.53	0.75	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		12	relationship between human and natural systems such as resource conservation, habitat restoration and creation, and urban ecology	2.36	0.79	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		13	influence of context on design, planning, and management decisions	2.45	0.76	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		14	research methods including data collection, interpretation, and application of results	2.37	0.93	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		15	therapeutic aspects of design	1.66	0.88	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		16	communication and education methods, including sharing knowledge and evaluating outcomes	2.15	0.99	0	0	0	0	0	0	0	0	0	0	0	1	0	0
	Public Policy and Regulation	17	governmental policies and laws that affect the use and development of land	1.8	0.85	0	1	1	0	0	0	1	0	0	0	0	0	0	0
		18	political and regulatory approval processes	1.67	0.92	0	0	1	0	0	0	1	0	0	0	0	0	0	0
		19	land and development economics	1.47	0.83	0	0	0	1	0	0	1	0	0	0	0	0	0	0
		20	emerging trends and issues	1.65	0.83	0	0	0	0	1	0	1	0	0	0	0	0	0	0
	Design, Planning and Management at Various Scales and Applications	21	photogrammetry and remote sensing	1.47	0.84	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		22	visual resource assessment	1.91	0.88	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		23	agricultural and rural landscape analysis	1.68	0.85	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		24	urban landscape	2.17	0.71	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		25	planning principles including regional community and neighborhood planning	2.12	0.76	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		26	conservation of natural resources	2.33	0.8	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		27	historic preservation	1.73	0.76	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		28	ecological planning principles	2.23	0.8	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		29	Water resource management	1.91	0.84	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		30	wetland	1.78	0.83	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		31	floodplain management	1.8	0.86	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		32	land and water reclamation procedures including quarry, mine and landfill reclamation	1.43	0.84	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		33	treatment of toxic materials	1.05	0.86	0	0	0	0	0	0	0	0	0	0	0	0	0	0

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Knowledge Statement / Competency Division	Domains		Knowledge Statements / Competencies	Mean	Standard Deviation	Contract Law	Liability	Privacy	Economics & the role of Information	Valuing & Measuring Benefits	Models of Benefits	Uses of Geospatial Information in	Public Participation in Governing	Public Participation GIS	Mechanisms of Control of Geospatial Information	Enforcing Control	Data Sharing Among Organizations &	Legal Mechanisms for Sharing Geospatial	Ethics & Geospatial Information
KNOWLEDGE STATEMENTS	Site Design and Engineering: Materials, Methods, Technologies and Applications	34	design needs for special populations	1.91	0.78	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		35	accessibility regulations	2.28	0.87	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		36	roadway design principles	2.15	0.83	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		37	elements of vehicular and pedestrian circulation systems and their design requirements	2.57	0.72	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		38	landscape maintenance techniques, materials, equipment, and practices	1.93	0.87	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		39	noise attenuation and mitigation techniques	1.66	0.82	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		40	sustainable construction practices	1.82	0.84	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		41	construction equipment and technologies	1.76	0.87	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		42	grading, drainage and stormwater treatment	2.78	0.57	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		43	biofiltration and other alternative drainage methods	1.91	0.84	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		44	erosion and sedimentation control	2.28	0.82	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		45	utility systems	1.77	0.77	0	0	0	0	0	0	1	0	0	0	0	0	0	0
		46	Irrigation systems	1.75	0.88	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		47	lighting systems	1.7	0.79	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		48	structural considerations	2.06	0.82	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Construction Documentation and Administration	49	quality control procedures for construction, such as delivery, storage, testing, etc.	1.27	0.87	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		51	the life-cycle cost-analysis process	1.32	0.86	0	0	0	0	1	0	0	0	0	0	0	0	0	0
		52	geographic coordinate systems and layout techniques and conventions	1.9	0.9	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		56	basic construction law	1.48	0.84	0	0	0	0	0	0	0	0	0	0	1	0	0	0
		57	construction contracts	1.55	0.88	0	0	0	0	0	0	0	0	0	0	1	0	0	0
	Communication	58	determination of user values such as focus groups and surveys	1.52	0.83	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		61	the roles of visual communication, including photographic and video documentation	2.25	0.85	0	0	0	0	0	1	0	0	1	0	0	0	0	0
		62	graphic presentation techniques, systems and symbols	2.71	0.73	0	0	0	0	0	1	0	0	0	0	0	0	0	0
		63	interpretive methods and techniques such as information displays and brochures	1.82	0.98	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		64	public relations, outreach, and image development	1.49	0.97	0	0	0	0	0	0	0	0	1	0	0	0	0	0
	Values and Ethics in Practice	65	environmental ethics	2.08	0.82	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		66	social responsibility in design	2.1	0.78	0	1	0	0	0	0	0	0	0	0	0	0	0	0
		67	organizational management principles such as leadership principles and landscape architect career cycle	1.61	0.93	0	0	0	0	0	0	0	0	0	0	0	0	0	1
		68	resolving moral and ethical dilemmas	1.89	0.93	0	0	0	0	0	0	0	0	0	0	0	0	0	1

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						GS1			GS2			GS3			GS4		GS5		GS6
Knowledge Statement / Competency Division	Domains		Knowledge Statements / Competencies	Mean	Standard Deviation	Contract Law	Liability	Privacy	Economics & the role of Information	Valuing & Measuring Benefits	Models of Benefits	Uses of Geospatial Information in	Public Participation in Governing	Public Participation GIS	Mechanisms of Control of Geospatial Information	Enforcing Control	Data Sharing Among Organizations &	Legal Mechanisms for Sharing Geospatial	Ethics & Geospatial Information
COMPETENCIES	Landscape Architecture History & Criticism	69	Develop an understanding of design as exemplified by historically significant works of landscape architecture, urban planning, civic design, and architecture	2.02	0.73	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		70	Examine economic, political, social, ecological and esthetic relationships and their influence on the development of the profession of landscape architecture	1.65	0.78	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		71	Demonstrate an understanding of the evolution of landscape architecture as an art and a profession through knowledge of its terminology, literature, personalities, and concepts	1.85	0.76	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		73	Develop an ability to synthesize and make connections between aspects of landscape architecture and disciplines outside of landscape architecture	1.98	0.73	0	0	0	0	0	0	0	0	0	0	0	0	1	0
	Natural & Cultural Systems	74	Conduct field investigations to identify significant natural and cultural features, characteristics, and systems	2.06	0.74	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		75	Perform quantitative analyses to evaluate the interactions of natural and cultural features, characteristics, and systems	1.64	0.78	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		76	Perform qualitative analyses to evaluate the relationship between the natural and cultural features, characteristics, and systems	1.79	0.78	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		77	Predict implications of design, planning, and management proposals on natural cultural systems both within the site and in the larger context	1.88	0.76	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Public Policy and Regulation	78	Identify and collect regulatory information, applicable data and required approvals governing a project (e.g., relevant laws, codes, and regulations)	1.31	0.74	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0
		79	Confirm code compliance (e.g. zoning, environment, and accessibility)	1.37	0.81	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0
		80	Assist in the preparation of ordinances, regulations, covenants, standards, and guidelines	0.77	0.69	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		81	Influence public policies on areas such as growth and land and water management by testifying, lobbying, or preparing written documents for public distribution	0.73	0.75	1	0	0	0	0	0	0	1	0	0	0	0	0	0	0
	Design, Planning, and Management at Various Scales and Applications	82	Develop a design program based on users' needs and clients' goals and resources	2.13	0.75	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		83	Analyze relationships among design elements by determining opportunities and constraints	2.33	0.62	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		84	Develop conceptual design, planning, and management solutions	2.39	0.61	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		85	Evaluate design alternatives to determine the appropriate solution	2.45	0.59	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Site Design and Engineering: Materials, Methods, Technologies and Applications	86	Design for protection and management of land resources (e.g. land forms, vegetation, habitat, erosion and sedimentation control)	2.13	0.64	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		87	Design for protection and management of water resources (e.g. storm water, water supply, ground water)	2.05	0.66	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		88	Design pedestrian, vehicular, and non-motorized circulation systems	2.28	0.62	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		89	Design elements for construction considering materials, structural issues, and construction technologies	1.94	0.69	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Construction Documentation and Administration	90	Prepare construction documents including plans, working drawings, and technical specifications	1.87	0.77	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

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COMPETENCIES	Communication	98	Maintain clear communication among collaborators through correspondence and project coordination	1.51	0.9	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		~~100~~	~~Create graphic materials in a variety of media~~	~~2.19~~	~~0.76~~	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		101	Prepare and deliver oral presentations such as meetings, demonstrations, and outreach	2.18	0.72	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Values and Ethics in Practice	104	Manage business practices and organizations	0.81	0.74	0	0	0	0	0	0	0	0	0	1	0	0	0	0
		105	Manage risk and liability	0.86	0.81	0	1	0	0	0	0	0	0	0	0	0	0	0	0
		107	Participate in life-long learning (e.g., a professional organization, continuing education activities)	1.56	1.03	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		109	Train, educate and mentor other professionals	0.96	0.91	0	0	0	0	0	0	0	0	0	0	0	1	0	0
		110	Maintain and promote professional and ethical standards	2.12	0.86	0	0	0	0	0	0	0	0	0	0	0	0	0	1
					Sum	1	3	2	1	2	2	7	1	2	2	2	2	1	3
					Average	0.01	0.03	0.02	0.01	0.02	0.02	0.08	0.01	0.02	0.02	0.02	0.02	0.01	0.03

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						Organizational & Institutional Aspects																
						OI1	OI2					OI3		OI4	OI5			OI6				
Knowledge Statement / Competency Division	Domains		Knowledge Statements / Competencies	Mean	Standard Deviation	Learning from Experience	Ongoing GI System Revisions	Budgeting for GI System Management	Database Administration	System Management	User Support	Organizational Models for GI System	Organizational Models for Geocoding GI Systems and/or Program	GIS&T Training & Education	Spatial Data Infrastructures	Spatial Data Sharing Among Organizations	Balancing Data Access, Security, & Privacy	Federal Agencies & National & International Organizations &	Professional Organizations	The Geospatial Community		Sum Horizontal Results
KNOWLEDGE STATEMENTS	Landscape Architecture History and Criticism	1	history of landscape architecture and allied professions	2.15	0.69	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0		14
		2	historic preservation principles	1.69	0.83	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		4
	Natural and Cultural Systems	3	land information sources	2.55	0.77	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		5
		4	patterns of land use and built form	2.43	0.76	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		33
		5	natural site conditions and ecosystems	2.76	0.66	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		25
		6	social and cultural influences on design	2.19	0.81	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		7
		7	regional hazard design considerations	2.1	0.87	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		5
	Design and Planning Theories and Methodologies	8	creativity and process including design theory and problem –solving strategies	2.83	0.64	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		10
		9	aesthetic principles of design	2.78	0.71	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		10
		10	human factors such as behavior, perception, psychological and sensory response	2.33	0.76	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		9
		11	natural factors such as ecological relationships	2.53	0.75	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		23
		12	relationship between human and natural systems such as resource conservation, habitat restoration and creation, and urban ecology	2.36	0.79	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		19
		13	influence of context on design, planning, and management decisions	2.45	0.76	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		14
		14	research methods including data collection, interpretation, and application of results	2.37	0.93	0	1	1	1	0	0	0	0	0	0	1	0	0	0	0		19
		15	therapeutic aspects of design	1.66	0.88	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		3
		16	communication and education methods, including sharing knowledge and evaluating outcomes	2.15	0.99	1	0	1	0	1	1	1	1	0	0	0	1	0	0	1		24
	Public Policy and Regulation	17	governmental policies and laws that affect the use and development of land	1.8	0.85	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		9
		18	political and regulatory approval processes	1.67	0.92	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		4
		19	land and development economics	1.47	0.83	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		8
		20	emerging trends and issues	1.65	0.83	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		4
	Design, Planning and Management at Various Scales and Applications	21	photogrammetry and remote sensing	1.47	0.84	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		30
		22	visual resource assessment	1.91	0.88	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		42
		23	agricultural and rural landscape analysis	1.68	0.85	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		20
		24	urban landscape	2.17	0.71	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		15
		25	planning principles including regional community and neighborhood planning	2.12	0.76	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		12
		26	conservation of natural resources	2.33	0.8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		15
		27	historic preservation	1.73	0.76	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		4
		28	ecological planning principles	2.23	0.8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		10
		29	Water resource management	1.91	0.84	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		10
		30	wetland	1.78	0.83	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		14
		31	floodplain management	1.8	0.86	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		15
		32	land and water reclamation procedures including quarry, mine and landfill reclamation	1.43	0.84	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		8
		33	treatment of toxic materials	1.05	0.86	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		6

LABOK						GIS&T BOK																
				Command of Knowledge at time of Degree		Organizational & Institutional Aspects																
						OI1	OI2					OI3		OI4	OI5			OI6				
Knowledge Statement / Competency Division	Domains		Knowledge Statements / Competencies	Mean	Standard Deviation	Learning from Experience	Ongoing GI System Revisions	Budgeting for GI System Management	Database Administration	System Management	User Support	Organizational Models for GI System	Organizational Models for Geocoding GI Systems and/or Program	GIS&T Training & Education	Spatial Data Infrastructures	Spatial Data Sharing Among Organizations	Balancing Data Access, Security, & Privacy	Federal Agencies & National & International Organizations &	Professional Organizations	The Geospatial Community		Sum Horizontal Results
KNOWLEDGE STATEMENTS	Site Design and Engineering: Materials, Methods, Technologies and Applications	34	design needs for special populations	1.91	0.78	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		2
		35	accessibility regulations	2.28	0.87	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		4
		36	roadway design principles	2.15	0.83	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		19
		37	elements of vehicular and pedestrian circulation systems and their design requirements	2.57	0.72	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		14
		38	landscape maintenance techniques, materials, equipment, and practices	1.93	0.87	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		1
		39	noise attenuation and mitigation techniques	1.66	0.82	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		2
		40	sustainable construction practices	1.82	0.84	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		4
		41	construction equipment and technologies	1.76	0.87	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		1
		42	grading, drainage and stormwater treatment	2.78	0.57	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		12
		43	biofiltration and other alternative drainage methods	1.91	0.84	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		6
		44	erosion and sedimentation control	2.28	0.82	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		7
		45	utility systems	1.77	0.77	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		12
		46	Irrigation systems	1.75	0.88	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		10
		47	lighting systems	1.7	0.79	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		10
		48	structural considerations	2.06	0.82	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		4
	Construction Documentation and Administration	49	quality control procedures for construction, such as delivery, storage, testing, etc.	1.27	0.87	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		3
		51	the life-cycle cost-analysis process	1.32	0.86	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		1
		52	geographic coordinate systems and layout techniques and conventions	1.9	0.9	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		38
		56	basic construction law	1.48	0.84	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		2
		57	construction contracts	1.55	0.88	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		2
	Communication	58	determination of user values such as focus groups and surveys	1.52	0.83	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		2
		61	the roles of visual communication, including photographic and video documentation	2.25	0.85	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		26
		62	graphic presentation techniques, systems and symbols	2.71	0.73	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0		55
		63	interpretive methods and techniques such as information displays and brochures	1.82	0.98	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		6
		64	public relations, outreach, and image development	1.49	0.97	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		2
	Values and Ethics in Practice	65	environmental ethics	2.08	0.82	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		3
		66	social responsibility in design	2.1	0.78	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		2
		67	organizational management principles such as leadership principles and landscape architect career cycle	1.61	0.93	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		1
		68	resolving moral and ethical dilemmas	1.89	0.93	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		2

LABOK						GIS&T BOK																
				Command of Knowledge at time of Degree		Organizational & Institutional Aspects																
						OI1	OI2					OI3		OI4	OI5			OI6				
Knowledge Statement / Competency Division	Domains		Knowledge Statements / Competencies	Mean	Standard Deviation	Learning from Experience	Ongoing GI System Revisions	Budgeting for GI System Management	Database Administration	System Management	User Support	Organizational Models for GI System	Organizational Models for Geocoding GI Systems and/or Program	GIS&T Training & Education	Spatial Data Infrastructures	Spatial Data Sharing Among Organizations	Balancing Data Access, Security, & Privacy	Federal Agencies & National & International Organizations &	Professional Organizations	The Geospatial Community		Sum Horizontal Results
COMPETENCIES	Landscape Architecture History & Criticism	69	Develop an understanding of design as exemplified by historically significant works of landscape architecture, urban planning, civic design, and architecture	2.02	0.73	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		3
		70	Examine economic, political, social, ecological and esthetic relationships and their influence on the development of the profession of landscape architecture	1.65	0.78	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		6
		71	Demonstrate an understanding of the evolution of landscape architecture as an art and a profession through knowledge of its terminology, literature, personalities, and concepts	1.85	0.76	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		1
		73	Develop an ability to synthesize and make connections between aspects of landscape architecture and disciplines outside of landscape architecture	1.98	0.73	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0		9
	Natural & Cultural Systems	74	Conduct field investigations to identify significant natural and cultural features, characteristics, and systems	2.06	0.74	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		13
		75	Perform quantitative analyses to evaluate the interactions of natural and cultural features, characteristics, and systems	1.64	0.78	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		10
		76	Perform qualitative analyses to evaluate the relationship between the natural and cultural features, characteristics, and systems	1.79	0.78	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		11
		77	Predict implications of design, planning, and management proposals on natural cultural systems both within the site and in the larger context	1.88	0.76	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		9
	Public Policy and Regulation	78	Identify and collect regulatory information, applicable data and required approvals governing a project (e.g., relevant laws, codes, and regulations)	1.31	0.74	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		6
		79	Confirm code compliance (e.g. zoning, environment, and accessibility)	1.37	0.81	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		6
		80	Assist in the preparation of ordinances, regulations, covenants, standards, and guidelines	0.77	0.69	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		3
		81	Influence public policies on areas such as growth and land and water management by testifying, lobbying, or preparing written documents for public distribution	0.73	0.75	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		7
	Design, Planning, and Management at Various Scales and Applications	82	Develop a design program based on users' needs and clients' goals and resources	2.13	0.75	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		2
		83	Analyze relationships among design elements by determining opportunities and constraints	2.33	0.62	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		8
		84	Develop conceptual design, planning, and management solutions	2.39	0.61	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		4
		85	Evaluate design alternatives to determine the appropriate solution	2.45	0.59	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		5
	Site Design and Engineering: Materials, Methods, Technologies and Applications	86	Design for protection and management of land resources (e.g. land forms, vegetation, habitat, erosion and sedimentation control)	2.13	0.64	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		19
		87	Design for protection and management of water resources (e.g. storm water, water supply, ground water)	2.05	0.66	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		14
		88	Design pedestrian, vehicular, and non-motorized circulation systems	2.28	0.62	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		14
		89	Design elements for construction considering materials, structural issues, and construction technologies	1.94	0.69	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		3
	Construction Documentation and Administration	90	Prepare construction documents including plans, working drawings, and technical specifications	1.87	0.77	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		1

LABOK						GIS&T BOK																
				Command of Knowledge at time of Degree		Organizational & Institutional Aspects																
						OI1	OI2					OI3		OI4	OI5			OI6				
Knowledge Statement / Competency Division	Domains		Knowledge Statements / Competencies	Mean	Standard Deviation	Learning from Experience	Ongoing GI System Revisions	Budgeting for GI System Management	Database Administration	System Management	User Support	Organizational Models for GI System	Organizational Models for Geocoding GI Systems and/or Program	GIS&T Training & Education	Spatial Data Infrastructures	Spatial Data Sharing Among Organizations	Balancing Data Access, Security, & Privacy	Federal Agencies & National & International Organizations &	Professional Organizations	The Geospatial Community		Sum Horizontal Results
COMPETENCIES	Communication	98	Maintain clear communication among collaborators through correspondence and project coordination	1.51	0.9	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0		1
		~~100~~	~~Create graphic materials in a variety of media~~	~~2.19~~	~~0.76~~	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		20
		101	Prepare and deliver oral presentations such as meetings, demonstrations, and outreach	2.18	0.72	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		1
	Values and Ethics in Practice	104	Manage business practices and organizations	0.81	0.74	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		1
		105	Manage risk and liability	0.86	0.81	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		1
		107	Participate in life-long learning (e.g., a professional organization, continuing education activities)	1.56	1.03	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0		1
		109	Train, educate and mentor other professionals	0.96	0.91	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0		4
		110	Maintain and promote professional and ethical standards	2.12	0.86	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		1
					Sum	1	2	3	1	1	1	1	1	1	1	3	1	1	1	1		
					Average	0.01	0.02	0.03	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.03	0.01	0.01	0.01	0.01		

Appendix H - Phase Two

LABOK						LAAB	GIS&T BOK															
				Command of Knowledge at time of Degree			Analytical Methods															
							AM1		AM2		AM3								AM4			
Knowledge Statement / Competency Division	Domains		Knowledge Statements / Competencies	Mean	Standard Deviation	Computing applications and other advanced technology	Academic Foundations	Analytical Approaches	Structured Query & Language	Spatial Queries	Distance & Lengths	Direction	Shape	Area	Proximity & Distance Decay	Adjacency & Connectivity	Buffers	Overlay	Neighborhoods	Map Algebra
Knowledge Statements	Natural and Cultural Systems	3	land information sources	2.55	0.77	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		4	patterns of land use and built form	2.43	0.76	1	1	1	0	0	0	0	1	0	1	1	1	1	0	0
		5	natural site conditions and ecosystems	2.76	0.66	1	0	1	0	0	0	1	0	0	0	0	1	1	0	0
		6	social and cultural influences on design	2.19	0.81	1	0	0	0	0	0	0	0	0	1	0	0	0	0	0
		7	regional hazard design considerations	2.1	0.87	1	0	0	0	0	0	0	0	0	0	0	1	1	0	0
	Design and Planning Theories and Methodologies	8	creativity and process including design theory and problem –solving strategies	2.83	0.64	1	0	0	0	0	0	0	0	0	0	0	1	0	0	0
		10	human factors such as behavior, perception, psychological and sensory response	2.33	0.76	1	0	0	0	0	0	0	0	0	1	0	1	0	0	0
		11	natural factors such as ecological relationships	2.53	0.75	1	0	1	0	0	0	0	0	0	0	1	1	0	1	1
		12	relationship between human and natural systems such as resource conservation, habitat restoration and creation, and urban ecology	2.36	0.79	1	1	0	0	0	0	0	0	0	1	0	1	0	1	0
		13	influence of context on design, planning, and management decisions	2.45	0.76	1	1	0	0	0	0	1	0	0	1	0	1	0	0	0
		14	research methods including data collection, interpretation, and application of results	2.37	0.93	1	1	0	0	0	0	0	0	0	0	0	1	0	0	0
		16	communication and education methods, including sharing knowledge and evaluating outcomes	2.15	0.99	1	1	0	1	0	0	0	0	0	0	0	0	0	0	0
	Public Policy and Regulation	17	governmental policies and laws that affect the use and development of land	1.8	0.85	1	0	0	0	0	0	0	0	0	0	0	1	0	0	0
	Design, Planning and Management at Various Scales and Applications	21	photogrammetry and remote sensing	1.47	0.84	1	0	1	0	1	0	1	1	0	0	0	0	0	0	0
		22	visual resource assessment	1.91	0.88	1	0	1	0	0	1	0	1	0	0	0	0	1	0	0
		23	agricultural and rural landscape analysis	1.68	0.85	1	0	1	0	0	0	0	1	0	0	0	1	0	0	0
		24	urban landscape	2.17	0.71	1	0	0	0	0	1	0	1	0	1	0	1	0	1	1
		25	planning principles including regional community and neighborhood planning	2.12	0.76	1	0	0	0	0	1	0	0	0	1	1	1	0	0	0
		26	conservation of natural resources	2.33	0.8	1	1	0	0	1	0	0	0	0	0	0	1	0	0	1
		28	ecological planning principles	2.23	0.8	1	0	0	0	0	0	0	0	0	0	0	1	0	0	1
		29	Water resource management	1.91	0.84	1	1	0	0	0	0	0	0	0	0	0	0	0	0	1
		31	floodplain management	1.8	0.86	1	0	0	0	0	0	0	0	0	0	0	1	0	0	1
	Site Design and Engineering: Materials, Methods, Technologies and Applications	36	roadway design principles	2.15	0.83	1	0	0	0	0	1	1	1	1	1	1	1	1	0	0
		37	elements of vehicular and pedestrian circulation systems and their design requirements	2.57	0.72	1	0	0	0	0	1	1	1	0	1	1	1	0	0	0
		42	grading, drainage and stormwater treatment	2.78	0.57	1	0	0	0	0	1	1	0	1	0	0	1	0	0	0
		44	erosion and sedimentation control	2.28	0.82	1	0	0	0	0	0	0	0	0	0	0	1	0	0	0
		45	utility systems	1.77	0.77	1	0	0	0	1	1	1	0	0	1	0	0	1	0	1
		46	Irrigation systems	1.75	0.88	1	0	0	0	1	1	1	0	0	1	0	0	1	0	0
		47	lighting systems	1.7	0.79	1	0	0	0	1	1	1	0	0	1	0	0	1	0	0
	Construction Documentation and Administration	52	geographic coordinate systems and layout techniques and conventions	1.9	0.9	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Communication	61	the roles of visual communication, including photographic and video documentation	2.25	0.85	1	0	0	0	0	0	0	0	0	0	0	1	0	0	0
		62	graphic presentation techniques, systems and symbols	2.71	0.73	1	0	1	0	0	0	1	0	0	0	0	0	0	0	0
	Values and Ethics in Practice	65	environmental ethics	2.08	0.82	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0

LABOK						LAAB	GIS&T BOK															
				Command of Knowledge at time of Degree			Analytical Methods															
							AM1		AM2		AM3								AM4			
Knowledge Statement / Competency Division	Domains		Knowledge Statements / Competencies	Mean	Standard Deviation	Computing applications and other advanced technology	Academic Foundations	Analytical Approaches	Structured Query & Language	Spatial Queries	Distance & Lengths	Direction	Shape	Area	Proximity & Distance Decay	Adjacency & Connectivity	Buffers	Overlay	Neighborhoods	Map Algebra
Competencies	Natural & Cultural Systems	74	Conduct field investigations to identify significant natural and cultural features, characteristics, and systems	2.06	0.74	**1**	1	1	0	1	0	0	0	0	0	0	1	0	0	1
		75	Perform quantitative analyses to evaluate the interactions of natural and cultural features, characteristics, and systems	1.64	0.78	**1**	0	0	0	0	0	0	0	0	0	0	0	0	0	1
		76	Perform qualitative analyses to evaluate the relationship between the natural and cultural features, characteristics, and systems	1.79	0.78	**1**	0	0	0	0	0	0	0	0	0	0	0	0	0	1
		77	Predict implications of design, planning, and management proposals on natural cultural systems both within the site and in the larger context	1.88	0.76	**1**	0	0	0	0	0	0	0	0	1	0	1	0	0	0
	Public Policy and Regulation	79	Confirm code compliance (e.g. zoning, environment, and accessibility)	1.37	0.81	**1**	0	0	0	0	1	0	0	0	1	0	0	0	0	0
	Design, Planning, and Management at Various Scales and	82	Develop a design program based on users' needs and clients' goals and resources	2.13	0.75	**1**	0	0	0	1	0	0	0	0	0	1	0	0	0	0
		83	Analyze relationships among design elements by determining opportunities and constraints	2.33	0.62	**1**	0	0	0	0	0	0	1	0	0	0	0	1	0	1
		84	Develop conceptual design, planning, and management solutions	2.39	0.61	**1**	0	0	0	0	0	0	0	0	1	1	0	1	0	0
		85	Evaluate design alternatives to determine the appropriate solution	2.45	0.59	**1**	0	0	0	0	1	0	0	0	1	1	0	0	0	0
	Site Design and Engineering: Materials, Methods, Technologies and Applications	86	Design for protection and management of land resources (e.g. land forms, vegetation, habitat, erosion and sedimentation control)	2.13	0.64	**1**	0	0	0	1	0	0	0	0	0	1	1	1	0	1
		87	Design for protection and management of water resources (e.g. storm water, water supply, ground water)	2.05	0.66	**1**	0	0	0	0	0	0	0	0	0	1	1	1	0	1
		88	Design pedestrian, vehicular, and non-motorized circulation systems	2.28	0.62	**1**	0	0	0	0	1	1	0	0	1	1	0	1	0	1
		89	Design elements for construction considering materials, structural issues, and construction technologies	1.94	0.69	**1**	0	0	0	0	0	0	0	0	0	0	0	1	0	0
	Construction Documentation and Administration	90	Prepare construction documents including plans, working drawings, and technical specifications	1.87	0.77	**1**	0	0	0	0	1	0	0	0	0	0	0	0	0	0
	Communication	98	Maintain clear communication among collaborators through correspondence and project coordination	1.51	0.9	**1**	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		100	Create graphic materials in a variety of media	2.19	0.76	**1**	0	0	0	0	0	0	0	0	0	0	0	1	0	0
					Sum		8	8	1	8	13	11	8	2	17	11	25	15	3	14
					Average		0.16	0.16	0.02	0.16	0.27	0.22	0.16	0.04	0.35	0.22	0.51	0.31	0.06	0.29

LABOK						LAAB	GIS&T BOK												
				Command of Knowledge at time of Degree			Analytical Methods												
							AM5							AM6				AM7	
Knowledge Statement / Competency Division	Domains		Knowledge Statements / Competencies	Mean	Standard Deviation	Computing applications and other advanced technology	Point Pattern Analysis	Spatial Cluster Analysis	Spatial Interaction	Analyzing Multidimensional Attributes	Cartographic Modeling	Multi-criteria Evaluation	Spatial Process Models	Calculating Surface Derivatives	Interpretation of Surfaces	Surface Features	Indivisibility	Graphical Methods
Knowledge Statements	Natural and Cultural Systems	3	land information sources	2.55	0.77	1	0	0	0	0	0	0	0	1	1	1	0	0
		4	patterns of land use and built form	2.43	0.76	1	1	1	1	1	0	0	1	1	1	1	0	1
		5	natural site conditions and ecosystems	2.76	0.66	1	0	0	1	1	0	1	1	1	1	1	0	1
		6	social and cultural influences on design	2.19	0.81	1	0	0	1	0	0	0	0	0	0	0	0	0
		7	regional hazard design considerations	2.1	0.87	1	0	0	0	0	0	1	0	1	0	0	0	0
	Design and Planning Theories and Methodologies	8	creativity and process including design theory and problem –solving strategies	2.83	0.64	1	0	0	0	0	1	0	0	0	0	0	0	0
		10	human factors such as behavior, perception, psychological and sensory response	2.33	0.76	1	0	0	0	0	0	0	1	1	0	0	0	0
		11	natural factors such as ecological relationships	2.53	0.75	1	0	1	1	0	0	0	1	1	1	1	0	0
		12	relationship between human and natural systems such as resource conservation, habitat restoration and creation, and urban ecology	2.36	0.79	1	0	0	1	1	0	0	1	1	0	0	0	0
		13	influence of context on design, planning, and management decisions	2.45	0.76	1	0	0	1	0	0	0	1	1	0	0	0	0
		14	research methods including data collection, interpretation, and application of results	2.37	0.93	1	0	0	0	0	0	0	0	1	0	0	0	1
		16	communication and education methods, including sharing knowledge and evaluating outcomes	2.15	0.99	1	0	0	0	0	0	0	0	0	0	0	0	1
	Public Policy and Regulation	17	governmental policies and laws that affect the use and development of land	1.8	0.85	1	0	0	0	0	0	0	0	0	0	0	0	0
	Design, Planning and Management at Various Scales and Applications	21	photogrammetry and remote sensing	1.47	0.84	1	0	0	0	1	0	0	0	0	0	0	1	0
		22	visual resource assessment	1.91	0.88	1	0	0	0	0	1	0	0	1	1	0	1	1
		23	agricultural and rural landscape analysis	1.68	0.85	1	0	0	1	1	0	0	1	1	1	1	1	1
		24	urban landscape	2.17	0.71	1	1	0	1	0	0	0	1	1	1	0	1	0
		25	planning principles including regional community and neighborhood planning	2.12	0.76	1	0	0	1	0	0	1	0	1	1	0	0	0
		26	conservation of natural resources	2.33	0.8	1	0	0	1	0	1	1	0	1	1	1	1	0
		28	ecological planning principles	2.23	0.8	1	0	0	1	0	1	1	0	1	1	1	0	0
		29	Water resource management	1.91	0.84	1	0	0	1	0	0	1	0	1	1	1	0	0
		31	floodplain management	1.8	0.86	1	0	0	1	0	0	1	0	1	1	1	0	0
	Site Design and Engineering: Materials, Methods, Technologies and Applications	36	roadway design principles	2.15	0.83	1	0	0	1	0	0	0	0	1	1	1	0	0
		37	elements of vehicular and pedestrian circulation systems and their design requirements	2.57	0.72	1	0	0	1	0	0	0	0	1	1	0	0	0
		42	grading, drainage and stormwater treatment	2.78	0.57	1	0	0	0	0	0	0	0	1	1	1	1	0
		44	erosion and sedimentation control	2.28	0.82	1	0	0	0	0	0	0	0	1	1	1	0	0
		45	utility systems	1.77	0.77	1	0	0	0	0	0	0	0	1	1	0	0	0
		46	Irrigation systems	1.75	0.88	1	0	0	0	0	0	0	0	1	1	0	0	0
		47	lighting systems	1.7	0.79	1	0	0	0	0	0	0	0	1	1	0	0	0
	Construction Documentation and Administration	52	geographic coordinate systems and layout techniques and conventions	1.9	0.9	1	0	0	0	0	0	0	0	0	0	0	1	0
	Communication	61	the roles of visual communication, including photographic and video documentation	2.25	0.85	1	0	0	0	0	0	0	0	0	0	0	0	1
		62	graphic presentation techniques, systems and symbols	2.71	0.73	1	0	0	0	0	0	0	0	0	0	0	1	1
	Values and Ethics in Practice	65	environmental ethics	2.08	0.82	1	0	0	0	0	0	0	0	0	0	1	1	0

LABOK						LAAB	GIS&T BOK												
				Command of Knowledge at time of Degree			Analytical Methods												
							AM5							AM6				AM7	
Knowledge Statement / Competency Division	Domains		Knowledge Statements / Competencies	Mean	Standard Deviation	Computing applications and other advanced technology	Point Pattern Analysis	Spatial Cluster Analysis	Spatial Interaction	Analyzing Multidimensional Attributes	Cartographic Modeling	Multi-criteria Evaluation	Spatial Process Models	Calculating Surface Derivatives	Interpretation of Surfaces	Surface Features	Indivisibility	Graphical Methods
Competencies	Natural & Cultural Systems	74	Conduct field investigations to identify significant natural and cultural features, characteristics, and systems	2.06	0.74	**1**	0	0	1	0	0	0	0	1	0	1	1	0
		75	Perform quantitative analyses to evaluate the interactions of natural and cultural features, characteristics, and systems	1.64	0.78	**1**	0	0	1	0	0	1	0	1	1	1	1	1
		76	Perform qualitative analyses to evaluate the relationship between the natural and cultural features, characteristics, and systems	1.79	0.78	**1**	0	0	1	0	0	1	0	1	1	1	1	1
		77	Predict implications of design, planning, and management proposals on natural cultural systems both within the site and in the larger context	1.88	0.76	**1**	0	0	0	0	0	0	0	1	0	1	1	1
	Public Policy and Regulation	79	Confirm code compliance (e.g. zoning, environment, and accessibility)	1.37	0.81	**1**	0	0	0	0	0	0	0	1	0	0	0	0
	Design, Planning, and Management at Various Scales and	82	Develop a design program based on users' needs and clients' goals and resources	2.13	0.75	**1**	0	0	0	0	0	0	0	0	0	0	0	0
		83	Analyze relationships among design elements by determining opportunities and constraints	2.33	0.62	**1**	0	0	1	0	0	0	0	1	0	0	0	1
		84	Develop conceptual design, planning, and management solutions	2.39	0.61	**1**	0	0	0	0	0	0	0	1	0	0	0	0
		85	Evaluate design alternatives to determine the appropriate solution	2.45	0.59	**1**	0	0	0	0	0	0	0	1	0	0	0	0
	Site Design and Engineering: Materials, Methods, Technologies and Applications	86	Design for protection and management of land resources (e.g. land forms, vegetation, habitat, erosion and sedimentation control)	2.13	0.64	**1**	0	0	1	0	0	1	0	1	1	1	1	0
		87	Design for protection and management of water resources (e.g. storm water, water supply, ground water)	2.05	0.66	**1**	0	0	1	0	0	0	0	1	0	1	1	0
		88	Design pedestrian, vehicular, and non-motorized circulation systems	2.28	0.62	**1**	0	0	0	0	0	0	0	1	0	0	1	0
		89	Design elements for construction considering materials, structural issues, and construction technologies	1.94	0.69	**1**	0	0	0	0	0	0	0	1	0	0	0	0
	Construction Documentation and Administration	90	Prepare construction documents including plans, working drawings, and technical specifications	1.87	0.77	**1**	0	0	0	0	0	0	0	0	0	0	0	0
	Communication	98	Maintain clear communication among collaborators through correspondence and project coordination	1.51	0.9	**1**	0	0	0	0	0	0	0	0	0	0	0	0
		100	Create graphic materials in a variety of media	2.19	0.76	**1**	0	0	0	0	0	0	0	0	0	0	0	1
					Sum		2	2	21	5	4	10	8	36	22	19	16	13
					Average		0.04	0.04	0.43	0.10	0.08	0.20	0.16	0.73	0.45	0.39	0.33	0.27

LABOK						LAAB	GIS&T BOK												
				Command of Knowledge at time of Degree			Analytical Methods												
							AM8				AM10		AM11						AM12
Knowledge Statement / Competency Division	Domains		Knowledge Statements / Competencies	Mean	Standard Deviation	Computing applications and other advanced technology	Spatial Sampling for Statistical Analysis	Principles of Semi-variogram Construction	Principles of Kriging	Kriging Variants	Knowledge Discovery	Pattern Recognition & Matching	Networks Defined	Graphic Theoretic (descriptive) Measures	Least-cost (shortest) Path	Classic Transportation Problem	Other Classic Network Problems	Accessibility Modeling	Operations Research Modeling & Location Modeling Principles
Knowledge Statements	Natural and Cultural Systems	3	land information sources	2.55	0.77	1	0	0	0	0	0	0	0	0	0	0	0	0	0
		4	patterns of land use and built form	2.43	0.76	1	1	0	1	1	0	1	1	1	0	1	1	1	1
		5	natural site conditions and ecosystems	2.76	0.66	1	1	1	1	1	0	1	1	1	0	0	0	1	0
		6	social and cultural influences on design	2.19	0.81	1	0	0	0	0	0	0	0	0	0	1	0	1	0
		7	regional hazard design considerations	2.1	0.87	1	0	0	0	0	0	1	0	0	0	0	0	0	0
	Design and Planning Theories and Methodologies	8	creativity and process including design theory and problem –solving strategies	2.83	0.64	1	0	0	0	0	1	0	0	0	0	0	0	1	0
		10	human factors such as behavior, perception, psychological and sensory response	2.33	0.76	1	0	0	0	0	0	0	0	0	0	0	0	1	0
		11	natural factors such as ecological relationships	2.53	0.75	1	1	0	1	1	0	1	1	1	0	0	1	1	0
		12	relationship between human and natural systems such as resource conservation, habitat restoration and creation, and urban ecology	2.36	0.79	1	1	1	0	0	0	0	1	1	0	0	1	1	1
		13	influence of context on design, planning, and management decisions	2.45	0.76	1	1	1	0	0	0	0	0	0	0	1	0	1	1
		14	research methods including data collection, interpretation, and application of results	2.37	0.93	1	1	0	0	0	1	0	0	0	1	0	0	0	0
		16	communication and education methods, including sharing knowledge and evaluating outcomes	2.15	0.99	1	0	0	0	0	1	0	0	0	0	0	0	0	0
	Public Policy and Regulation	17	governmental policies and laws that affect the use and development of land	1.8	0.85	1	0	0	0	0	0	0	0	0	0	0	0	0	0
	Design, Planning and Management at Various Scales and Applications	21	photogrammetry and remote sensing	1.47	0.84	1	0	0	1	1	0	0	0	0	1	0	0	0	1
		22	visual resource assessment	1.91	0.88	1	0	0	1	1	0	0	0	0	1	0	0	0	0
		23	agricultural and rural landscape analysis	1.68	0.85	1	1	0	1	1	0	0	0	0	1	0	0	0	0
		24	urban landscape	2.17	0.71	1	0	0	0	0	0	0	0	0	0	1	0	0	0
		25	planning principles including regional community and neighborhood planning	2.12	0.76	1	0	0	0	0	0	0	1	1	0	0	0	0	0
		26	conservation of natural resources	2.33	0.8	1	0	0	1	1	0	0	0	0	0	0	0	0	0
		28	ecological planning principles	2.23	0.8	1	0	0	0	0	0	0	0	0	0	0	0	0	0
		29	Water resource management	1.91	0.84	1	0	0	0	0	0	0	0	0	0	0	0	0	0
		31	floodplain management	1.8	0.86	1	1	0	1	1	0	1	1	1	0	0	0	0	0
	Site Design and Engineering: Materials, Methods, Technologies and Applications	36	roadway design principles	2.15	0.83	1	0	0	0	0	0	0	1	1	0	1	1	1	0
		37	elements of vehicular and pedestrian circulation systems and their design requirements	2.57	0.72	1	0	0	0	0	0	0	1	1	0	1	1	1	0
		42	grading, drainage and stormwater treatment	2.78	0.57	1	0	0	0	0	0	0	1	1	0	0	0	0	0
		44	erosion and sedimentation control	2.28	0.82	1	0	0	0	0	0	0	1	1	0	0	0	0	0
		45	utility systems	1.77	0.77	1	0	0	0	0	0	0	0	0	0	0	1	0	0
		46	Irrigation systems	1.75	0.88	1	0	0	0	0	0	0	0	0	0	0	1	0	0
		47	lighting systems	1.7	0.79	1	0	0	0	0	0	0	0	0	0	0	1	0	0
	Construction Documentation and Administration	52	geographic coordinate systems and layout techniques and conventions	1.9	0.9	1	0	0	0	0	0	0	0	0	1	0	0	0	0
	Communication	61	the roles of visual communication, including photographic and video documentation	2.25	0.85	1	0	0	0	0	0	0	0	0	1	0	0	0	0
		62	graphic presentation techniques, systems and symbols	2.71	0.73	1	1	0	0	0	0	0	0	0	1	0	0	0	0
	Values and Ethics in Practice	65	environmental ethics	2.08	0.82	1	0	0	0	0	0	0	0	0	0	0	0	0	0

LABOK						LAAB	GIS&T BOK												
				Command of Knowledge at time of Degree			Analytical Methods												
							AM8				AM10		AM11						AM12
Knowledge Statement / Competency Division	Domains		Knowledge Statements / Competencies	Mean	Standard Deviation	Computing applications and other advanced technology	Spatial Sampling for Statistical Analysis	Principles of Semi-variogram Construction	Principles of Kriging	Kriging Variants	Knowledge Discovery	Pattern Recognition & Matching	Networks Defined	Graphic Theoretic (descriptive) Measures	Least-cost (shortest) Path	Classic Transportation Problem	Other Classic Network Problems	Accessibility Modeling	Operations Research Modeling & Location Modeling Principles
Competencies	Natural & Cultural Systems	74	Conduct field investigations to identify significant natural and cultural features, characteristics, and systems	2.06	0.74	**1**	1	0	0	0	0	1	1	1	0	0	0	0	0
		75	Perform quantitative analyses to evaluate the interactions of natural and cultural features, characteristics, and systems	1.64	0.78	**1**	0	0	0	0	0	1	0	0	0	0	0	0	0
		76	Perform qualitative analyses to evaluate the relationship between the natural and cultural features, characteristics, and systems	1.79	0.78	**1**	1	0	0	0	0	1	0	0	0	0	0	0	0
		77	Predict implications of design, planning, and management proposals on natural cultural systems both within the site and in the larger context	1.88	0.76	**1**	1	0	0	0	0	1	0	0	0	0	0	0	0
	Public Policy and Regulation	79	Confirm code compliance (e.g. zoning, environment, and accessibility)	1.37	0.81	**1**	0	0	0	0	0	0	0	0	0	0	0	0	0
	Design, Planning, and Management at Various Scales and	82	Develop a design program based on users' needs and clients' goals and resources	2.13	0.75	**1**	0	0	0	0	0	0	0	0	0	0	0	0	0
		83	Analyze relationships among design elements by determining opportunities and constraints	2.33	0.62	**1**	0	0	0	0	0	0	0	0	0	0	1	1	0
		84	Develop conceptual design, planning, and management solutions	2.39	0.61	**1**	0	0	0	0	0	0	0	0	0	0	0	0	0
		85	Evaluate design alternatives to determine the appropriate solution	2.45	0.59	**1**	0	0	0	0	0	0	0	0	0	0	0	0	0
	Site Design and Engineering: Materials, Methods, Technologies and Applications	86	Design for protection and management of land resources (e.g. land forms, vegetation, habitat, erosion and sedimentation control)	2.13	0.64	**1**	1	0	0	0	0	0	1	1	0	0	0	1	0
		87	Design for protection and management of water resources (e.g. storm water, water supply, ground water)	2.05	0.66	**1**	1	0	0	0	0	0	1	1	0	0	0	0	0
		88	Design pedestrian, vehicular, and non-motorized circulation systems	2.28	0.62	**1**	0	0	0	0	0	0	1	1	0	1	0	1	0
		89	Design elements for construction considering materials, structural issues, and construction technologies	1.94	0.69	**1**	0	0	0	0	0	0	0	0	0	0	0	0	0
	Construction Documentation and Administration	90	Prepare construction documents including plans, working drawings, and technical specifications	1.87	0.77	**1**	0	0	0	0	0	0	0	0	0	0	0	0	0
	Communication	98	Maintain clear communication among collaborators through correspondence and project coordination	1.51	0.9	**1**	0	0	0	0	0	0	0	0	0	0	0	0	0
		100	Create graphic materials in a variety of media	2.19	0.76	**1**	0	0	0	0	0	0	0	0	1	0	0	0	0
					Sum		14	3	8	8	3	9	14	14	8	7	9	13	4
					Average		0.29	0.06	0.16	0.16	0.06	0.18	0.29	0.29	0.16	0.14	0.18	0.27	0.08

LABOK						LAAB	GIS&T BOK												
				Command of Knowledge at time of Degree			Conceptual Foundations												
							CF1		CF2					CF3				CF5	
Knowledge Statement / Competency Division	Domains		Knowledge Statements / Competencies	Mean	Standard Deviation	Computing applications and other advanced technology	Metaphysics & Ontology	Epistemology	From Concepts to Data	Place & Landscape	Common-sense Geographies	Cultural Influences	Political Influences	Properties	Fields in Space & Time	Integrated Models	Spatial Distribution	Region
Knowledge Statements	Natural and Cultural Systems	3	land information sources	2.55	0.77	1	0	0	0	0	0	0	0	0	0	1	0	1
		4	patterns of land use and built form	2.43	0.76	1	0	0	0	0	0	0	0	0	0	1	0	1
		5	natural site conditions and ecosystems	2.76	0.66	1	0	0	0	0	0	0	0	0	1	1	1	1
		6	social and cultural influences on design	2.19	0.81	1	0	0	0	1	0	0	0	0	0	0	0	1
		7	regional hazard design considerations	2.1	0.87	1	0	0	0	0	0	0	0	0	0	0	0	0
	Design and Planning Theories and Methodologies	8	creativity and process including design theory and problem –solving strategies	2.83	0.64	1	1	0	0	0	0	0	0	0	0	0	0	1
		10	human factors such as behavior, perception, psychological and sensory response	2.33	0.76	1	0	0	0	1	0	1	0	0	0	0	0	0
		11	natural factors such as ecological relationships	2.53	0.75	1	0	0	0	0	0	0	0	0	1	1	0	0
		12	relationship between human and natural systems such as resource conservation, habitat restoration and creation, and urban ecology	2.36	0.79	1	0	0	0	1	0	0	0	0	1	1	0	0
		13	influence of context on design, planning, and management decisions	2.45	0.76	1	0	0	0	0	0	0	0	0	0	1	0	0
		14	research methods including data collection, interpretation, and application of results	2.37	0.93	1	1	1	1	0	0	0	0	0	0	0	0	0
		16	communication and education methods, including sharing knowledge and evaluating outcomes	2.15	0.99	1	0	0	0	0	1	0	0	0	0	0	0	0
	Public Policy and Regulation	17	governmental policies and laws that affect the use and development of land	1.8	0.85	1	0	0	0	0	0	0	1	0	0	0	0	0
	Design, Planning and Management at Various Scales and Applications	21	photogrammetry and remote sensing	1.47	0.84	1	0	0	0	0	1	0	0	0	0	0	0	0
		22	visual resource assessment	1.91	0.88	1	0	0	1	0	0	0	0	0	0	0	1	0
		23	agricultural and rural landscape analysis	1.68	0.85	1	0	0	0	0	0	0	0	0	0	0	1	0
		24	urban landscape	2.17	0.71	1	0	0	0	0	0	0	0	0	0	0	1	0
		25	planning principles including regional community and neighborhood planning	2.12	0.76	1	0	0	0	0	0	0	0	0	0	0	0	0
		26	conservation of natural resources	2.33	0.8	1	0	0	0	0	0	0	1	0	0	1	0	0
		28	ecological planning principles	2.23	0.8	1	0	0	0	0	0	0	1	0	0	1	0	0
		29	Water resource management	1.91	0.84	1	0	0	0	0	0	0	1	0	0	1	0	1
		31	floodplain management	1.8	0.86	1	0	0	0	0	0	0	1	0	0	1	0	0
	Site Design and Engineering: Materials, Methods, Technologies and Applications	36	roadway design principles	2.15	0.83	1	0	0	0	0	0	0	0	0	0	0	0	0
		37	elements of vehicular and pedestrian circulation systems and their design requirements	2.57	0.72	1	0	0	0	0	0	0	0	0	0	0	0	0
		42	grading, drainage and stormwater treatment	2.78	0.57	1	0	0	0	0	0	0	0	0	0	0	0	0
		44	erosion and sedimentation control	2.28	0.82	1	0	0	0	0	0	0	0	0	0	0	0	0
		45	utility systems	1.77	0.77	1	0	0	0	0	0	0	0	0	0	0	0	0
		46	Irrigation systems	1.75	0.88	1	0	0	0	0	0	0	0	0	0	0	0	0
		47	lighting systems	1.7	0.79	1	0	0	0	0	0	0	0	0	0	0	0	0
	Construction Documentation and Administration	52	geographic coordinate systems and layout techniques and conventions	1.9	0.9	1	0	0	1	0	0	0	0	0	0	0	0	1
	Communication	61	the roles of visual communication, including photographic and video documentation	2.25	0.85	1	0	0	0	0	0	0	0	0	0	0	0	0
		62	graphic presentation techniques, systems and symbols	2.71	0.73	1	0	0	1	0	0	0	0	0	0	0	0	0
	Values and Ethics in Practice	65	environmental ethics	2.08	0.82	1	1	0	0	0	0	0	0	0	0	0	0	0

LABOK						LAAB	GIS&T BOK												
				Command of Knowledge at time of Degree			Conceptual Foundations												
							CF1		CF2					CF3			CF5		
Knowledge Statement / Competency Division	Domains		Knowledge Statements / Competencies	Mean	Standard Deviation	Computing applications and other advanced technology	Metaphysics & Ontology	Epistemology	From Concepts to Data	Place & Landscape	Common-sense Geographies	Cultural Influences	Political Influences	Properties	Fields in Space & Time	Integrated Models	Spatial Distribution	Region
Competencies	Natural & Cultural Systems	74	Conduct field investigations to identify significant natural and cultural features, characteristics, and systems	2.06	0.74	**1**	0	0	0	0	0	0	0	0	0	0	0	0
		75	Perform quantitative analyses to evaluate the interactions of natural and cultural features, characteristics, and systems	1.64	0.78	**1**	0	0	0	0	0	0	0	1	0	0	0	0
		76	Perform qualitative analyses to evaluate the relationship between the natural and cultural features, characteristics, and systems	1.79	0.78	**1**	0	0	0	0	0	0	0	1	0	0	0	0
		77	Predict implications of design, planning, and management proposals on natural cultural systems both within the site and in the larger context	1.88	0.76	**1**	0	0	0	0	0	0	0	0	0	0	0	0
	Public Policy and Regulation	79	Confirm code compliance (e.g. zoning, environment, and accessibility)	1.37	0.81	**1**	0	0	0	0	0	1	1	0	0	0	0	0
	Design, Planning, and Management at Various Scales and	82	Develop a design program based on users' needs and clients' goals and resources	2.13	0.75	**1**	0	0	0	0	0	0	0	0	0	0	0	0
		83	Analyze relationships among design elements by determining opportunities and constraints	2.33	0.62	**1**	0	0	0	0	0	0	0	0	0	0	0	0
		84	Develop conceptual design, planning, and management solutions	2.39	0.61	**1**	0	0	0	0	0	0	0	0	0	0	0	0
		85	Evaluate design alternatives to determine the appropriate solution	2.45	0.59	**1**	0	0	0	0	0	0	0	0	0	0	0	0
	Site Design and Engineering: Materials, Methods, Technologies and Applications	86	Design for protection and management of land resources (e.g. land forms, vegetation, habitat, erosion and sedimentation control)	2.13	0.64	**1**	0	0	0	0	0	0	1	0	0	1	1	0
		87	Design for protection and management of water resources (e.g. storm water, water supply, ground water)	2.05	0.66	**1**	0	0	0	0	0	0	1	0	0	1	0	0
		88	Design pedestrian, vehicular, and non-motorized circulation systems	2.28	0.62	**1**	0	0	0	0	0	0	0	0	0	0	0	0
		89	Design elements for construction considering materials, structural issues, and construction technologies	1.94	0.69	**1**	0	0	0	0	0	0	0	0	0	0	0	0
	Construction Documentation and Administration	90	Prepare construction documents including plans, working drawings, and technical specifications	1.87	0.77	**1**	0	0	0	0	0	0	0	0	0	0	0	0
	Communication	98	Maintain clear communication among collaborators through correspondence and project coordination	1.51	0.9	**1**	0	0	0	0	0	0	0	0	0	0	0	0
		100	Create graphic materials in a variety of media	2.19	0.76	**1**	0	0	0	0	0	0	0	0	0	0	0	0
					Sum		3	1	4	3	2	2	8	2	3	12	5	7
					Average		0.06	0.02	0.08	0.06	0.04	0.04	0.16	0.04	0.06	0.24	0.10	0.14

LABOK						LAAB	GIS&T BOK									
				Command of Knowledge at time of Degree			Cartography & Visualization									
							CV1		CV2		CV3					
Knowledge Statement / Competency Division	Domains		Knowledge Statements / Competencies	Mean	Standard Deviation	Computing applications and other advanced technology	History of Cartography	Technological Transformations	Source Materials for Mapping	Projections as a Map Design Issue	Map Design Fundamentals	Basic Concepts of Symbolization	Color for Cartography & Visualization	Typography for Cartography & Visualization	Basic Thematic Mapping Methods	Multivariate Displays
Knowledge Statements	Natural and Cultural Systems	3	land information sources	2.55	0.77	1	0	0	0	0	0	0	0	0	0	0
		4	patterns of land use and built form	2.43	0.76	1	0	0	0	0	0	0	0	0	0	0
		5	natural site conditions and ecosystems	2.76	0.66	1	0	0	0	0	0	0	0	0	0	0
		6	social and cultural influences on design	2.19	0.81	1	0	0	0	0	0	0	0	0	0	0
		7	regional hazard design considerations	2.1	0.87	1	0	0	0	0	0	0	0	0	0	0
	Design and Planning Theories and Methodologies	8	creativity and process including design theory and problem –solving strategies	2.83	0.64	1	0	0	0	0	0	0	0	0	0	0
		10	human factors such as behavior, perception, psychological and sensory response	2.33	0.76	1	0	1	0	1	0	0	0	0	0	0
		11	natural factors such as ecological relationships	2.53	0.75	1	0	0	0	0	0	0	0	0	0	0
		12	relationship between human and natural systems such as resource conservation, habitat restoration and creation, and urban ecology	2.36	0.79	1	0	0	0	0	0	0	0	0	0	0
		13	influence of context on design, planning, and management decisions	2.45	0.76	1	0	0	0	0	0	0	0	0	0	0
		14	research methods including data collection, interpretation, and application of results	2.37	0.93	1	1	1	0	0	0	0	0	0	0	0
		16	communication and education methods, including sharing knowledge and evaluating outcomes	2.15	0.99	1	1	1	0	0	0	0	0	0	0	0
	Public Policy and Regulation	17	governmental policies and laws that affect the use and development of land	1.8	0.85	1	0	0	0	0	0	0	0	0	0	0
	Design, Planning and Management at Various Scales and Applications	21	photogrammetry and remote sensing	1.47	0.84	1	0	1	1	0	0	0	1	0	0	0
		22	visual resource assessment	1.91	0.88	1	0	1	1	0	0	0	1	1	1	0
		23	agricultural and rural landscape analysis	1.68	0.85	1	0	0	0	0	1	0	0	0	0	0
		24	urban landscape	2.17	0.71	1	0	0	0	0	1	0	0	0	0	0
		25	planning principles including regional community and neighborhood planning	2.12	0.76	1	0	0	0	0	1	0	0	0	0	0
		26	conservation of natural resources	2.33	0.8	1	0	0	0	0	0	0	0	0	0	0
		28	ecological planning principles	2.23	0.8	1	0	0	0	0	0	0	0	0	0	0
		29	Water resource management	1.91	0.84	1	0	0	0	0	0	0	0	0	0	0
		31	floodplain management	1.8	0.86	1	0	0	0	0	0	0	0	0	0	0
	Site Design and Engineering: Materials, Methods, Technologies and Applications	36	roadway design principles	2.15	0.83	1	0	0	0	0	1	0	0	0	0	0
		37	elements of vehicular and pedestrian circulation systems and their design requirements	2.57	0.72	1	0	0	0	0	0	0	0	0	0	0
		42	grading, drainage and stormwater treatment	2.78	0.57	1	0	0	0	0	1	0	0	0	0	0
		44	erosion and sedimentation control	2.28	0.82	1	0	0	0	0	1	0	0	0	0	0
		45	utility systems	1.77	0.77	1	0	0	0	0	1	0	0	0	0	0
		46	Irrigation systems	1.75	0.88	1	0	0	0	0	1	0	0	0	0	0
		47	lighting systems	1.7	0.79	1	0	0	0	0	1	0	0	0	0	0
	Construction Documentation and Administration	52	geographic coordinate systems and layout techniques and conventions	1.9	0.9	1	0	0	1	1	0	1	1	1	1	1
	Communication	61	the roles of visual communication, including photographic and video documentation	2.25	0.85	1	1	1	1	1	1	0	1	1	1	0
		62	graphic presentation techniques, systems and symbols	2.71	0.73	1	1	1	1	1	0	1	1	1	1	1
	Values and Ethics in Practice	65	environmental ethics	2.08	0.82	1	0	0	0	0	0	0	0	0	0	0

LABOK						LAAB	GIS&T BOK									
				Command of Knowledge at time of Degree			Cartography & Visualization									
							CV1		CV2		CV3					
Knowledge Statement / Competency Division	Domains		Knowledge Statements / Competencies	Mean	Standard Deviation	Computing applications and other advanced technology	History of Cartography	Technological Transformations	Source Materials for Mapping	Projections as a Map Design Issue	Map Design Fundamentals	Basic Concepts of Symbolization	Color for Cartography & Visualization	Typography for Cartography & Visualization	Basic Thematic Mapping Methods	Multivariate Displays
Competencies	Natural & Cultural Systems	74	Conduct field investigations to identify significant natural and cultural features, characteristics, and systems	2.06	0.74	**1**	0	0	0	0	0	0	0	0	0	0
		75	Perform quantitative analyses to evaluate the interactions of natural and cultural features, characteristics, and systems	1.64	0.78	**1**	0	0	0	0	0	0	0	0	0	0
		76	Perform qualitative analyses to evaluate the relationship between the natural and cultural features, characteristics, and systems	1.79	0.78	**1**	0	0	0	0	0	0	0	0	0	0
		77	Predict implications of design, planning, and management proposals on natural cultural systems both within the site and in the larger context	1.88	0.76	**1**	0	0	0	0	0	0	0	0	0	0
	Public Policy and Regulation	79	Confirm code compliance (e.g. zoning, environment, and accessibility)	1.37	0.81	**1**	0	0	0	0	0	0	0	0	0	0
	Design, Planning, and Management at Various Scales and	82	Develop a design program based on users' needs and clients' goals and resources	2.13	0.75	**1**	0	0	0	0	0	0	0	0	0	0
		83	Analyze relationships among design elements by determining opportunities and constraints	2.33	0.62	**1**	0	0	0	0	0	0	0	0	0	0
		84	Develop conceptual design, planning, and management solutions	2.39	0.61	**1**	0	0	0	0	0	0	0	0	0	0
		85	Evaluate design alternatives to determine the appropriate solution	2.45	0.59	**1**	0	0	0	0	0	0	0	0	0	0
	Site Design and Engineering: Materials, Methods, Technologies and Applications	86	Design for protection and management of land resources (e.g. land forms, vegetation, habitat, erosion and sedimentation control)	2.13	0.64	**1**	0	0	0	0	1	0	0	0	0	0
		87	Design for protection and management of water resources (e.g. storm water, water supply, ground water)	2.05	0.66	**1**	0	0	0	0	1	0	0	0	0	0
		88	Design pedestrian, vehicular, and non-motorized circulation systems	2.28	0.62	**1**	0	0	0	0	1	0	0	0	0	0
		89	Design elements for construction considering materials, structural issues, and construction technologies	1.94	0.69	**1**	0	0	0	0	1	0	0	0	0	0
	Construction Documentation and Administration	90	Prepare construction documents including plans, working drawings, and technical specifications	1.87	0.77	**1**	0	0	0	0	0	0	0	0	0	0
	Communication	98	Maintain clear communication among collaborators through correspondence and project coordination	1.51	0.9	**1**	0	0	0	0	0	0	0	0	0	0
		100	Create graphic materials in a variety of media	2.19	0.76	**1**	0	0	1	1	1	0	0	0	0	0
					Sum		4	7	6	5	15	2	5	4	4	2
					Average		0.08	0.14	0.12	0.10	0.31	0.04	0.10	0.08	0.08	0.04

LABOK						LAAB	GIS&T BOK											
				Command of Knowledge at time of Degree			Cartography & Visualization											
							CV4					CV5		CV6				
Knowledge Statement / Competency Division	Domains		Knowledge Statements / Competencies	Mean	Standard Deviation	Computing applications and other advanced technology	Dynamic & Interactive Displays	Representing Terrain	Virtual & Immersive Environments	Visualization of Temporal Geographic Data	Visualization of Uncertainty	Map Production	Map Reproduction	Map Reading	Map Interpretation	Map Analysis	Evaluation & Testing
Knowledge Statements	Natural and Cultural Systems	3	land information sources	2.55	0.77	1	0	0	0	0	0	0	0	0	0	0	0
		4	patterns of land use and built form	2.43	0.76	1	0	0	0	0	0	0	0	0	0	0	0
		5	natural site conditions and ecosystems	2.76	0.66	1	0	0	0	0	0	0	0	0	0	0	0
		6	social and cultural influences on design	2.19	0.81	1	0	0	0	0	0	0	0	0	0	0	0
		7	regional hazard design considerations	2.1	0.87	1	0	0	0	0	0	0	0	0	0	0	0
	Design and Planning Theories and Methodologies	8	creativity and process including design theory and problem –solving strategies	2.83	0.64	1	0	0	0	0	0	0	0	0	0	0	0
		10	human factors such as behavior, perception, psychological and sensory response	2.33	0.76	1	0	0	0	0	0	0	0	0	0	0	0
		11	natural factors such as ecological relationships	2.53	0.75	1	0	0	0	0	0	0	0	0	0	0	0
		12	relationship between human and natural systems such as resource conservation, habitat restoration and creation, and urban ecology	2.36	0.79	1	0	0	0	0	0	0	0	0	0	0	0
		13	influence of context on design, planning, and management decisions	2.45	0.76	1	0	0	0	0	0	0	0	0	0	0	0
		14	research methods including data collection, interpretation, and application of results	2.37	0.93	1	0	0	0	0	0	0	0	0	0	0	0
		16	communication and education methods, including sharing knowledge and evaluating outcomes	2.15	0.99	1	0	1	1	0	0	0	0	0	0	0	1
	Public Policy and Regulation	17	governmental policies and laws that affect the use and development of land	1.8	0.85	1	0	0	0	0	0	0	0	0	0	0	0
	Design, Planning and Management at Various Scales and Applications	21	photogrammetry and remote sensing	1.47	0.84	1	0	0	0	0	0	1	0	0	1	1	0
		22	visual resource assessment	1.91	0.88	1	1	1	1	1	0	1	1	1	1	1	0
		23	agricultural and rural landscape analysis	1.68	0.85	1	0	0	0	0	0	0	0	0	1	0	0
		24	urban landscape	2.17	0.71	1	0	0	0	0	0	0	0	0	0	0	0
		25	planning principles including regional community and neighborhood planning	2.12	0.76	1	0	0	0	0	0	0	0	0	0	0	0
		26	conservation of natural resources	2.33	0.8	1	0	0	0	0	0	0	0	0	0	0	0
		28	ecological planning principles	2.23	0.8	1	0	0	0	0	0	0	0	0	0	0	0
		29	Water resource management	1.91	0.84	1	0	0	0	0	0	0	0	0	0	0	0
		31	floodplain management	1.8	0.86	1	0	0	0	0	0	0	0	0	0	0	0
	Site Design and Engineering: Materials, Methods, Technologies and Applications	36	roadway design principles	2.15	0.83	1	0	0	0	0	0	0	0	0	0	0	0
		37	elements of vehicular and pedestrian circulation systems and their design requirements	2.57	0.72	1	0	0	0	0	0	0	0	0	0	0	0
		42	grading, drainage and stormwater treatment	2.78	0.57	1	0	1	0	0	0	0	0	0	0	0	0
		44	erosion and sedimentation control	2.28	0.82	1	0	0	0	0	0	0	0	0	0	0	0
		45	utility systems	1.77	0.77	1	0	0	0	0	0	0	0	0	0	0	0
		46	Irrigation systems	1.75	0.88	1	0	0	0	0	0	0	0	0	0	0	0
		47	lighting systems	1.7	0.79	1	0	0	0	0	0	0	0	0	0	0	0
	Construction Documentation and Administration	52	geographic coordinate systems and layout techniques and conventions	1.9	0.9	1	1	0	0	0	0	0	0	0	0	1	0
	Communication	61	the roles of visual communication, including photographic and video documentation	2.25	0.85	1	1	1	0	1	0	0	0	1	1	0	1
		62	graphic presentation techniques, systems and symbols	2.71	0.73	1	1	1	0	1	1	1	0	1	0	0	1
	Values and Ethics in Practice	65	environmental ethics	2.08	0.82	1	0	0	0	0	0	0	0	0	0	0	0

LABOK						LAAB	GIS&T BOK											
				Command of Knowledge at time of Degree			Cartography & Visualization											
							CV4					CV5		CV6				
Knowledge Statement / Competency Division	Domains		Knowledge Statements / Competencies	Mean	Standard Deviation	Computing applications and other advanced technology	Dynamic & Interactive Displays	Representing Terrain	Virtual & Immersive Environments	Visualization of Temporal Geographic Data	Visualization of Uncertainty	Map Production	Map Reproduction	Map Reading	Map Interpretation	Map Analysis	Evaluation & Testing
Competencies	Natural & Cultural Systems	74	Conduct field investigations to identify significant natural and cultural features, characteristics, and systems	2.06	0.74	**1**	0	0	0	0	0	0	0	0	0	0	0
		75	Perform quantitative analyses to evaluate the interactions of natural and cultural features, characteristics, and systems	1.64	0.78	**1**	0	0	0	0	0	0	0	0	0	0	0
		76	Perform qualitative analyses to evaluate the relationship between the natural and cultural features, characteristics, and systems	1.79	0.78	**1**	0	0	0	0	0	0	0	0	0	0	0
		77	Predict implications of design, planning, and management proposals on natural cultural systems both within the site and in the larger context	1.88	0.76	**1**	0	0	0	0	0	0	0	0	0	0	0
	Public Policy and Regulation	79	Confirm code compliance (e.g. zoning, environment, and accessibility)	1.37	0.81	**1**	0	0	0	0	0	0	0	0	0	0	0
	Design, Planning, and Management at Various Scales and	82	Develop a design program based on users' needs and clients' goals and resources	2.13	0.75	**1**	0	0	0	0	0	0	0	0	0	0	0
		83	Analyze relationships among design elements by determining opportunities and constraints	2.33	0.62	**1**	0	0	0	0	0	0	0	0	0	0	0
		84	Develop conceptual design, planning, and management solutions	2.39	0.61	**1**	0	0	0	0	0	0	0	0	0	0	0
		85	Evaluate design alternatives to determine the appropriate solution	2.45	0.59	**1**	0	0	0	0	0	0	0	0	0	0	0
	Site Design and Engineering: Materials, Methods, Technologies and Applications	86	Design for protection and management of land resources (e.g. land forms, vegetation, habitat, erosion and sedimentation control)	2.13	0.64	**1**	0	0	0	0	0	0	0	0	0	0	0
		87	Design for protection and management of water resources (e.g. storm water, water supply, ground water)	2.05	0.66	**1**	0	0	0	0	0	0	0	0	0	0	0
		88	Design pedestrian, vehicular, and non-motorized circulation systems	2.28	0.62	**1**	0	0	0	0	0	0	0	0	0	0	0
		89	Design elements for construction considering materials, structural issues, and construction technologies	1.94	0.69	**1**	0	0	0	0	0	0	0	0	0	0	0
	Construction Documentation and Administration	90	Prepare construction documents including plans, working drawings, and technical specifications	1.87	0.77	**1**	0	0	0	0	0	0	0	0	0	0	0
	Communication	98	Maintain clear communication among collaborators through correspondence and project coordination	1.51	0.9	**1**	0	0	0	0	0	0	0	0	0	0	0
		100	Create graphic materials in a variety of media	2.19	0.76	**1**	0	1	0	0	0	0	1	0	0	0	0
					Sum		4	6	2	3	1	3	2	3	4	3	3
					Average		0.08	0.12	0.04	0.06	0.02	0.06	0.04	0.06	0.08	0.06	0.06

LABOK						LAAB	GIS&T BOK													
				Command of Knowledge at time of Degree			Design Aspects													
							DA2			DA3		DA4			DA5				DA6	DA7
Knowledge Statement / Competency Division	Domains		Knowledge Statements / Competencies	Mean	Standard Deviation	Computing applications and other advanced technology	Planning for Design	Application/ User Assessment	Social, Political, & Cultural Issues	Data Costs	Labor Management	Conceptual Models	Logical Models	Physical Models	Recognizing Analytical Components	Identifying & Designing Analytical Procedures	Formalizing a Procedure Design	User Interfaces	Implementation Planning
Knowledge Statements	Natural and Cultural Systems	3	land information sources	2.55	0.77	1	0	0	0	0	0	0	0	0	0	0	0	0	0
		4	patterns of land use and built form	2.43	0.76	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		5	natural site conditions and ecosystems	2.76	0.66	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		6	social and cultural influences on design	2.19	0.81	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0
		7	regional hazard design considerations	2.1	0.87	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Design and Planning Theories and Methodologies	8	creativity and process including design theory and problem –solving strategies	2.83	0.64	1	0	0	0	0	0	1	1	1	0	0	0	0	0	0
		10	human factors such as behavior, perception, psychological and sensory response	2.33	0.76	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		11	natural factors such as ecological relationships	2.53	0.75	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		12	relationship between human and natural systems such as resource conservation, habitat restoration and creation, and urban ecology	2.36	0.79	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		13	influence of context on design, planning, and management decisions	2.45	0.76	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		14	research methods including data collection, interpretation, and application of results	2.37	0.93	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		16	communication and education methods, including sharing knowledge and evaluating outcomes	2.15	0.99	1	1	1	0	0	1	0	0	0	0	0	0	0	0	0
	Public Policy and Regulation	17	governmental policies and laws that affect the use and development of land	1.8	0.85	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0
	Design, Planning and Management at Various Scales and Applications	21	photogrammetry and remote sensing	1.47	0.84	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0
		22	visual resource assessment	1.91	0.88	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		23	agricultural and rural landscape analysis	1.68	0.85	1	0	0	0	0	0	0	0	0	0	1	0	0	0	0
		24	urban landscape	2.17	0.71	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		25	planning principles including regional community and neighborhood planning	2.12	0.76	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		26	conservation of natural resources	2.33	0.8	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		28	ecological planning principles	2.23	0.8	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		29	Water resource management	1.91	0.84	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		31	floodplain management	1.8	0.86	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Site Design and Engineering: Materials, Methods, Technologies and Applications	36	roadway design principles	2.15	0.83	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		37	elements of vehicular and pedestrian circulation systems and their design requirements	2.57	0.72	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		42	grading, drainage and stormwater treatment	2.78	0.57	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		44	erosion and sedimentation control	2.28	0.82	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		45	utility systems	1.77	0.77	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		46	Irrigation systems	1.75	0.88	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		47	lighting systems	1.7	0.79	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Construction Documentation and Administration	52	geographic coordinate systems and layout techniques and conventions	1.9	0.9	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Communication	61	the roles of visual communication, including photographic and video documentation	2.25	0.85	1	0	0	0	0	0	0	0	0	0	0	0	1	0	0
		62	graphic presentation techniques, systems and symbols	2.71	0.73	1	0	0	0	0	0	1	1	1	1	0	0	0	0	0
	Values and Ethics in Practice	65	environmental ethics	2.08	0.82	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0

LABOK						LAAB	GIS&T BOK													
				Command of Knowledge at time of Degree			Design Aspects													
							DA2			DA3		DA4			DA5			DA6	DA7
Knowledge Statement / Competency Division	Domains		Knowledge Statements / Competencies	Mean	Standard Deviation	Computing applications and other advanced technology	Planning for Design	Application/ User Assessment	Social, Political, & Cultural Issues	Data Costs	Labor Management	Conceptual Models	Logical Models	Physical Models	Recognizing Analytical Components	Identifying & Designing Analytical Procedures	Formalizing a Procedure Design	User Interfaces	Implementation Planning
Competencies	Natural & Cultural Systems	74	Conduct field investigations to identify significant natural and cultural features, characteristics, and systems	2.06	0.74	1	0	0	0	0	0	0	0	0	0	0	0	0	0
		75	Perform quantitative analyses to evaluate the interactions of natural and cultural features, characteristics, and systems	1.64	0.78	1	0	0	0	0	0	0	0	0	0	0	0	0	0
		76	Perform qualitative analyses to evaluate the relationship between the natural and cultural features, characteristics, and systems	1.79	0.78	1	0	0	0	0	0	0	0	0	0	0	0	0	0
		77	Predict implications of design, planning, and management proposals on natural cultural systems both within the site and in the larger context	1.88	0.76	1	0	0	0	0	0	0	0	0	0	0	0	0	1
	Public Policy and Regulation	79	Confirm code compliance (e.g. zoning, environment, and accessibility)	1.37	0.81	1	0	0	0	0	0	0	0	0	0	0	0	0	0
	Design, Planning, and Management at Various Scales and	82	Develop a design program based on users' needs and clients' goals and resources	2.13	0.75	1	0	0	0	0	0	0	0	0	0	0	0	0	0
		83	Analyze relationships among design elements by determining opportunities and constraints	2.33	0.62	1	0	0	0	0	0	0	0	0	0	0	0	0	0
		84	Develop conceptual design, planning, and management solutions	2.39	0.61	1	0	0	0	0	0	0	0	0	0	0	0	0	0
		85	Evaluate design alternatives to determine the appropriate solution	2.45	0.59	1	0	0	0	0	0	0	0	0	0	0	0	0	0
	Site Design and Engineering: Materials, Methods, Technologies and Applications	86	Design for protection and management of land resources (e.g. land forms, vegetation, habitat, erosion and sedimentation control)	2.13	0.64	1	0	0	0	0	0	0	0	0	0	0	0	0	0
		87	Design for protection and management of water resources (e.g. storm water, water supply, ground water)	2.05	0.66	1	0	0	0	0	0	0	0	0	0	0	0	0	0
		88	Design pedestrian, vehicular, and non-motorized circulation systems	2.28	0.62	1	0	0	0	0	0	0	0	0	0	0	0	0	0
		89	Design elements for construction considering materials, structural issues, and construction technologies	1.94	0.69	1	0	0	0	0	0	0	0	0	0	0	0	0	0
	Construction Documentation and Administration	90	Prepare construction documents including plans, working drawings, and technical specifications	1.87	0.77	1	0	0	0	0	0	0	0	0	0	0	0	0	0
	Communication	98	Maintain clear communication among collaborators through correspondence and project coordination	1.51	0.9	1	0	0	0	0	0	0	0	0	0	0	0	0	0
		100	Create graphic materials in a variety of media	2.19	0.76	1	0	0	0	0	0	1	1	1	0	0	0	1	0
					Sum		1	1	2	1	1	3	3	3	1	1	1	1	1
					Average		0.02	0.02	0.04	0.02	0.02	0.06	0.06	0.06	0.02	0.02	0.02	0.02	0.02

LABOK						LAAB	GIS&T BOK								
				Command of Knowledge at time of Degree			Data Modeling								
							DM3				DM4				DM5
Knowledge Statement / Competency Division	Domains		Knowledge Statements / Competencies	Mean	Standard Deviation	Computing applications and other advanced technology	The Raster Model	*Grid Compression Methods	Triangulated Irregular Network (TIN) Model	Resolution	Geometric Primitives	The Topological Model	The Network Model	Linear Referencing	Modeling Three-dimensional Entities
Knowledge Statements	Natural and Cultural Systems	3	land information sources	2.55	0.77	**1**	0	0	0	0	0	0	0	0	0
		4	patterns of land use and built form	2.43	0.76	**1**	0	0	0	0	0	0	0	0	0
		5	natural site conditions and ecosystems	2.76	0.66	**1**	0	0	0	0	0	0	0	0	0
		6	social and cultural influences on design	2.19	0.81	**1**	0	0	0	0	0	0	0	0	0
		7	regional hazard design considerations	2.1	0.87	**1**	0	0	0	0	0	0	0	0	0
	Design and Planning Theories and Methodologies	8	creativity and process including design theory and problem –solving strategies	2.83	0.64	**1**	0	0	0	0	0	0	0	0	0
		10	human factors such as behavior, perception, psychological and sensory response	2.33	0.76	**1**	0	0	0	0	0	0	0	0	0
		11	natural factors such as ecological relationships	2.53	0.75	**1**	0	0	0	0	0	0	0	0	0
		12	relationship between human and natural systems such as resource conservation, habitat restoration and creation, and urban ecology	2.36	0.79	**1**	0	0	0	0	0	0	0	0	0
		13	influence of context on design, planning, and management decisions	2.45	0.76	**1**	0	0	0	0	0	0	0	0	0
		14	research methods including data collection, interpretation, and application of results	2.37	0.93	**1**	0	0	0	0	0	0	0	0	0
		16	communication and education methods, including sharing knowledge and evaluating outcomes	2.15	0.99	**1**	0	0	0	0	0	0	0	0	0
	Public Policy and Regulation	17	governmental policies and laws that affect the use and development of land	1.8	0.85	**1**	0	0	0	0	0	0	0	0	0
	Design, Planning and Management at Various Scales and Applications	21	photogrammetry and remote sensing	1.47	0.84	**1**	0	0	0	0	0	0	0	0	0
		22	visual resource assessment	1.91	0.88	**1**	0	0	0	0	0	0	0	0	0
		23	agricultural and rural landscape analysis	1.68	0.85	**1**	0	0	0	0	0	0	0	0	0
		24	urban landscape	2.17	0.71	**1**	0	0	0	0	0	0	0	0	0
		25	planning principles including regional community and neighborhood planning	2.12	0.76	**1**	0	0	0	0	0	0	0	0	0
		26	conservation of natural resources	2.33	0.8	**1**	0	0	0	0	0	0	0	0	0
		28	ecological planning principles	2.23	0.8	**1**	0	0	0	0	0	0	0	0	0
		29	Water resource management	1.91	0.84	**1**	0	0	0	0	0	0	0	0	0
		31	floodplain management	1.8	0.86	**1**	0	0	0	0	0	0	0	0	0
	Site Design and Engineering: Materials, Methods, Technologies and Applications	36	roadway design principles	2.15	0.83	**1**	0	0	0	0	0	0	1	0	0
		37	elements of vehicular and pedestrian circulation systems and their design requirements	2.57	0.72	**1**	0	0	0	0	0	0	0	0	0
		42	grading, drainage and stormwater treatment	2.78	0.57	**1**	0	0	0	0	0	0	0	0	0
		44	erosion and sedimentation control	2.28	0.82	**1**	0	0	0	0	0	0	0	0	0
		45	utility systems	1.77	0.77	**1**	0	0	0	0	0	0	0	0	0
		46	Irrigation systems	1.75	0.88	**1**	0	0	0	0	0	0	0	0	0
		47	lighting systems	1.7	0.79	**1**	0	0	0	0	0	0	0	0	0
	Construction Documentation and Administration	52	geographic coordinate systems and layout techniques and conventions	1.9	0.9	**1**	1	0	0	0	0	0	0	1	0
	Communication	61	the roles of visual communication, including photographic and video documentation	2.25	0.85	**1**	1	0	0	1	1	0	0	0	1
		62	graphic presentation techniques, systems and symbols	2.71	0.73	**1**	0	0	1	0	1	1	0	0	1
	Values and Ethics in Practice	65	environmental ethics	2.08	0.82	**1**	0	0	0	0	0	0	0	0	0

LABOK						LAAB	GIS&T BOK								
				Command of Knowledge at time of Degree			Data Modeling								
							DM3				DM4				DM5
Knowledge Statement / Competency Division	Domains		Knowledge Statements / Competencies	Mean	Standard Deviation	Computing applications and other advanced technology	The Raster Model	*Grid Compression Methods	Triangulated Irregular Network (TIN) Model	Resolution	Geometric Primitives	The Topological Model	The Network Model	Linear Referencing	Modeling Three-dimensional Entities
Competencies	Natural & Cultural Systems	74	Conduct field investigations to identify significant natural and cultural features, characteristics, and systems	2.06	0.74	**1**	0	0	0	0	0	0	0	0	0
		75	Perform quantitative analyses to evaluate the interactions of natural and cultural features, characteristics, and systems	1.64	0.78	**1**	0	0	0	0	0	0	0	0	0
		76	Perform qualitative analyses to evaluate the relationship between the natural and cultural features, characteristics, and systems	1.79	0.78	**1**	0	0	0	0	0	0	0	0	0
		77	Predict implications of design, planning, and management proposals on natural cultural systems both within the site and in the larger context	1.88	0.76	**1**	0	0	0	0	0	0	0	0	0
	Public Policy and Regulation	79	Confirm code compliance (e.g. zoning, environment, and accessibility)	1.37	0.81	**1**	0	0	0	0	0	0	0	0	0
	Design, Planning, and Management at Various Scales and	82	Develop a design program based on users' needs and clients' goals and resources	2.13	0.75	**1**	0	0	0	0	0	0	0	0	0
		83	Analyze relationships among design elements by determining opportunities and constraints	2.33	0.62	**1**	0	0	0	0	0	0	0	0	0
		84	Develop conceptual design, planning, and management solutions	2.39	0.61	**1**	0	0	0	0	0	0	0	0	0
		85	Evaluate design alternatives to determine the appropriate solution	2.45	0.59	**1**	0	0	0	0	0	0	0	0	0
	Site Design and Engineering: Materials, Methods, Technologies and Applications	86	Design for protection and management of land resources (e.g. land forms, vegetation, habitat, erosion and sedimentation control)	2.13	0.64	**1**	0	0	0	0	0	0	0	0	0
		87	Design for protection and management of water resources (e.g. storm water, water supply, ground water)	2.05	0.66	**1**	0	0	0	0	0	0	0	0	0
		88	Design pedestrian, vehicular, and non-motorized circulation systems	2.28	0.62	**1**	0	0	0	0	0	0	1	0	0
		89	Design elements for construction considering materials, structural issues, and construction technologies	1.94	0.69	**1**	0	0	0	0	0	0	0	0	0
	Construction Documentation and Administration	90	Prepare construction documents including plans, working drawings, and technical specifications	1.87	0.77	**1**	0	0	0	0	0	0	0	0	0
	Communication	98	Maintain clear communication among collaborators through correspondence and project coordination	1.51	0.9	**1**	0	0	0	0	0	0	0	0	0
		100	Create graphic materials in a variety of media	2.19	0.76	**1**	1	1	0	0	0	1	0	0	1
					Sum		3	1	1	1	2	2	2	1	3
					Average		0.06	0.02	0.02	0.02	0.04	0.04	0.04	0.02	0.06

LABOK						LAAB	GIS&T BOK															
				Command of Knowledge at time of Degree			Data Manipulation									Geocomputation						
							DN1						DN2		DN3	GC2	GC7	GC8				
Knowledge Statement / Competency Division	Domains		Knowledge Statements / Competencies	Mean	Standard Deviation	Computing applications and other advanced technology	Impacts of Transformations	Data Model & Format Conversion	Interpolation	Vector-to-Raster & Raster-to-Vector Conversions	Raster Resembling	Coordinate Transformations	Scale & Generalization	Aggregation of Spatial Entities	Database Change	Pattern Recognition	Simulation Modeling	Conceptual Model of Uncertainty	Error	Problems of Currency, Source, & Scale
Knowledge Statements	Natural and Cultural Systems	3	land information sources	2.55	0.77	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		4	patterns of land use and built form	2.43	0.76	1	0	0	0	0	0	0	0	1	0	1	0	0	0	0
		5	natural site conditions and ecosystems	2.76	0.66	1	0	0	0	0	0	0	0	0	0	0	0	1	0	0
		6	social and cultural influences on design	2.19	0.81	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		7	regional hazard design considerations	2.1	0.87	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Design and Planning Theories and Methodologies	8	creativity and process including design theory and problem –solving strategies	2.83	0.64	1	0	0	0	0	0	0	0	0	0	0	1	0	0	0
		10	human factors such as behavior, perception, psychological and sensory response	2.33	0.76	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		11	natural factors such as ecological relationships	2.53	0.75	1	0	0	0	0	0	0	0	1	0	0	0	1	0	0
		12	relationship between human and natural systems such as resource conservation, habitat restoration and creation, and urban ecology	2.36	0.79	1	0	0	0	0	0	0	0	1	0	0	0	0	0	0
		13	influence of context on design, planning, and management decisions	2.45	0.76	1	0	0	0	0	0	0	0	1	0	0	0	0	0	0
		14	research methods including data collection, interpretation, and application of results	2.37	0.93	1	1	1	0	0	0	0	0	0	1	0	0	0	0	0
		16	communication and education methods, including sharing knowledge and evaluating outcomes	2.15	0.99	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0
	Public Policy and Regulation	17	governmental policies and laws that affect the use and development of land	1.8	0.85	1	0	0	0	0	0	0	0	1	0	0	0	0	0	0
	Design, Planning and Management at Various Scales and Applications	21	photogrammetry and remote sensing	1.47	0.84	1	0	0	0	1	1	0	1	0	0	0	0	0	0	0
		22	visual resource assessment	1.91	0.88	1	1	0	0	1	1	0	1	0	0	0	1	1	0	0
		23	agricultural and rural landscape analysis	1.68	0.85	1	0	0	0	0	0	0	0	0	0	1	0	0	0	0
		24	urban landscape	2.17	0.71	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		25	planning principles including regional community and neighborhood planning	2.12	0.76	1	0	0	0	0	0	0	1	0	0	0	0	0	0	0
		26	conservation of natural resources	2.33	0.8	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		28	ecological planning principles	2.23	0.8	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		29	Water resource management	1.91	0.84	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		31	floodplain management	1.8	0.86	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Site Design and Engineering: Materials, Methods, Technologies and Applications	36	roadway design principles	2.15	0.83	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		37	elements of vehicular and pedestrian circulation systems and their design requirements	2.57	0.72	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		42	grading, drainage and stormwater treatment	2.78	0.57	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		44	erosion and sedimentation control	2.28	0.82	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		45	utility systems	1.77	0.77	1	0	0	0	0	0	0	0	0	0	1	0	0	0	0
		46	Irrigation systems	1.75	0.88	1	0	0	0	0	0	0	0	0	0	1	0	0	0	0
		47	lighting systems	1.7	0.79	1	0	0	0	0	0	0	0	0	0	1	0	0	0	0
	Construction Documentation and Administration	52	geographic coordinate systems and layout techniques and conventions	1.9	0.9	1	1	1	1	0	0	1	0	0	0	0	0	0	1	1
	Communication	61	the roles of visual communication, including photographic and video documentation	2.25	0.85	1	0	0	0	0	0	0	0	0	0	0	1	0	0	0
		62	graphic presentation techniques, systems and symbols	2.71	0.73	1	0	0	1	0	0	0	0	0	0	0	0	1	1	1
	Values and Ethics in Practice	65	environmental ethics	2.08	0.82	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0

LABOK						LAAB	GIS&T BOK														
				Command of Knowledge at time of Degree			Data Manipulation									Geocomputation					
							DN1						DN2		DN3	GC2	GC7	GC8			
Knowledge Statement / Competency Division	Domains		Knowledge Statements / Competencies	Mean	Standard Deviation	Computing applications and other advanced technology	Impacts of Transformations	Data Model & Format Conversion	Interpolation	Vector-to-Raster & Raster-to-Vector Conversions	Raster Resembling	Coordinate Transformations	Scale & Generalization	Aggregation of Spatial Entities	Database Change	Pattern Recognition	Simulation Modeling	Conceptual Model of Uncertainty	Error	Problems of Currency, Source, & Scale
Competencies	Natural & Cultural Systems	74	Conduct field investigations to identify significant natural and cultural features, characteristics, and systems	2.06	0.74	**1**	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		75	Perform quantitative analyses to evaluate the interactions of natural and cultural features, characteristics, and systems	1.64	0.78	**1**	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		76	Perform qualitative analyses to evaluate the relationship between the natural and cultural features, characteristics, and systems	1.79	0.78	**1**	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		77	Predict implications of design, planning, and management proposals on natural cultural systems both within the site and in the larger context	1.88	0.76	**1**	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Public Policy and Regulation	79	Confirm code compliance (e.g. zoning, environment, and accessibility)	1.37	0.81	**1**	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Design, Planning, and Management at Various Scales and	82	Develop a design program based on users' needs and clients' goals and resources	2.13	0.75	**1**	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		83	Analyze relationships among design elements by determining opportunities and constraints	2.33	0.62	**1**	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		84	Develop conceptual design, planning, and management solutions	2.39	0.61	**1**	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		85	Evaluate design alternatives to determine the appropriate solution	2.45	0.59	**1**	0	0	0	0	0	0	0	0	0	0	1	0	0	0
	Site Design and Engineering: Materials, Methods, Technologies and Applications	86	Design for protection and management of land resources (e.g. land forms, vegetation, habitat, erosion and sedimentation control)	2.13	0.64	**1**	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		87	Design for protection and management of water resources (e.g. storm water, water supply, ground water)	2.05	0.66	**1**	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		88	Design pedestrian, vehicular, and non-motorized circulation systems	2.28	0.62	**1**	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		89	Design elements for construction considering materials, structural issues, and construction technologies	1.94	0.69	**1**	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Construction Documentation and Administration	90	Prepare construction documents including plans, working drawings, and technical specifications	1.87	0.77	**1**	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Communication	98	Maintain clear communication among collaborators through correspondence and project coordination	1.51	0.9	**1**	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		100	Create graphic materials in a variety of media	2.19	0.76	**1**	0	0	1	1	0	0	0	0	0	0	1	0	0	0
					Sum		4	3	3	3	2	1	3	5	1	5	5	4	2	2
					Average		0.08	0.06	0.06	0.06	0.04	0.02	0.06	0.10	0.02	0.10	0.10	0.08	0.04	0.04

LABOK						LAAB	GIS&T BOK													
				Command of Knowledge at time of Degree			Geospatial Data													
							GD1		GD2		GD3			GD4		GD5				
Knowledge Statement / Competency Division	Domains		Knowledge Statements / Competencies	Mean	Standard Deviation	Computing applications and other advanced technology	History of Understanding Earth's Shape	Spheres & Ellipses	Unsystematic Methods	Systematic Methods	Geographic Coordinate Systems	Plane Coordinate Systems	Linear Referencing Systems	Horizontal Datum's	Vertical Datum's	Map Projection Properties	Map Projection Classes	Map Projection Parameters	Georegistration
Knowledge Statements	Natural and Cultural Systems	3	land information sources	2.55	0.77	**1**	0	0	0	0	0	0	0	0	0	0	0	0	0
		4	patterns of land use and built form	2.43	0.76	**1**	1	0	1	1	0	0	0	0	0	0	0	0	0
		5	natural site conditions and ecosystems	2.76	0.66	**1**	0	0	0	0	0	0	0	0	0	0	0	0	0
		6	social and cultural influences on design	2.19	0.81	**1**	0	0	0	0	0	0	0	0	0	0	0	0	0
		7	regional hazard design considerations	2.1	0.87	**1**	0	0	0	0	0	0	0	0	0	0	0	0	0
	Design and Planning Theories and Methodologies	8	creativity and process including design theory and problem –solving strategies	2.83	0.64	**1**	0	0	0	0	0	0	0	0	0	0	0	0	0
		10	human factors such as behavior, perception, psychological and sensory response	2.33	0.76	**1**	0	0	0	0	0	0	0	0	0	0	0	0	0
		11	natural factors such as ecological relationships	2.53	0.75	**1**	0	0	0	0	0	0	0	0	0	0	0	0	0
		12	relationship between human and natural systems such as resource conservation, habitat restoration and creation, and urban ecology	2.36	0.79	**1**	0	0	0	0	0	0	0	0	0	0	0	0	0
		13	influence of context on design, planning, and management decisions	2.45	0.76	**1**	0	0	0	0	0	0	0	0	0	0	0	0	0
		14	research methods including data collection, interpretation, and application of results	2.37	0.93	**1**	0	0	0	0	0	0	0	0	0	0	0	0	0
		16	communication and education methods, including sharing knowledge and evaluating outcomes	2.15	0.99	**1**	0	0	0	0	0	0	0	0	0	0	0	0	0
	Public Policy and Regulation	17	governmental policies and laws that affect the use and development of land	1.8	0.85	**1**	0	0	1	1	0	0	0	0	0	0	0	0	0
	Design, Planning and Management at Various Scales and Applications	21	photogrammetry and remote sensing	1.47	0.84	**1**	0	0	0	0	0	0	0	0	0	1	0	0	0
		22	visual resource assessment	1.91	0.88	**1**	0	0	0	0	0	0	0	0	0	1	0	0	0
		23	agricultural and rural landscape analysis	1.68	0.85	**1**	0	0	0	0	0	0	0	0	0	0	0	0	0
		24	urban landscape	2.17	0.71	**1**	0	0	0	0	0	0	0	0	0	0	0	0	0
		25	planning principles including regional community and neighborhood planning	2.12	0.76	**1**	0	0	0	0	0	0	0	0	0	0	0	0	0
		26	conservation of natural resources	2.33	0.8	**1**	0	0	0	0	0	0	0	0	0	0	0	0	0
		28	ecological planning principles	2.23	0.8	**1**	0	0	0	0	0	0	0	0	0	0	0	0	0
		29	Water resource management	1.91	0.84	**1**	0	0	0	0	0	0	0	0	0	0	0	0	0
		31	floodplain management	1.8	0.86	**1**	0	0	0	0	0	0	0	0	0	0	0	0	0
	Site Design and Engineering: Materials, Methods, Technologies and Applications	36	roadway design principles	2.15	0.83	**1**	0	0	0	0	0	0	0	0	0	0	0	0	0
		37	elements of vehicular and pedestrian circulation systems and their design requirements	2.57	0.72	**1**	0	0	0	0	0	0	0	0	0	0	0	0	0
		42	grading, drainage and stormwater treatment	2.78	0.57	**1**	0	0	0	0	0	0	0	0	0	0	0	0	0
		44	erosion and sedimentation control	2.28	0.82	**1**	0	0	0	0	0	0	0	0	0	0	0	0	0
		45	utility systems	1.77	0.77	**1**	0	0	0	0	0	0	0	0	0	0	0	0	0
		46	Irrigation systems	1.75	0.88	**1**	0	0	0	0	0	0	0	0	0	0	0	0	0
		47	lighting systems	1.7	0.79	**1**	0	0	0	0	0	0	0	0	0	0	0	0	0
	Construction Documentation and Administration	52	geographic coordinate systems and layout techniques and conventions	1.9	0.9	**1**	1	1	1	1	1	1	1	1	1	1	1	1	1
	Communication	61	the roles of visual communication, including photographic and video documentation	2.25	0.85	**1**	0	0	0	0	0	0	0	0	0	0	0	0	0
		62	graphic presentation techniques, systems and symbols	2.71	0.73	**1**	1	1	0	0	1	1	1	1	1	1	1	1	1
	Values and Ethics in Practice	65	environmental ethics	2.08	0.82	**1**	0	0	0	0	0	0	0	0	0	0	0	0	0

LABOK						LAAB	GIS&T BOK														
				Command of Knowledge at time of Degree			Geospatial Data														
							GD1		GD2		GD3			GD4		GD5					
Knowledge Statement / Competency Division	Domains		Knowledge Statements / Competencies	Mean	Standard Deviation	Computing applications and other advanced technology	History of Understanding Earth's Shape	Spheres & Ellipses	Unsystematic Methods	Systematic Methods	Geographic Coordinate Systems	Plane Coordinate Systems	Linear Referencing Systems	Horizontal Datum's	Vertical Datum's	Map Projection Properties	Map Projection Classes	Map Projection Parameters	Georegistration
Competencies	Natural & Cultural Systems	74	Conduct field investigations to identify significant natural and cultural features, characteristics, and systems	2.06	0.74	**1**	0	0	0	0	0	0	0	0	0	0	0	0	0
		75	Perform quantitative analyses to evaluate the interactions of natural and cultural features, characteristics, and systems	1.64	0.78	**1**	0	0	0	0	0	0	0	0	0	0	0	0	0
		76	Perform qualitative analyses to evaluate the relationship between the natural and cultural features, characteristics, and systems	1.79	0.78	**1**	0	0	0	0	0	0	0	0	0	0	0	0	0
		77	Predict implications of design, planning, and management proposals on natural cultural systems both within the site and in the larger context	1.88	0.76	**1**	0	0	0	0	0	0	0	0	0	0	0	0	0
	Public Policy and Regulation	79	Confirm code compliance (e.g. zoning, environment, and accessibility)	1.37	0.81	**1**	0	0	0	0	0	0	0	0	0	0	0	0	0
	Design, Planning, and Management at Various Scales and	82	Develop a design program based on users' needs and clients' goals and resources	2.13	0.75	**1**	0	0	0	0	0	0	0	0	0	0	0	0	0
		83	Analyze relationships among design elements by determining opportunities and constraints	2.33	0.62	**1**	0	0	0	0	0	0	0	0	0	0	0	0	0
		84	Develop conceptual design, planning, and management solutions	2.39	0.61	**1**	0	0	0	0	0	0	0	0	0	0	0	0	0
		85	Evaluate design alternatives to determine the appropriate solution	2.45	0.59	**1**	0	0	0	0	0	0	0	0	0	0	0	0	0
	Site Design and Engineering: Materials, Methods, Technologies and Applications	86	Design for protection and management of land resources (e.g. land forms, vegetation, habitat, erosion and sedimentation control)	2.13	0.64	**1**	0	0	0	0	0	0	0	0	0	0	0	0	0
		87	Design for protection and management of water resources (e.g. storm water, water supply, ground water)	2.05	0.66	**1**	0	0	0	0	0	0	0	0	0	0	0	0	0
		88	Design pedestrian, vehicular, and non-motorized circulation systems	2.28	0.62	**1**	0	0	0	0	0	0	0	0	0	0	0	0	0
		89	Design elements for construction considering materials, structural issues, and construction technologies	1.94	0.69	**1**	0	0	0	0	0	0	0	0	0	0	0	0	0
	Construction Documentation and Administration	90	Prepare construction documents including plans, working drawings, and technical specifications	1.87	0.77	**1**	0	0	0	0	0	0	0	0	0	0	0	0	0
	Communication	98	Maintain clear communication among collaborators through correspondence and project coordination	1.51	0.9	**1**	0	0	0	0	0	0	0	0	0	0	0	0	0
		100	Create graphic materials in a variety of media	2.19	0.76	**1**	0	0	0	0	0	0	0	0	0	0	0	0	0
					Sum		3	2	3	3	2	2	2	2	2	4	2	2	2
					Average		0.06	0.04	0.06	0.06	0.04	0.04	0.04	0.04	0.04	0.08	0.04	0.04	0.04

LABOK						LAAB	GIS&T BOK																
				Command of Knowledge at time of Degree			Geospatial Data																
							GD6			GD7	GD8		GD9	GD10				GD11		GD12		
Knowledge Statement / Competency Division	Domains		Knowledge Statements / Competencies	Mean	Standard Deviation	Computing applications and other advanced technology	Thematic Accuracy	Resolution	Primary & Secondary Sources	Survey Theory & Electro-optical Methods	Tablet Digitizing	Scanning & Automated Vectorization	Spatial Sample Types	Nature of Aerial Imagery Data	Aerial Image Interpretation	Stereoscopy & Orthoimagery	Vector Data Extraction	Nature of Multispectral Image Data	Platforms & Sensors	Metadata	Spatial Data Infrastructures
Knowledge Statements	Natural and Cultural Systems	3	land information sources	2.55	0.77	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		4	patterns of land use and built form	2.43	0.76	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		5	natural site conditions and ecosystems	2.76	0.66	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		6	social and cultural influences on design	2.19	0.81	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		7	regional hazard design considerations	2.1	0.87	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Design and Planning Theories and Methodologies	8	creativity and process including design theory and problem –solving strategies	2.83	0.64	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		10	human factors such as behavior, perception, psychological and sensory response	2.33	0.76	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		11	natural factors such as ecological relationships	2.53	0.75	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		12	relationship between human and natural systems such as resource conservation, habitat restoration and creation, and urban ecology	2.36	0.79	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		13	influence of context on design, planning, and management decisions	2.45	0.76	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		14	research methods including data collection, interpretation, and application of results	2.37	0.93	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		16	communication and education methods, including sharing knowledge and evaluating outcomes	2.15	0.99	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Public Policy and Regulation	17	governmental policies and laws that affect the use and development of land	1.8	0.85	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Design, Planning and Management at Various Scales and Applications	21	photogrammetry and remote sensing	1.47	0.84	1	0	1	1	0	0	0	0	1	1	1	1	1	1	0	0
		22	visual resource assessment	1.91	0.88	1	0	1	1	0	1	1	0	1	1	0	0	1	0	0	0
		23	agricultural and rural landscape analysis	1.68	0.85	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		24	urban landscape	2.17	0.71	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		25	planning principles including regional community and neighborhood planning	2.12	0.76	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		26	conservation of natural resources	2.33	0.8	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		28	ecological planning principles	2.23	0.8	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		29	Water resource management	1.91	0.84	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		31	floodplain management	1.8	0.86	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Site Design and Engineering: Materials, Methods, Technologies and Applications	36	roadway design principles	2.15	0.83	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		37	elements of vehicular and pedestrian circulation systems and their design requirements	2.57	0.72	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		42	grading, drainage and stormwater treatment	2.78	0.57	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		44	erosion and sedimentation control	2.28	0.82	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		45	utility systems	1.77	0.77	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		46	Irrigation systems	1.75	0.88	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		47	lighting systems	1.7	0.79	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Construction Documentation and Administration	52	geographic coordinate systems and layout techniques and conventions	1.9	0.9	1	1	0	0	1	0	0	0	0	0	0	0	0	0	1	1
	Communication	61	the roles of visual communication, including photographic and video documentation	2.25	0.85	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0
		62	graphic presentation techniques, systems and symbols	2.71	0.73	1	1	1	0	0	1	1	1	0	0	0	0	0	0	1	0
	Values and Ethics in Practice	65	environmental ethics	2.08	0.82	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

LABOK						LAAB	GIS&T BOK																
				Command of Knowledge at time of Degree			Geospatial Data																
							GD6			GD7	GD8		GD9	GD10					GD11		GD12	
Knowledge Statement / Competency Division	Domains		Knowledge Statements / Competencies	Mean	Standard Deviation	Computing applications and other advanced technology	Thematic Accuracy	Resolution	Primary & Secondary Sources	Survey Theory & Electro-optical Methods	Tablet Digitizing	Scanning & Automated Vectorization	Spatial Sample Types	Nature of Aerial Imagery Data	Aerial Image Interpretation	Stereoscopy & Orthoimagery	Vector Data Extraction	Nature of Multispectral Image Data	Platforms & Sensors	Metadata	Spatial Data Infrastructures
Competencies	Natural & Cultural Systems	74	Conduct field investigations to identify significant natural and cultural features, characteristics, and systems	2.06	0.74	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		75	Perform quantitative analyses to evaluate the interactions of natural and cultural features, characteristics, and systems	1.64	0.78	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		76	Perform qualitative analyses to evaluate the relationship between the natural and cultural features, characteristics, and systems	1.79	0.78	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		77	Predict implications of design, planning, and management proposals on natural cultural systems both within the site and in the larger context	1.88	0.76	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Public Policy and Regulation	79	Confirm code compliance (e.g. zoning, environment, and accessibility)	1.37	0.81	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Design, Planning, and Management at Various Scales and	82	Develop a design program based on users' needs and clients' goals and resources	2.13	0.75	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		83	Analyze relationships among design elements by determining opportunities and constraints	2.33	0.62	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		84	Develop conceptual design, planning, and management solutions	2.39	0.61	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		85	Evaluate design alternatives to determine the appropriate solution	2.45	0.59	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Site Design and Engineering: Materials, Methods, Technologies and Applications	86	Design for protection and management of land resources (e.g. land forms, vegetation, habitat, erosion and sedimentation control)	2.13	0.64	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		87	Design for protection and management of water resources (e.g. storm water, water supply, ground water)	2.05	0.66	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		88	Design pedestrian, vehicular, and non-motorized circulation systems	2.28	0.62	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		89	Design elements for construction considering materials, structural issues, and construction technologies	1.94	0.69	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Construction Documentation and Administration	90	Prepare construction documents including plans, working drawings, and technical specifications	1.87	0.77	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Communication	98	Maintain clear communication among collaborators through correspondence and project coordination	1.51	0.9	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		100	Create graphic materials in a variety of media	2.19	0.76	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0
					Sum		2	4	2	1	2	2	1	2	2	1	1	2	1	3	1		
					Average		0.04	0.08	0.04	0.02	0.04	0.04	0.02	0.04	0.04	0.02	0.02	0.04	0.02	0.06	0.02		

LABOK					LAAB	GIS&T BOK																			
				Command of Knowledge at time of Degree		GIS&T and Society						Organizational & Institutional Aspects													
						GS1		GS2	GS3		GS5	OI1	OI2					OI3		OI5			OI6	
Knowledge Statement / Competency Division	Domains		Knowledge Statements / Competencies	Mean	Standard Deviation	Computing applications and other advanced technology	Liability	Privacy	Models of Benefits	Uses of Geospatial Information in Government	Public Participation GIS	Data Sharing Among Organizations & Individuals	Learning from Experience	Ongoing GI System Revisions	Budgeting for GI System Management	Database Administration	System Management	User Support	Organizational Models for GI System Management	Organizational Models for Geocoding GI Systems and/or Program Participants & Stakeholders	Spatial Data Infrastructures	Spatial Data Sharing Among Organizations	Balancing Data Access, Security, & Privacy	The Geospatial Community	Sum Horizontal LABOK Results
Knowledge Statements	Natural and Cultural Systems	3	land information sources	2.55	0.77	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5
		4	patterns of land use and built form	2.43	0.76	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	33
		5	natural site conditions and ecosystems	2.76	0.66	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	25
		6	social and cultural influences on design	2.19	0.81	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	7
		7	regional hazard design considerations	2.1	0.87	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5
	Design and Planning Theories and Methodologies	8	creativity and process including design theory and problem –solving strategies	2.83	0.64	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	10
		10	human factors such as behavior, perception, psychological and sensory response	2.33	0.76	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	9
		11	natural factors such as ecological relationships	2.53	0.75	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	23
		12	relationship between human and natural systems such as resource conservation, habitat restoration and creation, and urban ecology	2.36	0.79	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	19
		13	influence of context on design, planning, and management decisions	2.45	0.76	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	14
		14	research methods including data collection, interpretation, and application of results	2.37	0.93	1	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	1	0	0	19
		16	communication and education methods, including sharing knowledge and evaluating outcomes	2.15	0.99	1	0	0	0	0	0	1	1	0	1	0	1	1	1	1	0	0	1	1	24
	Public Policy and Regulation	17	governmental policies and laws that affect the use and development of land	1.8	0.85	1	1	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	9
	Design, Planning and Management at Various Scales and Applications	21	photogrammetry and remote sensing	1.47	0.84	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	30
		22	visual resource assessment	1.91	0.88	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	42
		23	agricultural and rural landscape analysis	1.68	0.85	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	20
		24	urban landscape	2.17	0.71	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	15
		25	planning principles including regional community and neighborhood planning	2.12	0.76	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	12
		26	conservation of natural resources	2.33	0.8	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	15
		28	ecological planning principles	2.23	0.8	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	10
		29	Water resource management	1.91	0.84	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	10
		31	floodplain management	1.8	0.86	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	15
	Site Design and Engineering: Materials, Methods, Technologies and Applications	36	roadway design principles	2.15	0.83	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	19
		37	elements of vehicular and pedestrian circulation systems and their design requirements	2.57	0.72	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	14
		42	grading, drainage and stormwater treatment	2.78	0.57	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	12
		44	erosion and sedimentation control	2.28	0.82	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	7
		45	utility systems	1.77	0.77	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	12
		46	Irrigation systems	1.75	0.88	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	10
		47	lighting systems	1.7	0.79	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	10
	Construction Documentation and Administration	52	geographic coordinate systems and layout techniques and conventions	1.9	0.9	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	38
	Communication	61	the roles of visual communication, including photographic and video documentation	2.25	0.85	1	0	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	26
		62	graphic presentation techniques, systems and symbols	2.71	0.73	1	0	0	1	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	55
	Values and Ethics in Practice	65	environmental ethics	2.08	0.82	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3

LABOK						LAAB	GIS&T BOK																			
				Command of Knowledge at time of Degree			GIS&T and Society						Organizational & Institutional Aspects													
							GS1		GS2	GS3		GS5	OI1	OI2					OI3		OI5			OI6	
Knowledge Statement / Competency Division	Domains		Knowledge Statements / Competencies	Mean	Standard Deviation	Computing applications and other advanced technology	Liability	Privacy	Models of Benefits	Uses of Geospatial Information in Government	Public Participation GIS	Data Sharing Among Organizations & Individuals	Learning from Experience	Ongoing GI System Revisions	Budgeting for GI System Management	Database Administration	System Management	User Support	Organizational Models for GI System Management	Organizational Models for Geocoding GI Systems and/or Program Participants & Stakeholders	Spatial Data Infrastructures	Spatial Data Sharing Among Organizations	Balancing Data Access, Security, & Privacy	The Geospatial Community	Sum Horizontal LABOK Results
Competencies	Natural & Cultural Systems	74	Conduct field investigations to identify significant natural and cultural features, characteristics, and systems	2.06	0.74	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	13
		75	Perform quantitative analyses to evaluate the interactions of natural and cultural features, characteristics, and systems	1.64	0.78	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	10
		76	Perform qualitative analyses to evaluate the relationship between the natural and cultural features, characteristics, and systems	1.79	0.78	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	11
		77	Predict implications of design, planning, and management proposals on natural cultural systems both within the site and in the larger context	1.88	0.76	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	9
	Public Policy and Regulation	79	Confirm code compliance (e.g. zoning, environment, and accessibility)	1.37	0.81	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	6
	Design, Planning, and Management at Various Scales and	82	Develop a design program based on users' needs and clients' goals and resources	2.13	0.75	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2
		83	Analyze relationships among design elements by determining opportunities and constraints	2.33	0.62	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	8
		84	Develop conceptual design, planning, and management solutions	2.39	0.61	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4
		85	Evaluate design alternatives to determine the appropriate solution	2.45	0.59	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5
	Site Design and Engineering: Materials, Methods, Technologies and Applications	86	Design for protection and management of land resources (e.g. land forms, vegetation, habitat, erosion and sedimentation control)	2.13	0.64	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	19
		87	Design for protection and management of water resources (e.g. storm water, water supply, ground water)	2.05	0.66	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	14
		88	Design pedestrian, vehicular, and non-motorized circulation systems	2.28	0.62	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	14
		89	Design elements for construction considering materials, structural issues, and construction technologies	1.94	0.69	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3
	Construction Documentation and Administration	90	Prepare construction documents including plans, working drawings, and technical specifications	1.87	0.77	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
	Communication	98	Maintain clear communication among collaborators through correspondence and project coordination	1.51	0.9	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1
		100	Create graphic materials in a variety of media	2.19	0.76	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	20
					Sum		1	1	2	3	1	1	1	2	3	1	1	1	1	1	1	1	1	1		
					Average		0.02	0.02	0.04	0.06	0.02	0.02	0.02	0.04	0.06	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02		

Appendix I - Phase Three

LABOK						LAAB	TECH MODULE						# Tech Module Courses with Objectives Incorporating LABOK Accreditation Knowledge Statements or Competencies
Knowledge Statement / Competency Division	Domains	Knowledge Statements / Competencies		Command of Knowledge at time of Degree		Computer applications and other advanced technology	I	II	III	IV	V	VI	
				Mean	Standard Deviation								
Knowledge Statements	Natural and Cultural Systems	3	land information sources	2.55	0.77	1	0	0	0	0	0	0	0
		4	patterns of land use and built form	2.43	0.76	1	2,3,4,6	2,3,4,6	2	2,3,4	2	4	6
		5	natural site conditions and ecosystems	2.76	0.66	1	2,4	2,4,5	2	2,4,5	2	1	6
		6	social and cultural influences on design	2.19	0.81	1	3	0	0	0	2	0	2
		7	regional hazard design considerations	2.1	0.87	1	0	0	0	0	0	0	0
	Design and Planning Theories and Methodologies	8	creativity and process including design theory and problem –solving strategies	2.83	0.64	1	1,5	1,5	2	1,5	2	0	5
		10	human factors such as behavior, perception, psychological and sensory response	2.33	0.76	1	2,3,4	2,3,4	0	2,3,4	2	4	5
		11	natural factors such as ecological relationships	2.53	0.75	1	5	5	2	5	2	0	5
		12	relationship between human and natural systems such as resource conservation, habitat restoration and creation, and urban ecology	2.36	0.79	1	2,4,5	2,4,5	0	2,4,5	2	1	5
		13	influence of context on design, planning, and management decisions	2.45	0.76	1	4,5	4,5	2	4,5	2	0	5
		14	research methods including data collection, interpretation, and application of results	2.37	0.93	1	5	5	0	5	0	1	4
		16	communication and education methods, including sharing knowledge and evaluating outcomes	2.15	0.99	1	1,2,3	1,2,3,4	1	1,2,3,4	1	4	6
	Public Policy and Regulation	17	governmental policies and laws that affect the use and development of land	1.8	0.85	1	4	4	0	4	2	0	4
	Design, Planning and Management at Various Scales and Applications	21	photogrammetry and remote sensing	1.47	0.84	1	3,5	3,4,6,8	1	3,4,7	1	1	6
		22	visual resource assessment	1.91	0.88	1	1,4,5	1,3,5,8	1,3	1,3,5,7	1	1,4	6
		23	agricultural and rural landscape analysis	1.68	0.85	1	5	5	0	5	1	0	4
		24	urban landscape	2.17	0.71	1	0	4	2	4	2	0	4
		25	planning principles including regional community and neighborhood planning	2.12	0.76	1	0	4	0	4	2	0	3
		26	conservation of natural resources	2.33	0.8	1	0	6	0	0	0	0	1
		28	ecological planning principles	2.23	0.8	1	0	6	2	0	0	0	2
		29	Water resource management	1.91	0.84	1	0	6	2	0	0	0	2
		31	floodplain management	1.8	0.86	1	0	6	0	0	0	0	1
	Site Design and Engineering: Materials, Methods, Technologies and Applications	36	roadway design principles	2.15	0.83	1	0	0	0	0	0	0	0
		37	elements of vehicular and pedestrian circulation systems and their design requirements	2.57	0.72	1	0	0	0	0	2	0	1
		42	grading, drainage and stormwater treatment	2.78	0.57	1	0	0	2	0	2	0	2
		44	erosion and sedimentation control	2.28	0.82	1	0	0	2	0	2	0	2
		45	utility systems	1.77	0.77	1	0	0	0	0	2	0	1
		46	Irrigation systems	1.75	0.88	1	0	0	0	0	2	0	1
		47	lighting systems	1.7	0.79	1	0	0	0	0	2	0	1
	Construction Documentation and Administration	52	geographic coordinate systems and layout techniques and conventions	1.9	0.9	1	2,4,5,6	3,4,5,8	3	3,4,5,9	1	1	6
	Communication	61	the roles of visual communication, including photographic and video documentation	2.25	0.85	1	1,2,3,4	1,2,3,4,5,7,8	1,2,3	1,3,4,5,6,7	1	1,4	6
		62	graphic presentation techniques, systems and symbols	2.71	0.73	1	1,2,3,4,6	1,2,3,4,7,8	1,2,3	1,2,3,4,6,7	1	1,4	6
	Values and Ethics in Practice	65	environmental ethics	2.08	0.82	1	4	4	0	4	0	0	3

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				Mean	Standard Deviation								
Competencies	Natural & Cultural Systems	74	Conduct field investigations to identify significant natural and cultural features, characteristics, and systems	2.06	0.74	1	5	5,8	0	5,7	0	0	3
		75	Perform quantitative analyses to evaluate the interactions of natural and cultural features, characteristics, and systems	1.64	0.78	1	0	4	0	4	0	0	3
		76	Perform qualitative analyses to evaluate the relationship between the natural and cultural features, characteristics, and systems	1.79	0.78	1	0	4	0	4	0	0	3
		77	Predict implications of design, planning, and management proposals on natural cultural systems both within the site and in the larger context	1.88	0.76	1	5	5	0	5	0	0	3
	Public Policy and Regulation	79	Confirm code compliance (e.g. zoning, environment, and accessibility)	1.37	0.81	1	0	8	0	7	2	0	3
	Design, Planning, and Management at Various Scales and	82	Develop a design program based on users' needs and clients' goals and resources	2.13	0.75	1	0	4	0	4	2	0	3
		83	Analyze relationships among design elements by determining opportunities and constraints	2.33	0.62	1	5	5	0	5	2	0	4
		84	Develop conceptual design, planning, and management solutions	2.39	0.61	1	0	4	0	4	2	0	3
		85	Evaluate design alternatives to determine the appropriate solution	2.45	0.59	1	0	4	0	4	2	0	3
	Site Design and Engineering: Materials, Methods, Technologies and Applications	86	Design for protection and management of land resources (e.g. land forms, vegetation, habitat, erosion and sedimentation control)	2.13	0.64	1	5	4,5	0	4,5	0	0	3
		87	Design for protection and management of water resources (e.g. storm water, water supply, ground water)	2.05	0.66	1	0	4	0	4	0	0	2
		88	Design pedestrian, vehicular, and non-motorized circulation systems	2.28	0.62	1	4	4	0	4	2	0	4
		89	Design elements for construction considering materials, structural issues, and construction technologies	1.94	0.69	1	0	0	0	0	2	0	1
	Construction Documentation and Administration	90	Prepare construction documents including plans, working drawings, and technical specifications	1.87	0.77	1	0	0	2	0	2	0	2
	Communication	98	Maintain clear communication among collaborators through correspondence and project coordination	1.51	0.9	1	0	0	x	0	0	0	0
		100	Create graphic materials in a variety of media	2.19	0.76	1	1,3,4	1,3,6	1,2,3	1,3	1	1,4	6