Considering Framework Data Concepts in GIScience Higher Education

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Project Scope

- "Teaching about Framework Data Concepts"
  - Training Materials for NSDI Framework Standards
  - Best Practices for Integrating Framework Principles into Higher Education Curricula

- FGDC Future Initiatives Training Program
  - Rocky Mountain Cooperative Ecosystem Study Unit Funding Award # 4121HS007:
  - Sharon Shin, FGDC Metadata Coordinator
  - Lynda Wayne, GeoMaxim

Today's Outline

- Framework Data Concept
- Context within U.S. National Spatial Data Infrastructure
- FGDC Framework Data Standards
- Status of Framework Data Awareness in Education and Research
- Strategies for Teaching about Framework in GIScience Curricula

What is Framework?

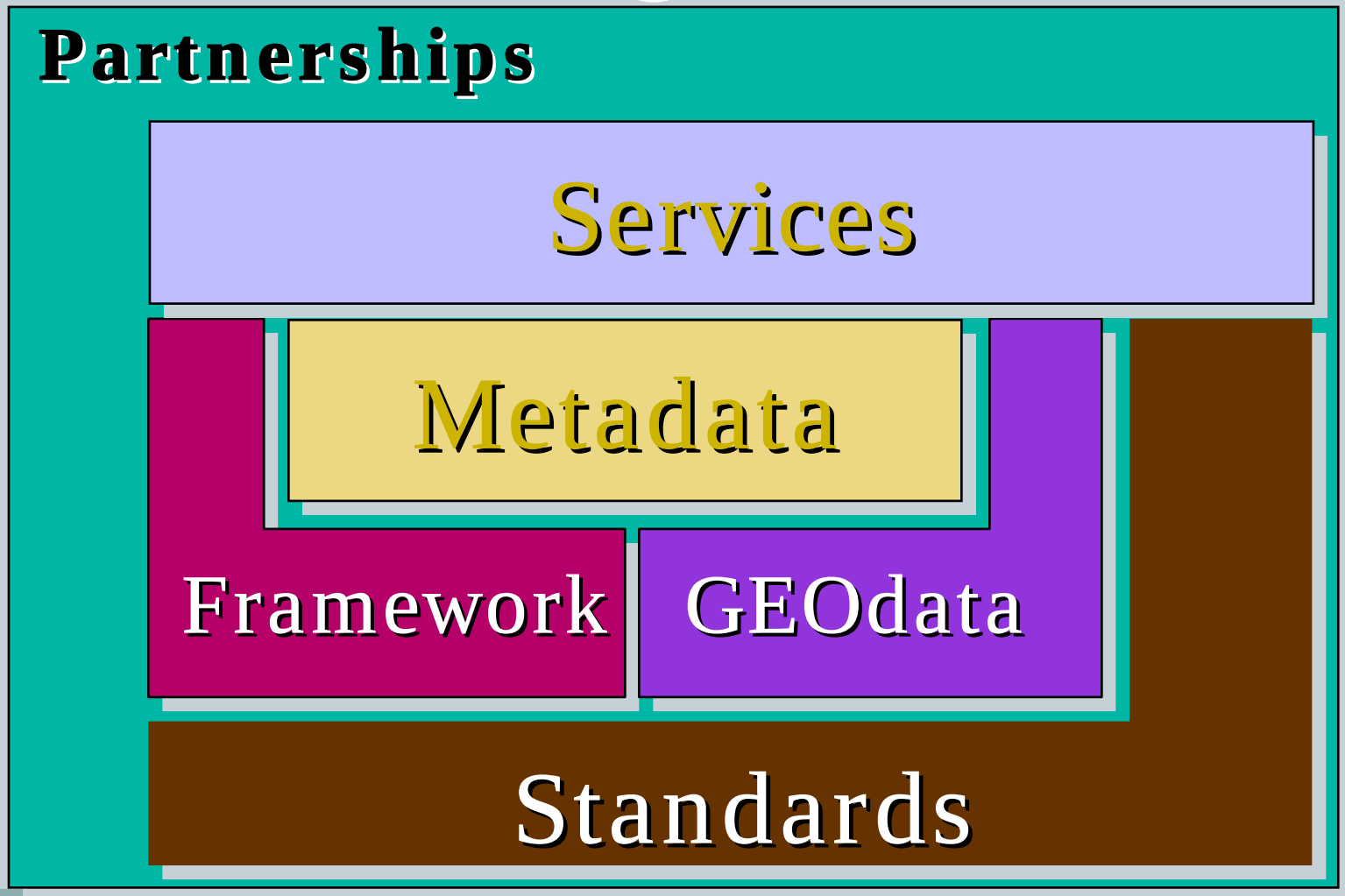
- Key Aspects of Framework:

- Themes of most commonly used digital geospatial data
- Procedures, technology, and guidelines that provide for integration, sharing, and use of these data.
- Institutional relationships and business practices that encourage the maintenance and use of data.

- Key Benefits of Framework:

- Facilitate production and use of geographic data
- Reduce overall operating costs for geographic data clients
- Improve service and decision-making

Components of the U.S. NSDI



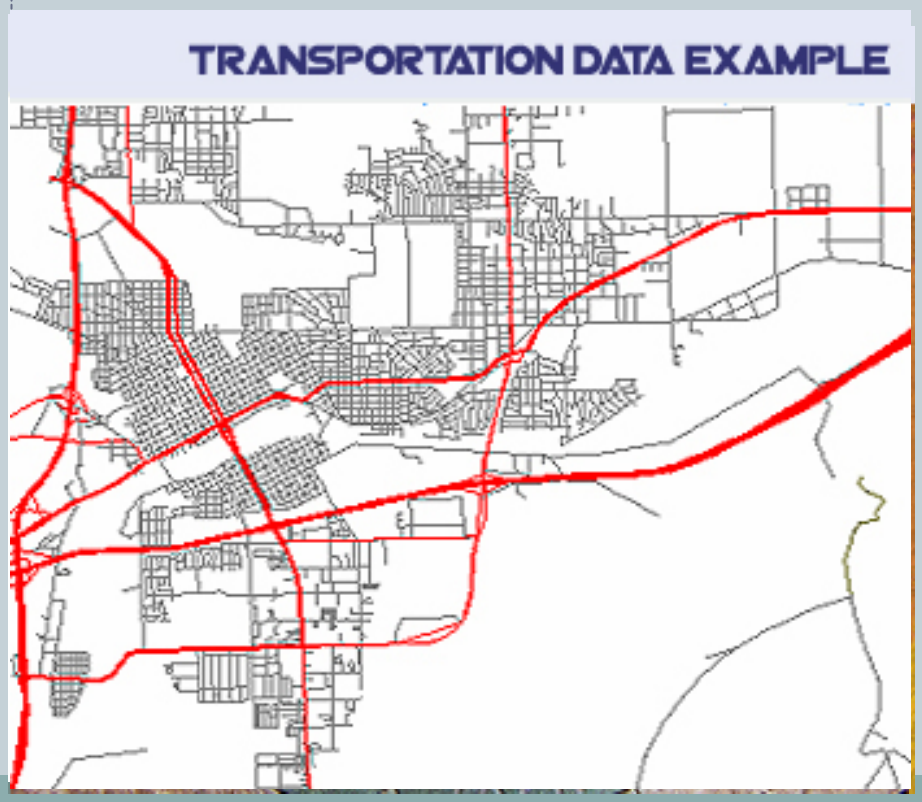
NSDI Framework Approach

...a collaborative initiative to develop geographic datasets that are compatible based upon spatial location and content. This allows different users to jointly access and work seamlessly with data collected from a variety of sources and for variety of reasons, ultimately reducing project costs and increase cooperation.

- Data
- Procedures & Technology
- Institutional Relationships & Business Practices

Seven Thematic Framework Elements

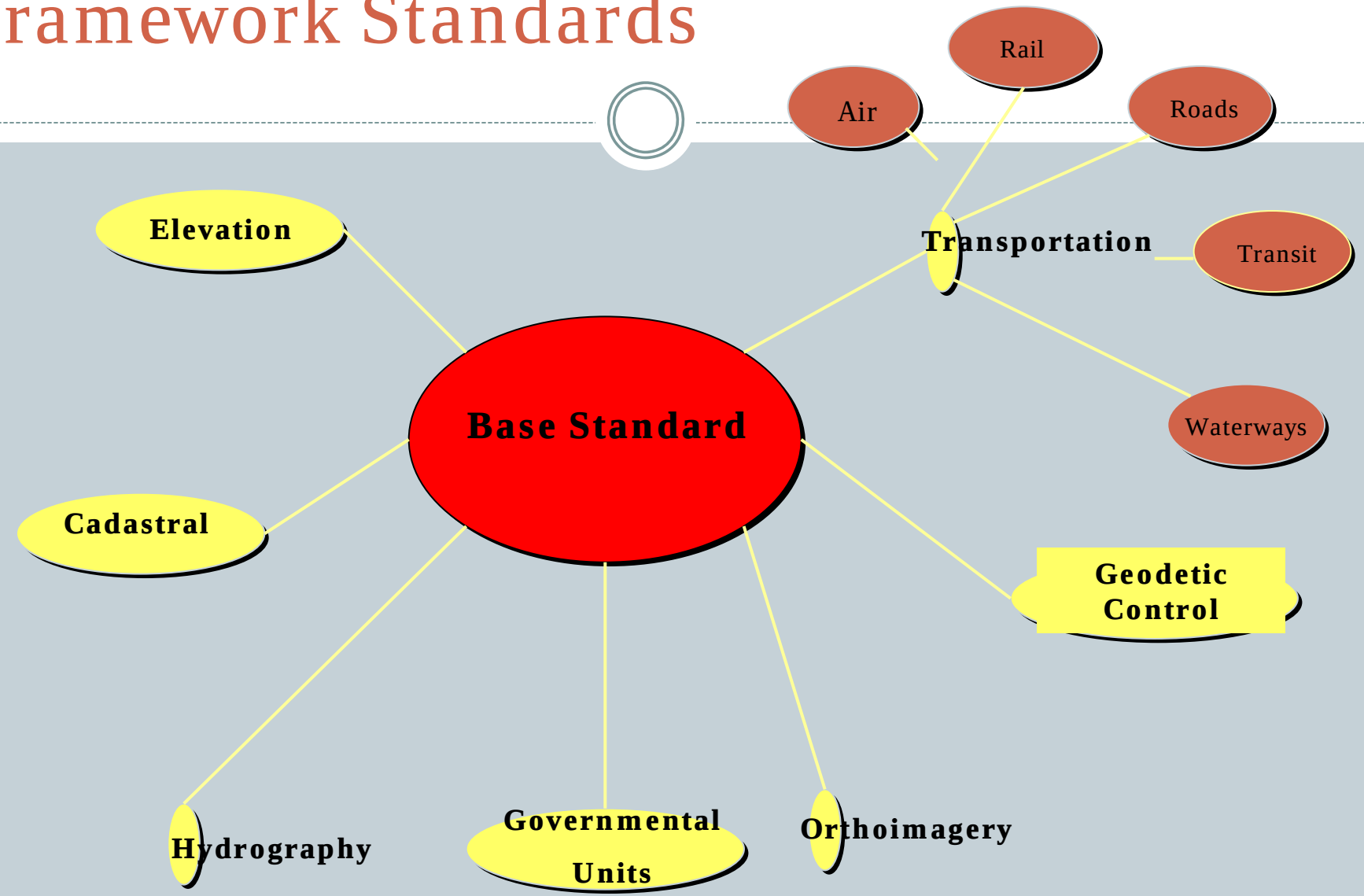
- Cadastral information
- Orthoimagery
- Elevation
- Geodetic control
- Hydrography
- Governmental units
- Transportation



NSDI Framework Data Content Standards

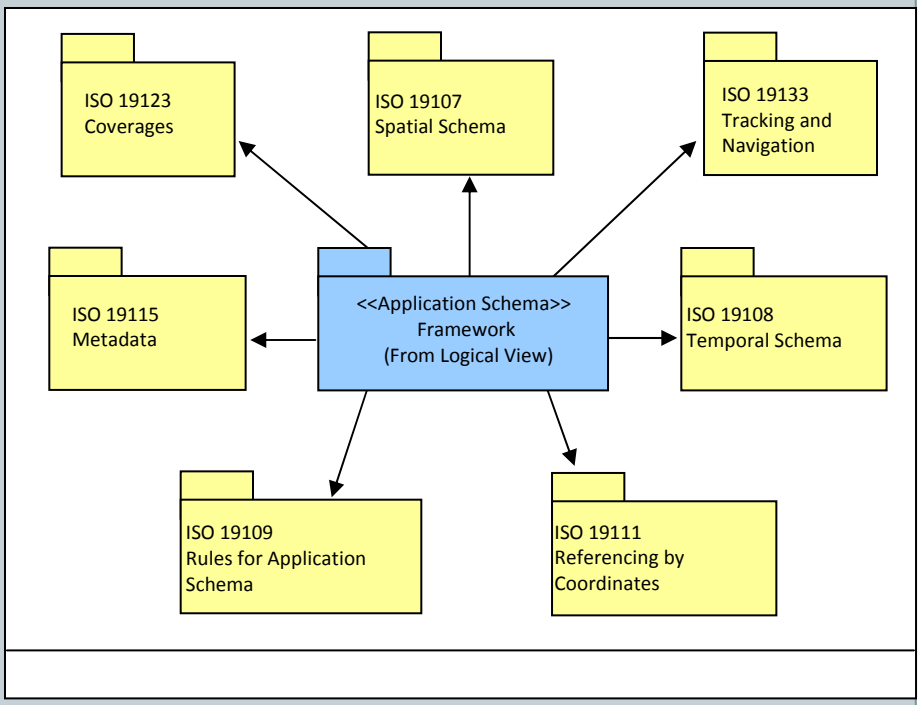
- A suite of standard parts that collectively define minimum requirements for data to be considered Framework data.
- Provide guidelines for creating and documenting data that allows computer software to use a set of characteristics to parse data sets and test for compatibility.
- Do not define how a user must create data.
- Each of the seven themes has its own standard part, and potentially sub-parts; none of the individual Framework Standard parts can stand on its own.

Framework Standards



Framework Standards

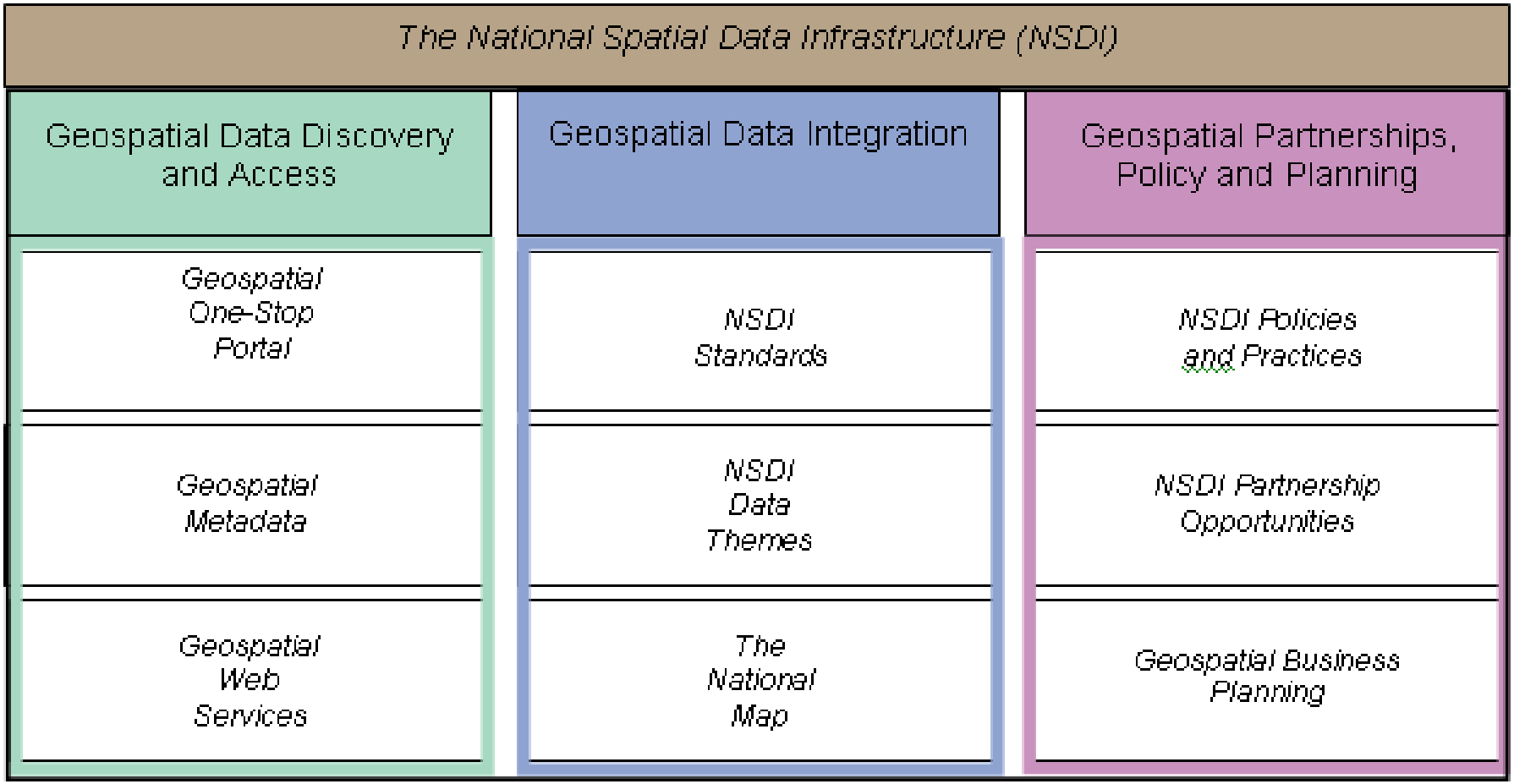
- Standards are all dependent upon concepts in the ISO 19100 series of geographic information standards. For example, the metadata component implemented by the Framework Base Standard is based on ISO 19115 which specifies requirements for all geographic metadata.



Framework Standards

- Framework supports:
  - community standards for sets of **spatial features**, feature representation, and attributes to a least common denominator
  - exchange of data through collecting, converting, or associating information to common **Framework data standards** with an **encoding format**
  - multiple representations of real-world features at different scales and times by **feature identifier** and generalization

Teaching Framework



NATIONAL SPATIAL DATA INFRASTRUCTURE FRAMEWORK DATA

Framework Data Content Base Standard

COURSE INFORMATION

The National Spatial Data Infrastructure (NSDI) Framework is a collaborative initiative to develop geographic datasets that are compatible based upon spatial location and content. The Framework approach allows data collected for variety of reasons and agencies to work together seamlessly; which can ultimately reduce project costs and increase interagency cooperation. The Framework Data Content Base Standards Suite dictates the requirements for Framework data.

This course covers the fundamentals of the Framework Data Content Base Standard which addresses the components which are contiguous throughout each of the Framework Standards. It is designed for users who are both interested in an overview of the Framework Data Content Base Standard as well as designers and developers implementing Framework data, and associated tools.

RELATED TOPICS

NSDI Training Tracks:
An initiative to define areas, topics, and materials for training within the NSDI.

ISO 19100 Series:
Suite of standards developed for geographic data and datasets. The most notable is ISO 19135 which pertains to metadata.

ANSI Standards:
Similar work to ISO, but standards directly apply to data created within the United States.

PREREQUISITES

- General Understanding of GIS, Geospatial Data and Metadata
- Familiarity with the FGDC and NSDI
- Basic knowledge of Geographic Data Standards (specifically ISO 19100 series)

fgdc
Federal Geographic Data Committee

NSDI

finalslides

Outline | Thumb | Notes | Search

Slide Title	Duration
A.1 - Course Introduc...	00:16
A.2 - Course Modules...	00:32
A.3 - Pre-test Instruct...	00:16
1.1 - Understanding F...	00:15
1.2 - What is Framew...	00:54
1.3 - Seven Thematic...	00:33
1.4 - Cadastral	00:42
1.5 - Digital Orthoima...	00:43
1.6 - Elevation	00:51
1.7 - Geodetic Control	00:41
1.8 - Governmental U...	00:39
1.9 - Hydrography	00:43
1.10 - Transportation	00:47
1.11 - Why Framewor...	00:57
1.12 - Framework Or...	01:04
1.13 - Practical Uses f...	01:01
1.14 - Framework at t...	00:40
1.15 - Framework at t...	00:52
1.16 - Framework at t...	00:47
1.17 - Framework in ...	00:44
1.18 - Understanding ...	00:39
2.1 - Framework Data...	00:17
2.2 - Framework Data...	00:31
2.3 - Purpose for the ...	00:39
2.4 - Hierarchy of Sta...	00:36

46 Minutes 10 Seconds Remaining

Slide 1 / 60 | Stopped 00:00 / 00:16

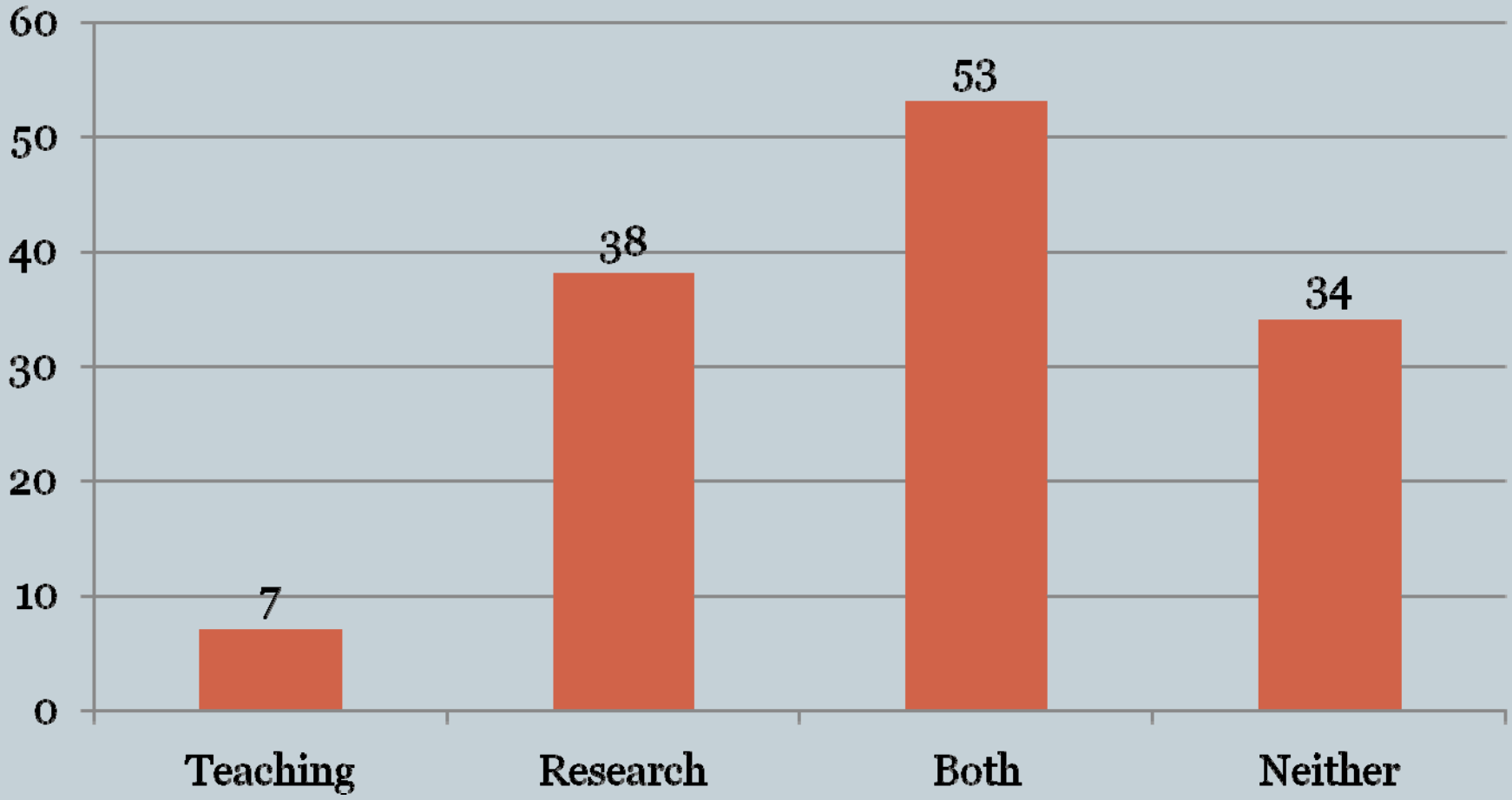
Recognizing Framework & Framework Standards in Research and Education

- Online Survey of Geospatial Standards and Infrastructures
- Textbook Meta-Analysis
- GIS&T Body of Knowledge Cross-Walk

Survey on Geospatial Standards & Infrastructures

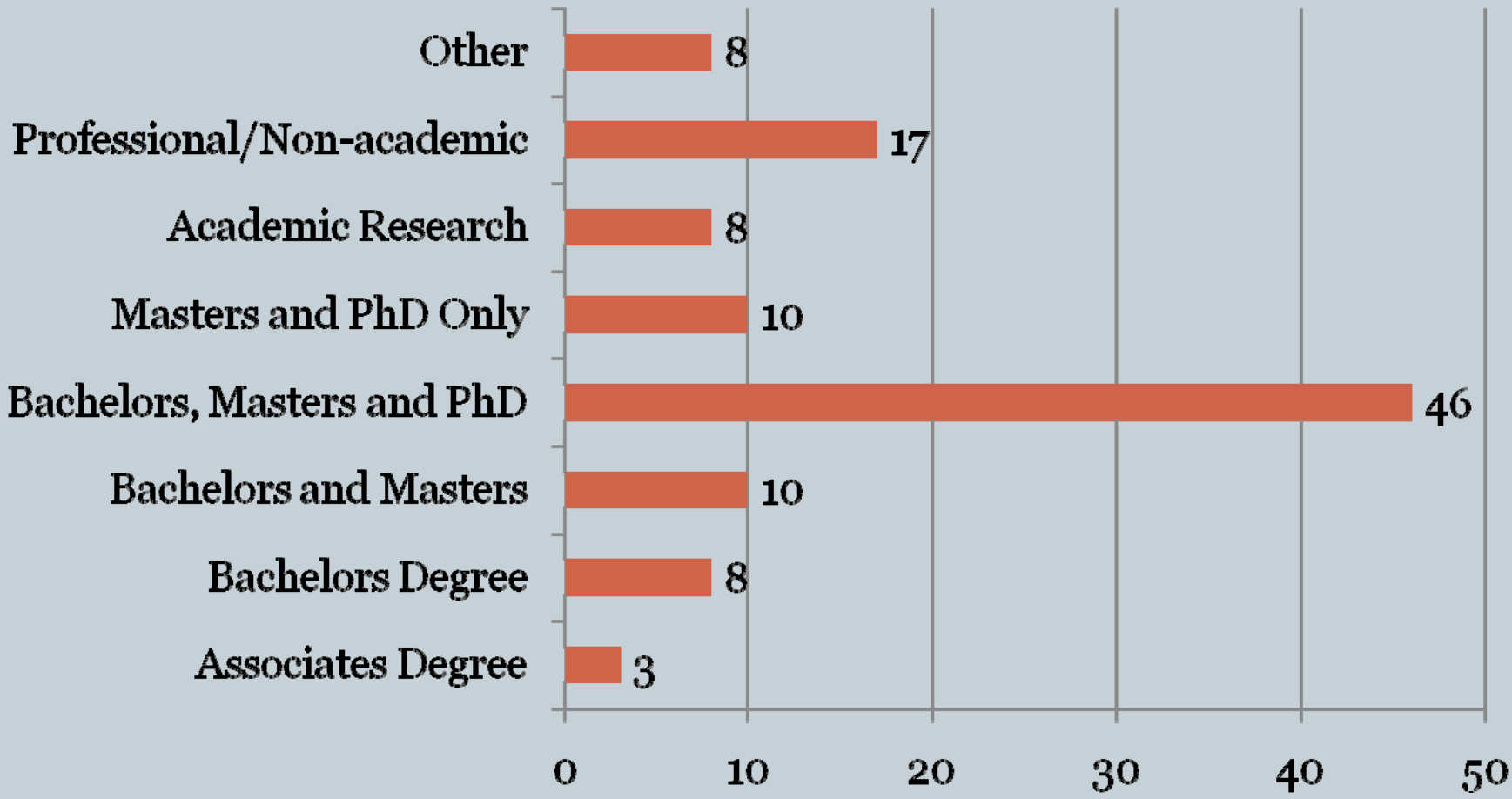
- 2007 Online Survey of subscribers to AAG GISSG, UCGIS and ESRI Education Program
- Total Questions: 41
- Total Respondents: 141
- Total Valid Reponses: 86-132 depending on question – 101 average valid responses.
- Respondents represented both US and international concerns.
  - Including Canada, Spain, India and others.

Respondent Institutional Role



Responses: 132

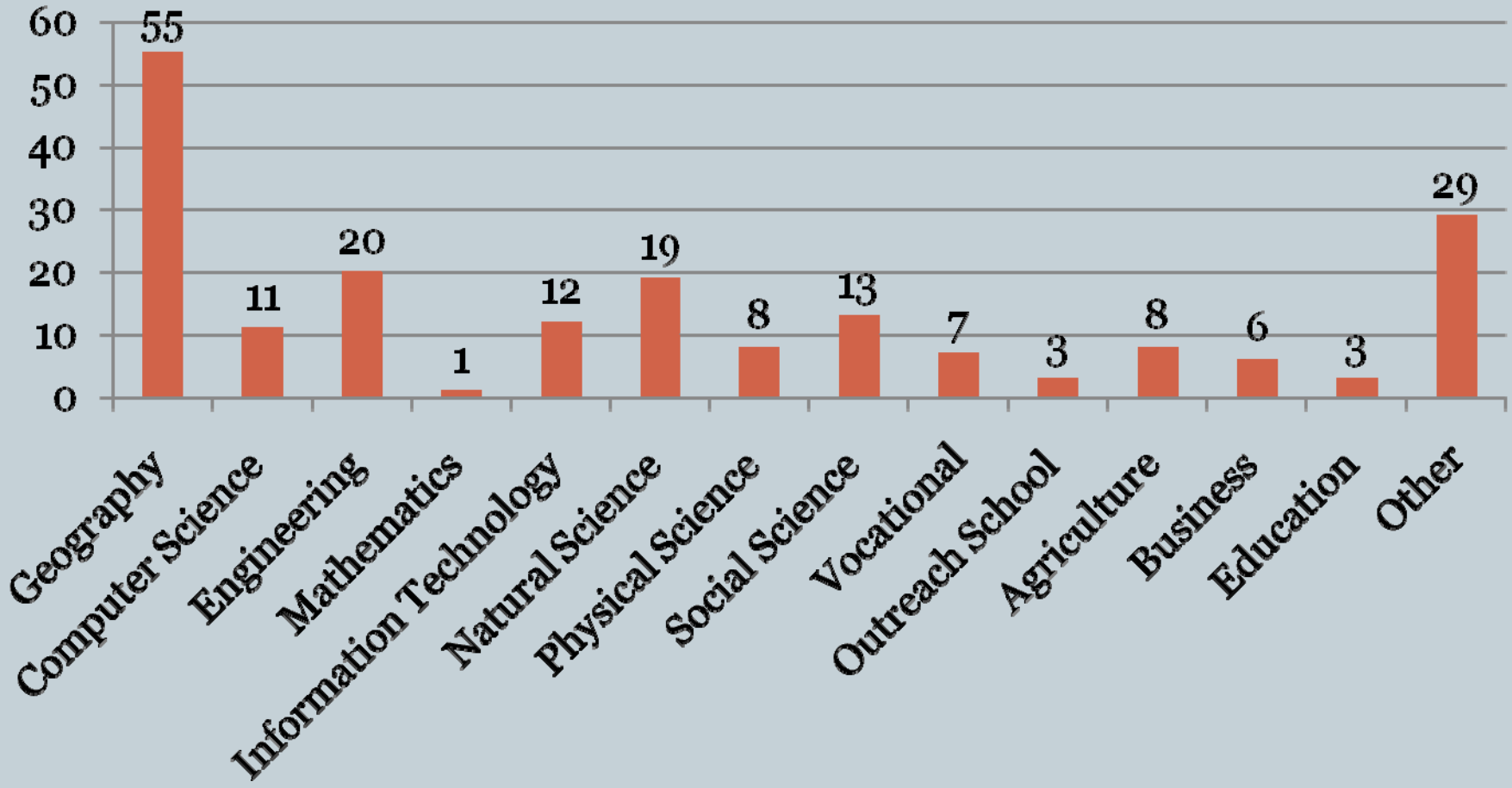
Institutional Type (inc. Degree Programs)



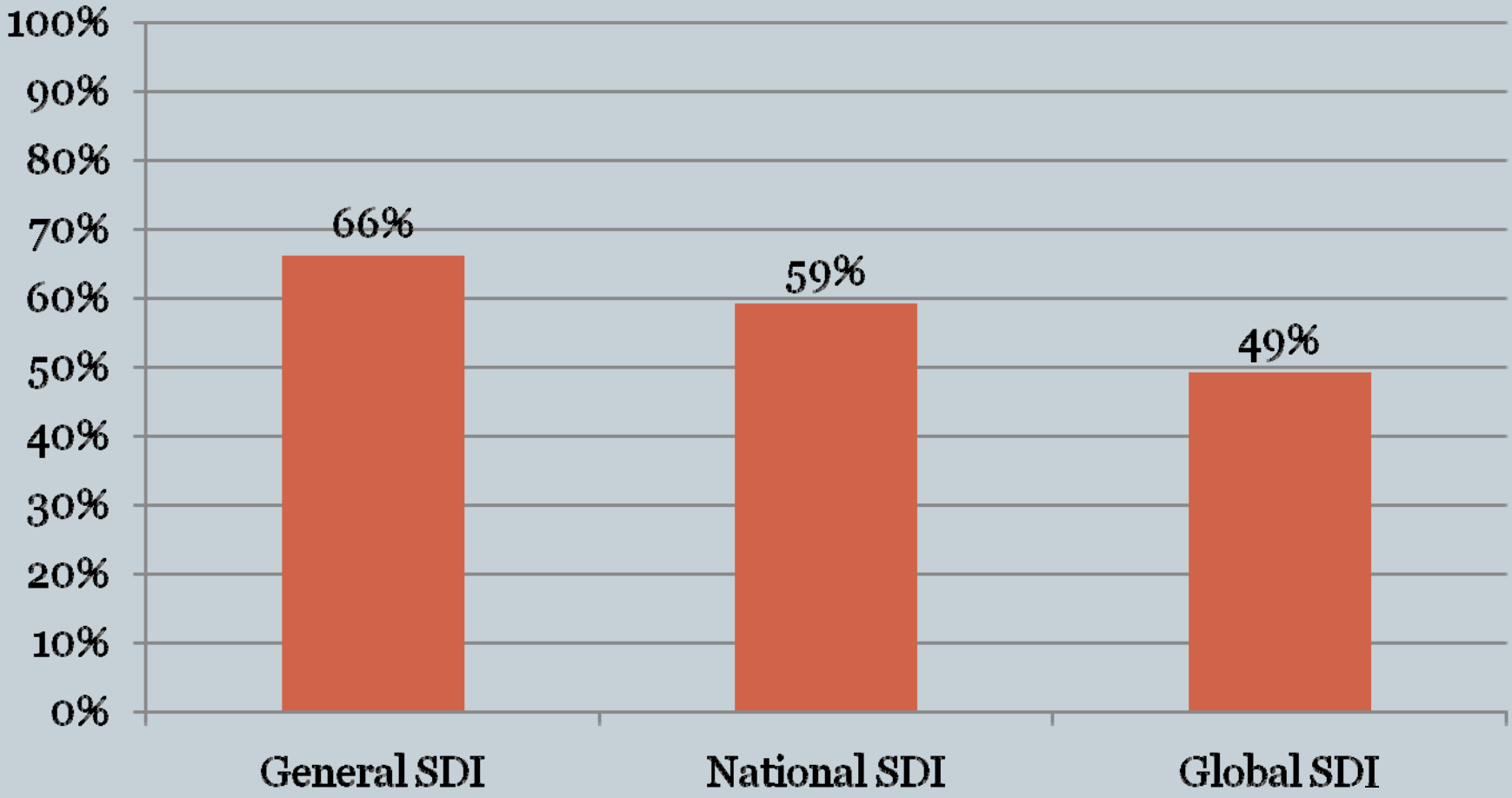
Responses: 110

Reponses of "other" that did not fit in one of the above included a GIS certificate program, a library, and K-12.

Where is GIS&T taught?



General Importance of SDI in Curriculum



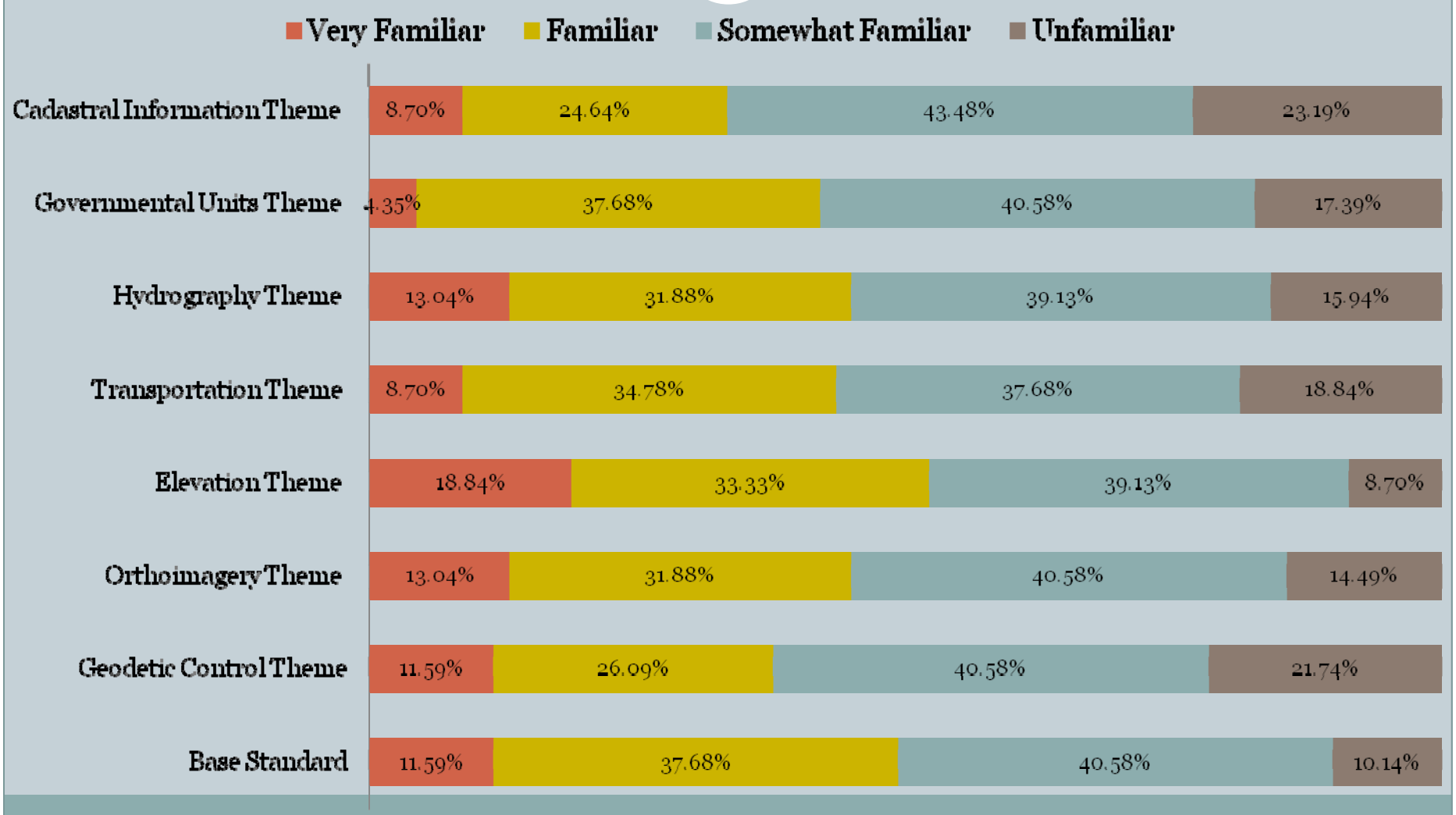
n=89, 91, 90

Reported % is the number of respondents who selected important or very important.

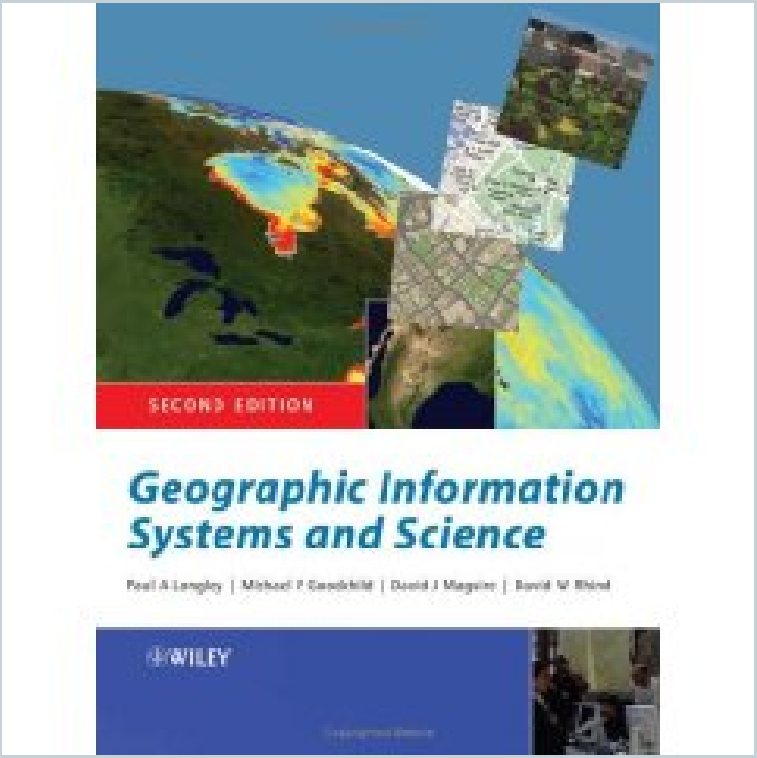
Familiarity with Framework Concepts

- 58% of respondents report 5 or more years of awareness of SDI concepts (n=88).
- 45% of respondents report 5 or more years of using SDI concepts in day-to-day activities (n=86).
- **76% of respondents indicate somewhat or greater familiarity with Framework (n=91).**

Framework Theme Familiarity



Framework Concept Meta-Analysis of GIS Textbooks



- Data availability and access
- Spatial data infrastructures
- Standards
  - Data models
  - Software architecture

Content:

- 10 Knowledge Areas
- 73 units
- 329 topics
- 1,600+ objectives

Utility:

Course & curriculum planning

Program comparison

Certification, accreditation, and articulation

Workforce development

GIS&T BoK Framework Cross-Walk

- KA: Geospatial Data (GD)
  - Unit GD6: Data Quality
  - Unit GD12: Metadata, Standards and Infrastructures
- KA: GIS&T and Society (GS)
  - Unit GS3: Use of Geospatial Information in the Public Sector
  - Unit GS5: Dissemination of Geospatial Information
- KA: Organizational and Institutional Aspects (OI)
  - Unit OI5: Institutional and Inter-Institutional Aspects
  - Unit OI6: Coordinating Organizations

Considerations in Teaching Framework

- Course-by-course applicability
  - Geographic Information and Map Use
  - Introductory GIS
  - Advanced GIS
  - GIS Management
  - Special Topics (data modeling, database design, etc.)
- Framework Components
  - SDI Context, Thematic Information Content, Technical Context, Operational Context, Business Context
- Breadth v. Depth
  - E.g., Development-->Stewardship-->Sharing

Considerations in Teaching Framework

- Desired Learning Outcomes and Drivers
  - New technology adoption (Heywood & Petch 1991)
  - Metadata (Berendsen et al. 2003)

1. Conviction
2. Motivation
3. Skills
4. Knowledge
5. Experience

Contributing Resources

- **National Map:**
  - Provides access to networked databases of current information about the Nation's landscape.
  - Consistent structure for geographic knowledge needed by the Nation
  - Builds data sharing and data update partnerships at multiple levels

- **GeoSpatial One-Stop:**
  - Comprehensive public portal for geospatial information from federal agencies and a growing number of state, local, tribal, and private agencies

- **FGDC CAP Grant Awardees - Framework Data Client Services Development**
  - E.g., USGS National Hydrography Dataset; Virginia Statewide Road Network

Next Steps

- Institutional versus Technical Focus
  - NSDI
  - Conceptual Schemas
  - UML, XML, GML…
- Applicability of “Training” Materials for Higher Education Curricular Use
- Course-Specific Examples

Questions?

FOR MORE INFORMATION:

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New Thinking