Multi-level Learning Schema – A need of today for Geospatial requirements

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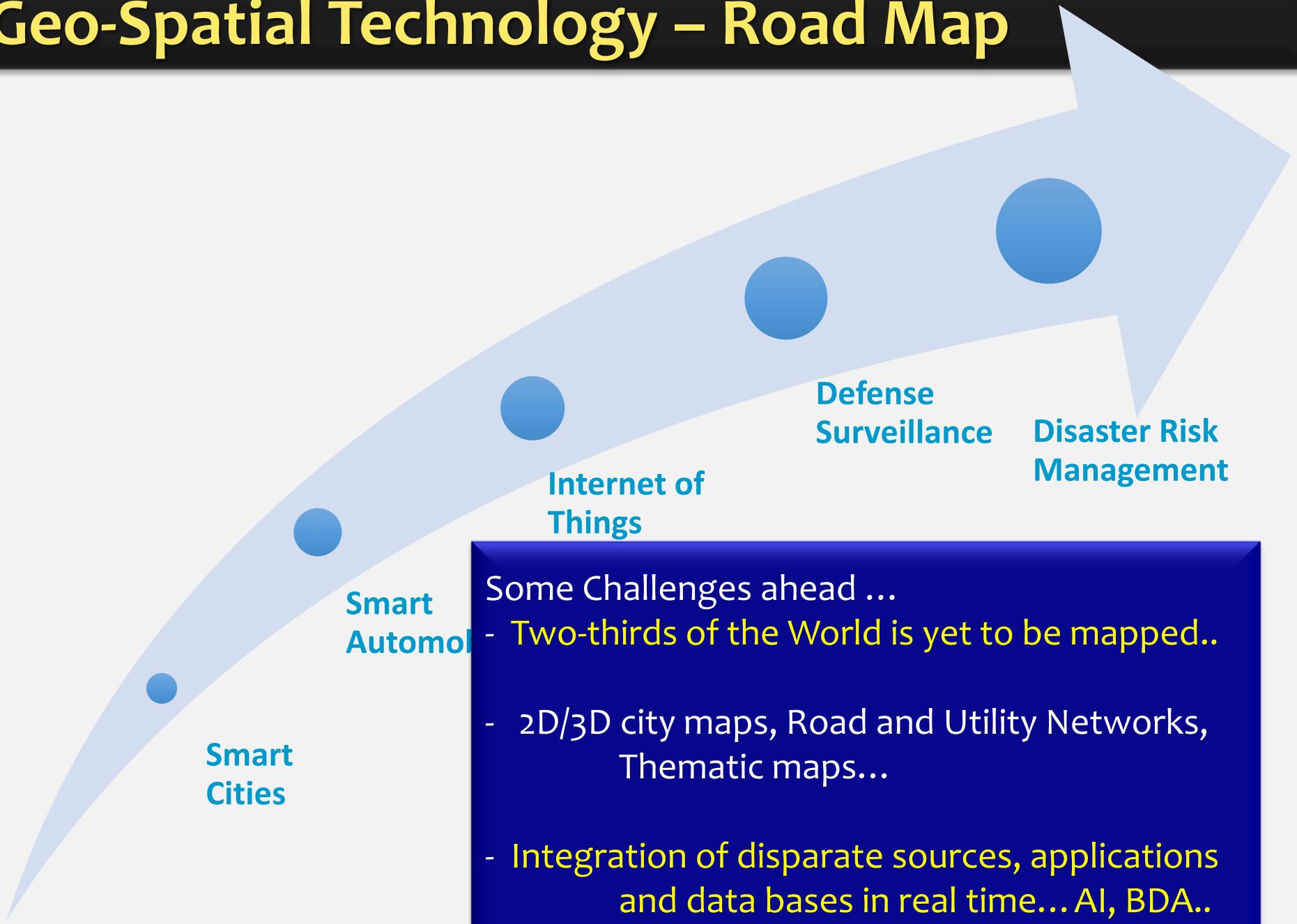
Geo-Spatial Technology – Road Map



Some Challenges ahead …

- Two-thirds of the World is yet to be mapped..
- 2D/3D city maps, Road and Utility Networks, Thematic maps…
- Integration of disparate sources, applications and data bases in real time… AI, BDA..

Employment Profile

Occupation Titl	Total Employr
Total geospatial technology industry	78,990
Aerospace engineers	13,290
Engineering managers	2,110
Computer software engineers, systems software	2,030
Management analysts	2,010
Inspectors, testers, sorters, samplers, and weighers	1,870
Production, planning, and expediting clerks	1,590

Source: U.S. Bureau of Labor Statistics Operational Employment Statistics @www.bls.gov/oes/home.h

Geospatial Technology-Related Occupations
Environmental engineers
Environmental engineering technicians
Surveying and mapping technicians
Cartographers and photogrammetrists
Geoscientists, except hydrologists and geographers
All other drafters, engineering, and mapping technicians
Engineering managers
Industrial engineering technicians
Surveyors
Architectural and civil drafters
Mechanical drafters

Drivers to Career Selection

Sustainable workforce – a need of today

Human Resource Development	Supply of Technical and Professional Personal (K12, UG/PG students, Teachers)
Organizational Strengthening	Strengthen Govt./NGOs 1. Management Capacity on Geo-ICT solution (systems, processes) 2. Strategic Management Principles (professional, field managers, trainees…)
Institutional Strengthening	Strengthen Capacity of Organizations to 1. Develop appropriate Mandates & Modus Operandi 2. Legal & Regulatory Frameworks (Decision makers, Local & National Govt. / NGO Administrators, Law and Policy staffs, …)

Identifying Multiple Levels in Geospatial Technology

To Whom: K-12 School Students

Characterization

IT Skills:	LIMITED
Purpose:	AWARENESS
Resources:	LOW
Theory:	LOW

To Whom: UG/PG Students

Characterization

IT Skills:	MEDIUM
Purpose:	BASIC/ADVANCED SKILLS
Resources:	LOW/MEDIUM
Theory:	MEDIUM/HIGH

Identifying Multiple Levels in Geospatial Technology

	Level of Education	IT Skills	Status	Purpose	Resources	Theory
School Students	K-12	Limited	Individual	Awareness	Low	Low
UG Students	2 Years College	Limited	Individual	Basic Skills	Low	Medium
PG Students	Degree/Diploma	Medium	Individual	Advance Skills	Low	High
Researchers	Masters	Advanced	Individual	Research	Medium	High
Academicians	Masters/PhD	Advanced	Students	Teach	Medium	High
Government	Degree/Diploma	Medium	Citizens	Decision making	High	Low
Industry	Degree/Diploma	Advanced	Customers	Service/Product development	High	Low
NGO	Degree/Diploma	Limited	Focus Group	Decision making	Low	Low

Pedagogy at K-12 Level Awareness

Characterization

IT Skills:	**LIMITED**
Purpose:	**AWARENESS**
Resources:	**LOW**
Theory:	**LOW**

LEARNING BY "DOING"

Water Rocket Making & Launching Competition

Poster Competition

Ms. Yu Qi Chew (Malaysia)

Amazing Outcomes

THEME: "UNITED THROUGH SPACE"

Ms. Charlene Josephine (Indonesia)

Challenges in Geospatial Technology training

- **Ever evolving technologies :**
  - Advanced sensors,
  - innovative (agile) platforms,
  - intelligent processing,
  - multi-sources integration strategies,
  - Ready to Analyze data with high reliability,
  - Higher demand for specialized courses, …

- **Challenges** in
  - Getting suitable “Trainers”
  - Building Laboratories (in house and field)

Possible Solutions for Geospatial Technology

- **Cross-border Education**
  - Joint education programs (JEPs),
  - dissemination approaches(seminars, tutorials, workshops, symposia, e-bulletins and other mechanisms & tools),
  - Cooperating with other Geo-societies;
  - Cooperate with regional partners;
- **Webinars/Outreach programs for "first" awareness**
  - Promotion of web-based resources with free access, ……

Best Practices in Capacity Building:

Before

- What is the best way to accomplish
- To whom are we trying to accomplish
- How to measure that it is the best way

While

- How to quantify the performance of trainers, trainees, material and methodology ..

Post

- What measures to be taken for improvement..
- What new topics for future training needs..
- Alumni Feedback and suggestions
- How to enhance retention of knowledge gained

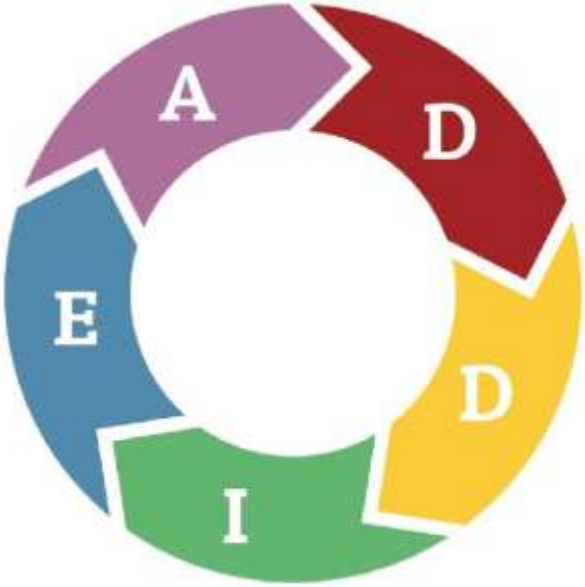
Best Practices: ISD & ADDIE

Instructional Systems Design (ISD)

- Purpose: Determining the state and needs of the learner, defining the end goal of instruction, and creating some "intervention" to assist in the transition.

- There are many instructional design models but many are based on the ADDIE model with the five phases:

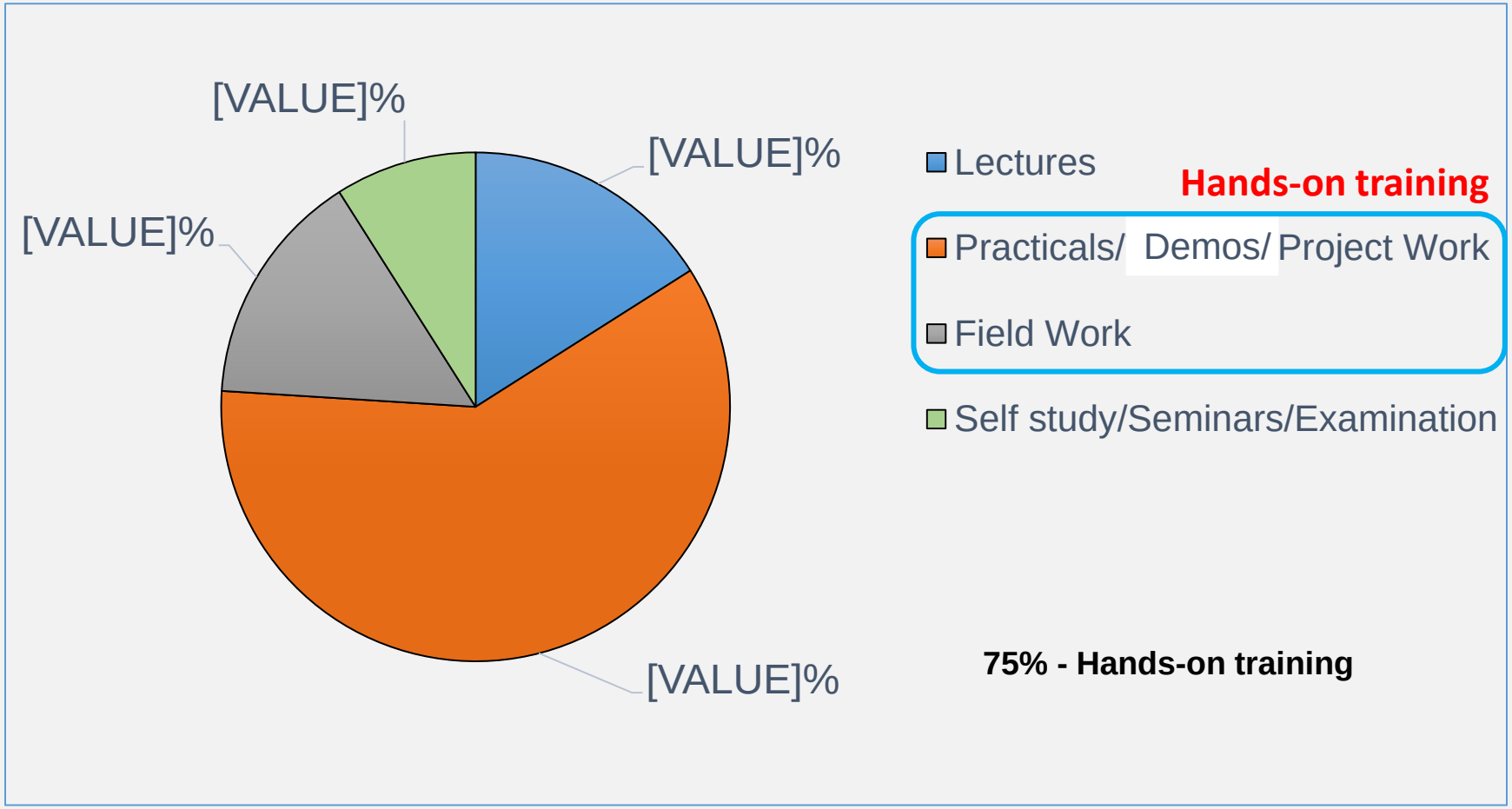
  - Analysis
  - Design
  - Development
  - Implementation
  - Evaluation



ADDIE Model … in a nutshell

Gain Attention	• Present the learner with an introductory activity that engages him/her
Inform objectives	• Present the learner with learning objectives
Stimulate recall of prior learning	• Present the learners with an experience that stimulates their prior knowledge
Present Stimulus	• Present the learner with content materials
Provide Guidance	• Present the learner with examples
Elicit Performance	• Present the learner with practice activities
Provide Feedback	• Present the learner with practice and feedback
Assess Performance	• Present the learner with post-assessment items
Enhance Retention & Transfer	• Present the learner with resources that enhance retention & transfer of knowledge

Structure of “in-person” training @ IIRS



Preparing a Multi-level Learning Schema

3 Stages - Geospatial Technology Learning Education / Training

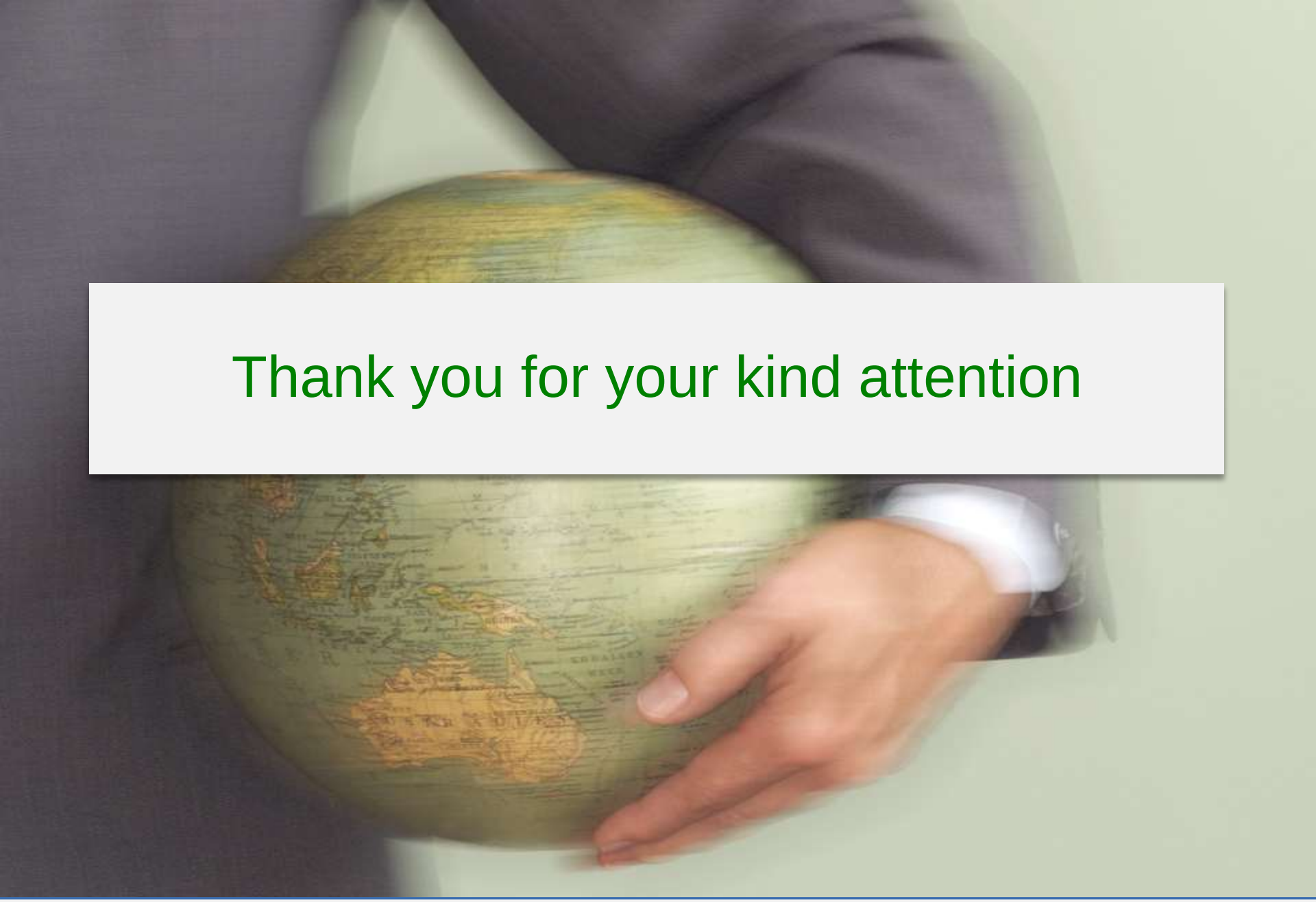
		Curriculum					Pedagogy						Evaluation				
		Geoinformatics BoK	Domain-Specific Content	SOP and Best Practices	Product Documentation	Standardization	Instructor Led Delivery	Learning Motivation	Field Work	Lab work Work	Independent Activities	Team/Group Activities	Familiarity with Curriculum	Integration in Practice	Self-learning	Professional Progression	IP and Community Contribution
Multi-Levels	School Students																
	Undergraduate College																
	Graduate Students																
	Researchers																
	Academicians																
	Industry Professionals																
	Government Employees																
	NGO Employees																

Source: ISPRS TC-V Initiatives

Summary

- ***Analytical Model***
  - for Multi-level Geoinformatics Learning - a need to build a strong Human resources for Geospatial Workspace requirement
  - Promoting Space Education from K-12 school level for long term sustainable Geospatial Work Force

- ***"Producer-Consumer"* Effort**
  - Constant interaction between Industrial partners and Academia to achieve multi-level schema for long term workforce preparation and management.



Thank you for your kind attention