Just In Time Learning – Create Once, Use Multiple Ways to Help Students and Support Your Grant

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GeoTECH
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Empowering Colleges:
Growing the Workforce

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Water meets laptop – and . . . Just in Time Learning!

What to do?

Google

netbook mini water on keyboard

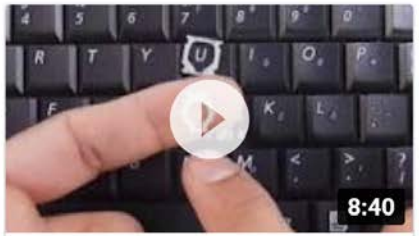
All | Shopping | Videos | Images | News | More | Settings | Tools

About 6,680,000 results (0.36 seconds)

Videos

How To Repair A Laptop After A Liquid Spill : Tutorial !

RetroGamerVX
YouTube - Sep 28, 2013



Mini Netbook Laptop Keyboard Key Repair | Fix Install Stuck Sticky ...

laptopkeycom
YouTube - Apr 24, 2010

Lenovo Laptop Keyboard Replacement | Change in 5 Easy Minutes ...

TricK i Know
YouTube - Sep 7, 2015

GeTECH

YouTube “Learning” – 5 Years Ago

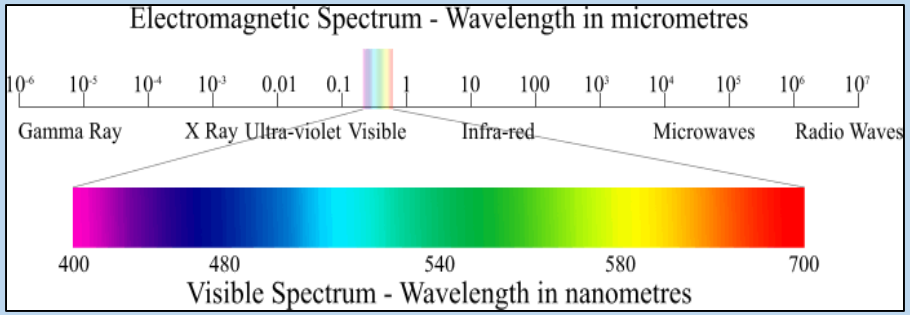
- **20 minutes later I was a Computer repair expert**
  - Ordered the part - $20
  - Watched the video again
  - And it worked – and continues to work!
- **An Idea was “born” – why not for academic learning**

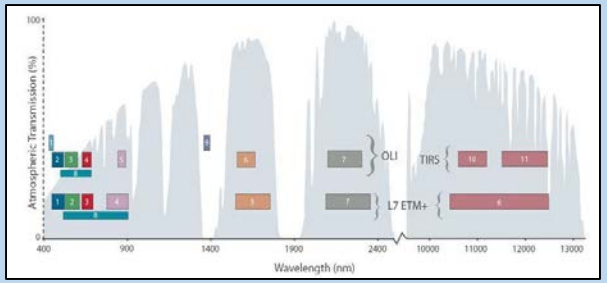
Create it Once! Use it multiple ways!

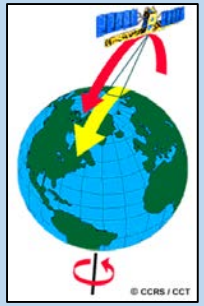
iGETT Remote Sensing – NSF ATE Grant

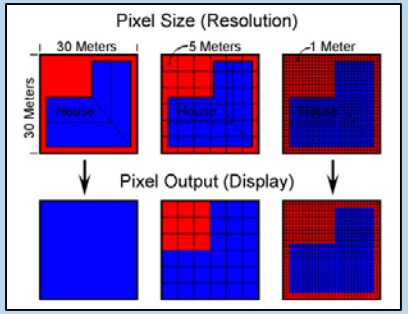
- Workshops to help educators learn about remote sensing
- Integrate remote sensing concepts into their Geographic Information System Programs (GIS)

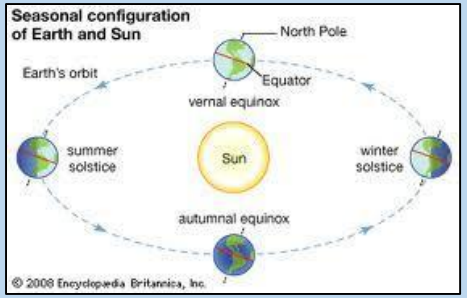
Remote Sensing concepts and techniques and how to acquire and analyze data!

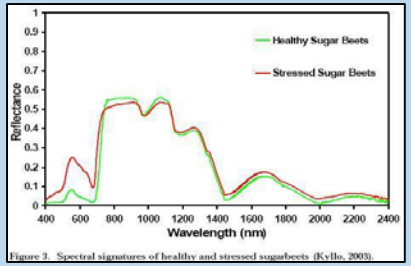


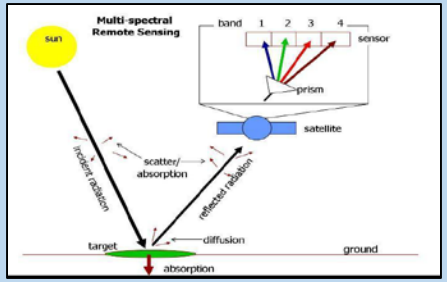


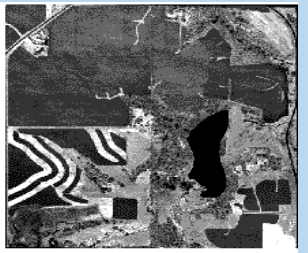










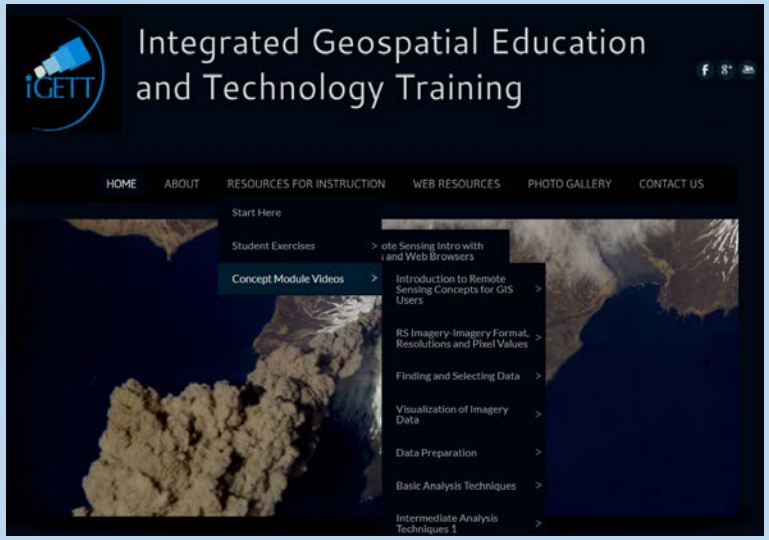


Originally – Participants Create Exercises

- **A "case study" or example of how and why to use remote sensing – localized for their region and students**
- **Participants "learned" as they created an exercise**
  - Hands on Lab exercise for use with students
  - Post them to the iGETT website
  - Great resources, but . . . .
    - Used software – became out of date
    - Hard to disseminate

Along Came Idea for YouTube Concept Module Videos

- Explain basic remote sensing concepts that technicians need to understand
- Examine one concept per video (in ~10 minutes)
- Stand alone – do not require GIS experience
- Participants "learned" the concept well as they created it

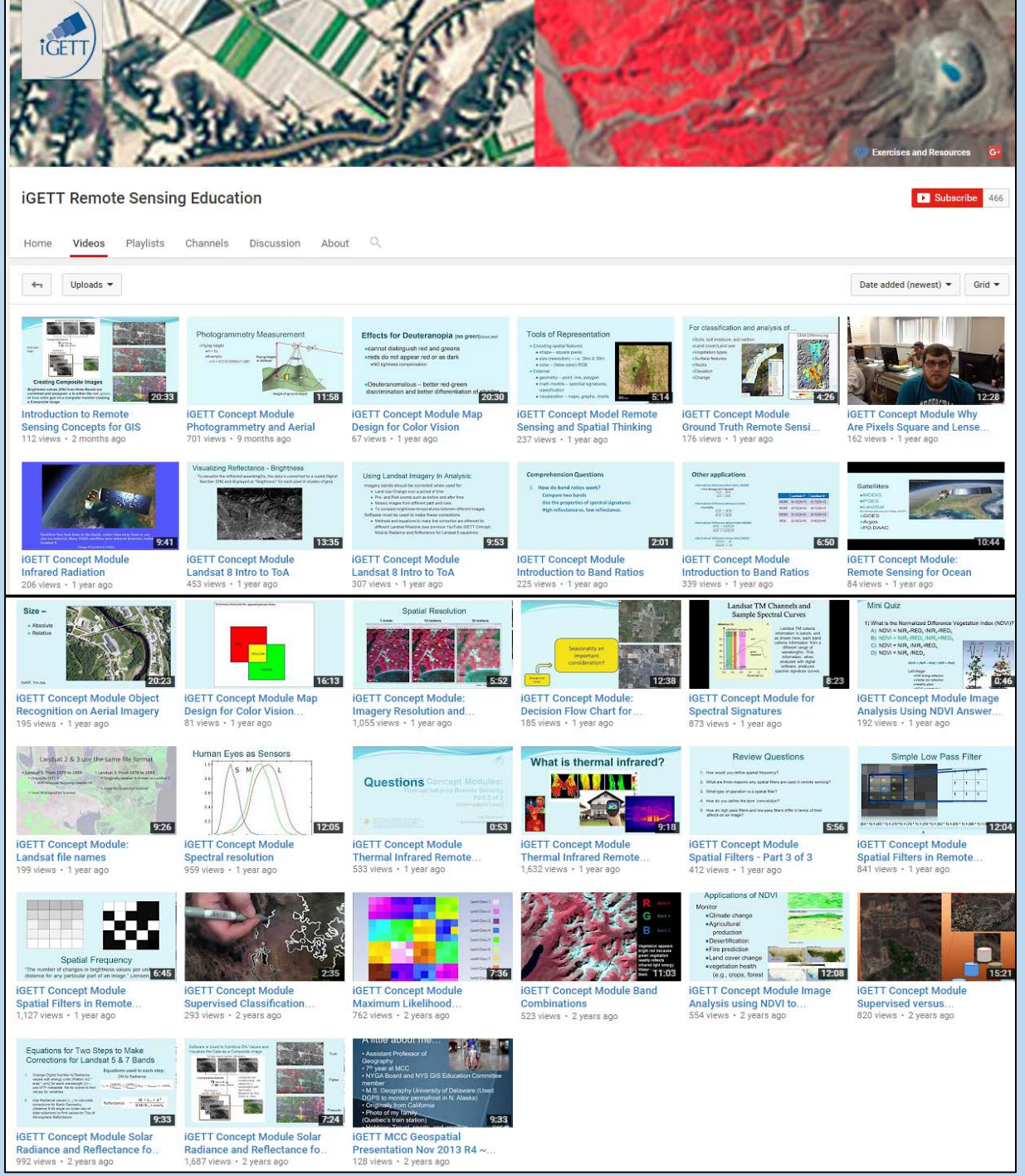


YouTube Channel for: iGETT Remote Sensing

We didn't have to "disseminate" them – Search via Google or YouTube!

Tracks views and subscriber for NSF reporting!

Still being used years later!



What we learned along the way

- A short video (5 to 15 minutes)
- Use a “template” for branding - “marketing and continuity” for the Project
  - Created as a narrated PPT saved in YouTube format (MP4)
- Post on a YouTube branded channel with Tags – keywords and details about the topic
- Need to have:
  - A person in overall charge
  - A defined concept – not a how to!

Why and Benefits – Some Unexpected !

- **Use in a course – F2F, but even more Online!**
  - Teach initially, review before tests, review for advanced courses
- **Use by workforce – before job interview, new tasks, Certification**
- **Learning tool for concept – student or educator created modules**
- **Dissemination, branding and numbers for support of ATE Grants/Projects**
- **Longterm sustainability of Grants**
  - Certification study and badges

What is a Concept versus a Technique?

- **Repairing a laptop is a technique or how to**
  - Useful but very time and topic (model) specific
- **Making a Good Lunch is a "how to" or technique**
- **Defining what makes a "good" lunch requires understanding the concept of creating a balanced, nutritious diet**
- **A concept module video has a longer "life"**
  - Techniques change rapidly, concepts should remain

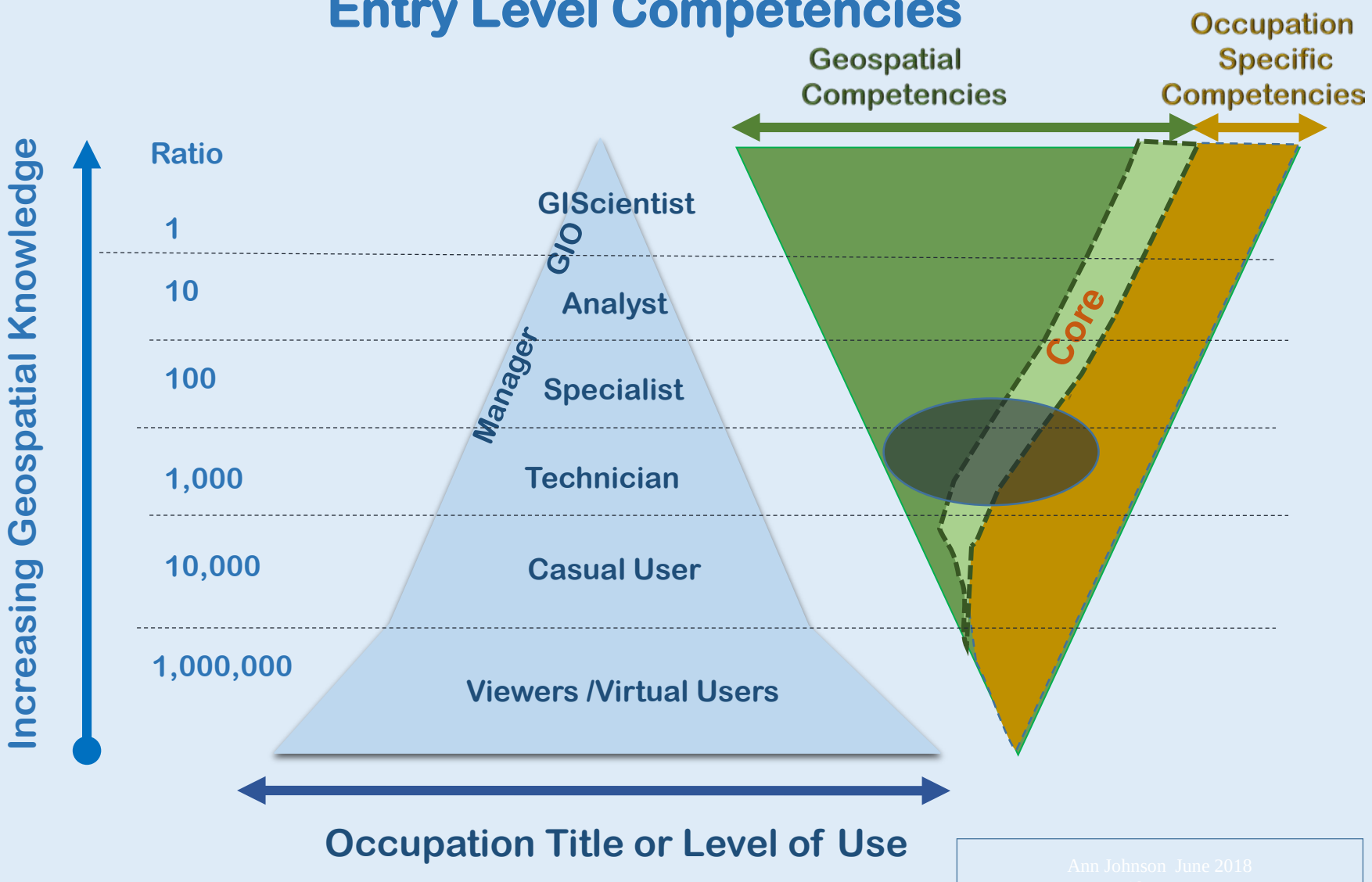
Identifying the Concepts for a Discipline?

Can you identify the concepts needed by students to successfully enter the workforce?

- For iGETT and GeoTech we used the Core Geospatial Concepts

First lets look at the entire geospatial technology user community and the domain of their knowledge!

Entry Level Competencies



Ann Johnson June 2018
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Finding the Entry Level Competencies:
GeoTech Center "DACUM" Job Analysis

- Panels of expert workers are used to precisely describe & define job tasks
  + knowledge, skills, behaviors, tools, equipment
- 8 to 12 GIS Technicians, over two - 8 hour days

DACUM: Developing A CurriculUM used regionally for competency based education & training by industry, government & education

DACUM Research Chart for GIS Technician

January 15th – 16th, 2009

Duties \ Tasks											
A Manage Tasks	A-1 Develop project scope	A-2 Develop project schedule	A-3 Document operating procedures	A-4 Create project status report							
B Manage Equipment	B-1 Maintain GPS & field equipment (e.g. digital camera, laser range finder, DMI)		B-2 Maintain Vehicle	B-3 Maintain plotter / printer	B-4 Maintain scanner						
C Gather Data	C-1 Define data requirements (e.g. domains)	C-2 Identify data sources / resources	C-3 Define data collection methods (e.g. GPS, air photo)	C-4 Acquire existing data (e.g. digital, hard copy)	C-5 Connect to external data sources (e.g. ODBC, GIS services)		C-6 Scan hard copy maps	C-7 Collect data using GPS	C-8 Collect data using field sheet		
D Process Data	D-1 Post process GPS data (e.g. differential correction)	D-2 Define data's spatial reference	D-3 Change data's spatial reference	D-4 "Heads-up" digitize data	D-5 Digitize data using COGO (e.g. metes & bounds)	D-6 Normalize data structure (e.g. schema)	D-7 Perform data conversions	D-8 Georeference data	D-9 Geocode addresses	D-10 Linear reference data	D-11 Derive new data (e.g. generate contours from DEM, data generalization)
D Process Data (continued)		D-12 Edit attribute data	D-13 Edit spatial data	D-14 Evaluate spatial data accuracy	D-15 Validate tabular data	D-16 Validate spatial data (e.g. topology, build, verification)					
E Manage Data	E-1 Organize digital data (e.g. data library)	E-2 Organize non-digital data	E-3 Create / update metadata	E-4 Join tables (e.g. link, join, relate)	E-5 Perform spatial join	E-6 Post / reconcile edits (e.g. changes)	E-7 Archive data				
F Analyze Data	F-1 Perform viewshed analysis	F-2 Generate statistical reports	F-3 Model linear networks	F-4 Perform site selection	F-5 Identify shortest route	F-6 Identify service area	F-7 Conduct slope analysis	F-8 Identify least-cost path	F-9 Perform proximity analysis		
G Generate Deliverables	G-1 Create thematic maps (e.g. zoning)	G-2 Create reference maps (e.g. streets)	G-3 Create data analysis reports (e.g. tables, charts)	G-4 Develop presentations	G-5 Provide training	G-6 Create animation (e.g. 3D, 4D)					
H Professional Development	H-1 Conduct self-assessment	H-2 Participate in workshops & conferences	H-3 Obtain professional certification (e.g. GISP, ASPRS)	H-4 Cross-training (e.g. mentoring, coaching)	H-5 Research current/emerging trends (e.g. publications, on-line)		H-6 Attend training				

Tasks

Duties

General Knowledge

Geoprocessing methods
Relational databases (Informix, Oracle)
Spatial projections
Basic scripting (SQL, VB, HTML, Python, ASP,)
GIS Industry standards
Client/company standards
Naming conventions
Raster / Vector
Export formats, properties & settings
Spatial awareness
Units of measure
Map scale
Plats & deeds
Industry jargon
Data sources
Google Earth (KML)
Adobe Illustrator
Crystal Reports
Coverage, CAD, DGN, TXT, IMG, TIF, SID, Flash, PDF, GeoPDF, e00, PkZIP, RAR, TAR
Related Industries
Mathematics (geometry, statistics, trigonometry, algebra)
Legacy technology

Skills

Typing
Unit conversions
Creating models
Time management
Organizational
Troubleshooting
Problem solving
Basic computer
GPS operation
Laminating
Modify user interface
Microsoft office
Map reading
Adding data to a project (GIS, CAD)
Create TIN model
Interpolation
Cartographic license
Verbal & written communication
Burn to disk
FTP site
Create map book
Interpersonal
Plotter operation
Graphing & reporting

Worker Behaviors

Self-improvement
Networking
Creativity
Detail orientated
Willingness to learn
Analytical
Punctuality
Self-motivated
Enthusiastic
Multi-tasking
Team player
Diplomatic, tactful
Common sense
Positive attitude
Ethical
Independent
Logical, intelligent
Visionary
Abstract thinker (outside the box)

Tools, Equipment, Supplies and Materials

ArcGIS Desktop
Adobe Illustrator
AutoCAD
ERDAS Imagine
Microstation
Microsoft Office
GPS
Scanner/Plotter
Internet
Computer
Mobile devices (PDA)
Phone
Camera
Calculator
Vehicle
Software licensing

Future Trends

Web applications
GIS for the masses (Google, Wikipedia)
User created mashups & social networking
Pictometry
Broader use in other fields
Utility work / mapping
More access to data
Manage higher expectations
Quality control issues
More info. mapped
Greater accuracy
Lower price
Mapping abstract info (military, social science)
Emergency response GIS
GIS use in mobile devices

Acronyms

AI	Adobe Illustrator
ASPRS	American Society of Photogrammetry and Remote Sensing
CAD	Computer Aided Design
COGO	Co-ordinate Geometry
DEM	Digital Elevation Model
DMI	Digital mile indicator
Flash	Animation File-Adobe
GISP	Certified GIS Professional
GPS	Global Positioning Systems
ODBC	Open Database Connectivity
SWF	Shock Wave Flash
TIN	Triangulated Irregular Network
BMP	Bitmap file
DGN	Design file
DXF	Drawing Interchange Format
GDB	Geodatabase file
JPEG	Joint Photographic Experts Group
KML	Keyhole Markup Language-Google
MrSID	Seamless Image Database-LizardTech
PDF	Portable Document Format-Adobe
RAR	Compression /Archive File
SHP	Shapefile
TIFF	Tagged Image File Format
ZIP	Compression /Archive File

DACUM Research Chart: GIS Technician

DACUM Panel

Azar Khani, GIS Specialist III, Fulton County Government
Brannon Schnelle, GIS Analyst, Jordan, Jones & Goulding
Collin Horace, GIS Developer/Analyst, CH2MHILL
Donald I. M. Enderle, GIS Analyst, Photo Science Inc.
Dwight Lanier, GIS/Environmental Science Laboratory Coordinator, Gainesville State College
Eric McRae, Director, Information Technology Outreach Services
Lisa Jackson, Information Analyst III, Center for GIS, Georgia Institute of Technology
Lisbeth Ruiz-Nunez, Regional Resource Info. Coordinator, US Forest Service
Mark Lane, GIS Manager, Hall County Government
Melanie Tabb, GIS Administrator, Gwinnett County
Ron Pate, Registered Land Surveyor
Tripp Corbin, Vice President GIS, Keck & Wood, Inc.

DACUM Facilitators

John Johnson, GIS Workshop Facilitator
Carol Kraemer, Recorder

Sponsored by:

The National Science Foundation;
Advance Technology Education
[DUE #0801893]

Produced by:

GeoTech
geotechcenter.org

Gainesville State College
University System of Georgia

Date: January 15th-16th, 2009

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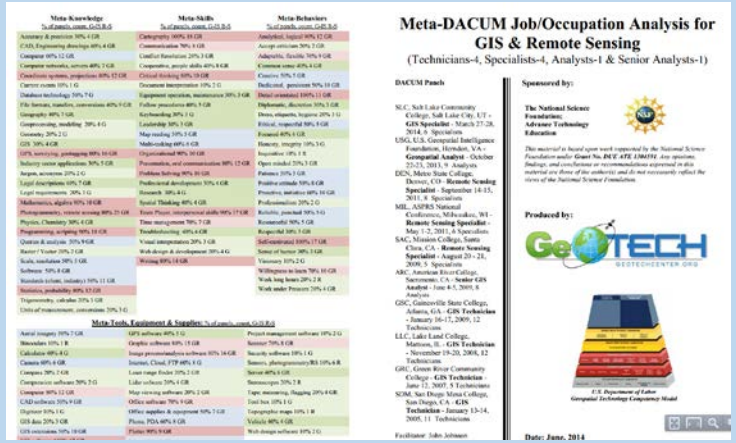
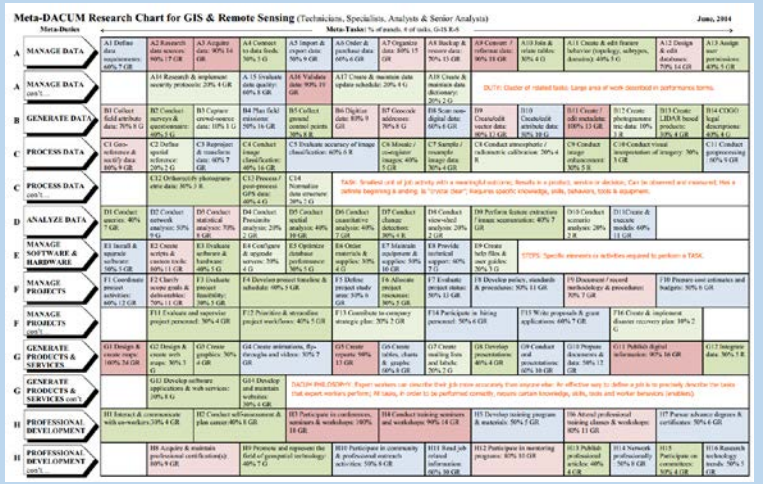
Meta-DACUM Methodology

By consolidating validated results from multiple DACUM analyses for a single occupation taken at various USA locations, we can identify a comprehensive list of competencies.





GeoTECH

Geosp…lodel

- Industry defined co…
- Building Block Tiers…
  - Personal
  - Academic
  - Workplace
  - Industry W…
  - Industry
- Each block "links to…
- Updated in 2014 an… in 2018
  - Out for Pub… soon!

Core Geospatial Abilities and Knowledge

Critical Work Functions

- **Earth Geometry and Geodesy**
  - Discuss the roles of several geometric approximations of the earth's shape, such as geoids, ellipsoids, and spheres
  - Describe characteristics and appropriate uses of common geospatial coordinate systems, such as geographic (latitude and longitude), UTM and State Plane Coordinates
  - Explain the relationship of horizontal datums, such as North America Datum of 1983 (NAD 83) or the World Geodetic System of 1984 (WGS 84), to coordinate system grids and geometric approximations of the earth's shape
  - Describe characteristics and appropriate uses of common map projections, such as Transverse Mercator, Lambert Conformal Conic, Albers Conic Equal Area, Azimuthal Equidistant, and Polar Stereographic
- **Data Quality**
  - Discuss the elements of geospatial data quality, including geometric accuracy, thematic accuracy, resolution, precision, and fitness for use
  - In the context of a given geospatial project, explain the difference between quality control and quality assurance
  - Identify data quality and integration problems likely to be associated with geospatial and attribute data acquired with legacy systems and processes
  - Calculate and interpret statistical measures of the accuracy of a digital data set, such as Root Mean Square Error (RMSE)
- **Positioning Systems**
  - Describe the basic components and operations of the Global Navigation Satellite System (GNSS), including the Global Positioning System and similar systems
  - Explain the role of GNSS in location-based services
  - Collect and integrate GNSS/GPS positions and associated attribute data with other geospatial data sets
  - Describe characteristics and appropriate uses of inertial measurement systems

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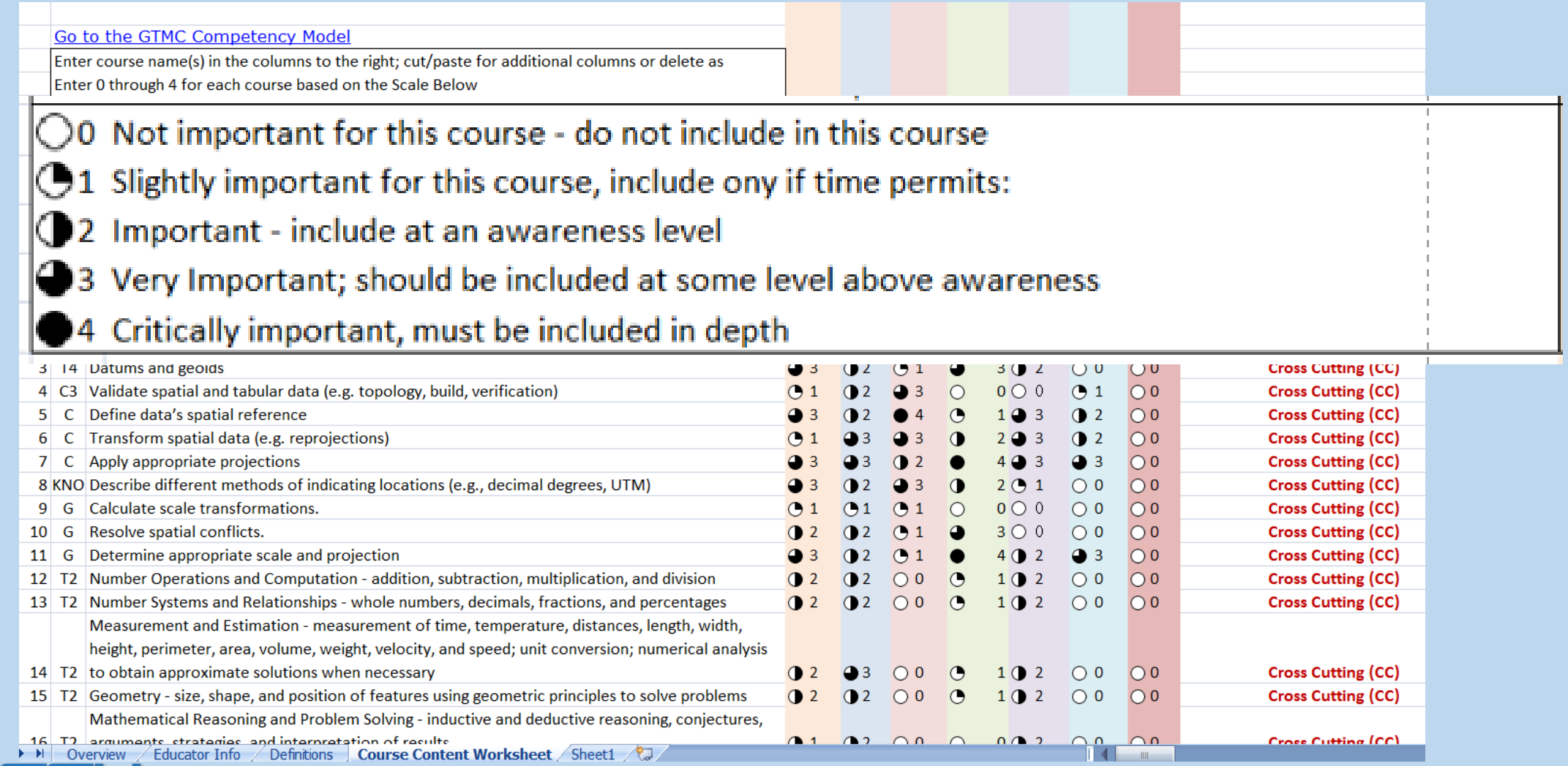
http://www.careeronestop.org

Program Content Tool – 311 Competencies



Go to the GTMC Competency Model

Enter course name(s) in the columns to the right; cut/paste for additional columns or delete as
Enter 0 through 4 for each course based on the Scale Below

- 0 Not important for this course - do not include in this course
- 1 Slightly important for this course, include ony if time permits:
- 2 Important - include at an awareness level
- 3 Very Important; should be included at some level above awareness
- 4 Critical importance, must be included in depth

3	T4	Datums and geoids	3	2	1		3	2	0		0				Cross Cutting (CC)
4	C3	Validate spatial and tabular data (e.g. topology, build, verification)	1	2	3		0	0	1		0				Cross Cutting (CC)
5	C	Define data's spatial reference	3	2	4		1	3	2		0				Cross Cutting (CC)
6	C	Transform spatial data (e.g. reprojections)	1	3	3		2	3	2		0				Cross Cutting (CC)
7	C	Apply appropriate projections	3	3	2		4	3	3		0				Cross Cutting (CC)
8	KNO	Describe different methods of indicating locations (e.g., decimal degrees, UTM)	3	2	3		2	1	0		0				Cross Cutting (CC)
9	G	Calculate scale transformations.	1	1	1		0	0	0		0				Cross Cutting (CC)
10	G	Resolve spatial conflicts.	2	2	1		3	0	0		0				Cross Cutting (CC)
11	G	Determine appropriate scale and projection	3	2	1		4	2	3		0				Cross Cutting (CC)
12	T2	Number Operations and Computation - addition, subtraction, multiplication, and division	2	2	0		1	2	0		0				Cross Cutting (CC)
13	T2	Number Systems and Relationships - whole numbers, decimals, fractions, and percentages	2	2	0		1	2	0		0				Cross Cutting (CC)
14	T2	Measurement and Estimation - measurement of time, temperature, distances, length, width, height, perimeter, area, volume, weight, velocity, and speed; unit conversion; numerical analysis to obtain approximate solutions when necessary	2	3	0		1	2	0		0				Cross Cutting (CC)
15	T2	Geometry - size, shape, and position of features using geometric principles to solve problems	2	2	0		1	2	0		0				Cross Cutting (CC)
16	T2	Mathematical Reasoning and Problem Solving - inductive and deductive reasoning, conjectures, arguments, strategies, and interpretation of results	1	2	0		0	2	0		0				Cross Cutting (CC)

Overview | Educator Info | Definitions | Course Content Worksheet | Sheet1

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National Geospatial Technology Center of Excellence

Empowering Colleges: GROWING THE WORKFORCE

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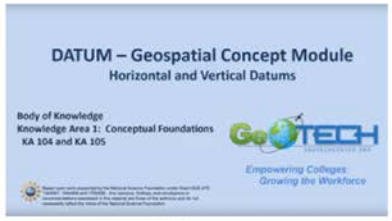
Concept Modules

Data Management

By: **Ann Johnson**

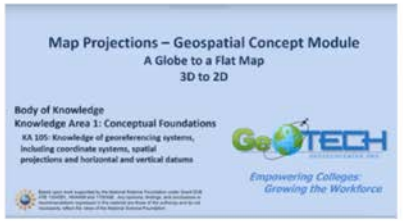
This Concept Module reviews important topics related to data management for geospatial technology. It includes review of data types, design and modeling of data management systems and compares simple project needs to those of enterprise-wide data management.



Datum

By: **Ann Johnson**

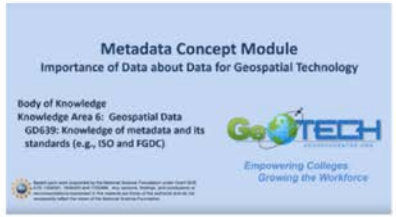
This Concept Module reviews what a datum is, differences between vertical and horizontal datums, how the datums have been created over time and plans to combine vertical and horizontal datums in the future. It includes the importance of a Datum for accurately locating features and the problems that can occur if all data sets in an analysis are not using the same datum.



Map Projections

By: **Ann Johnson**

This Concept Module reviews the need to create a flat map for features on a spherical Earth. Topics include why distortions occur in the process of going from a sphere to a flat map, different types of map projections and what distortions occur and provides a rule of thumb for picking a projection based on a project's specific needs.

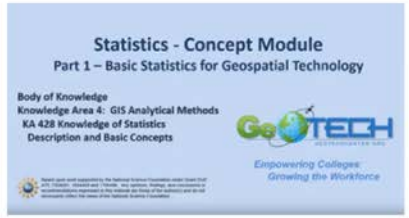


Metadata

By: **Ann Johnson**

This Concept Modules reviews why metadata, the data about geospatial data, is so important for use of data from different sources. Topics include different metadata standards (US and International) and what specific data attributes should be or must be included.

Learn More



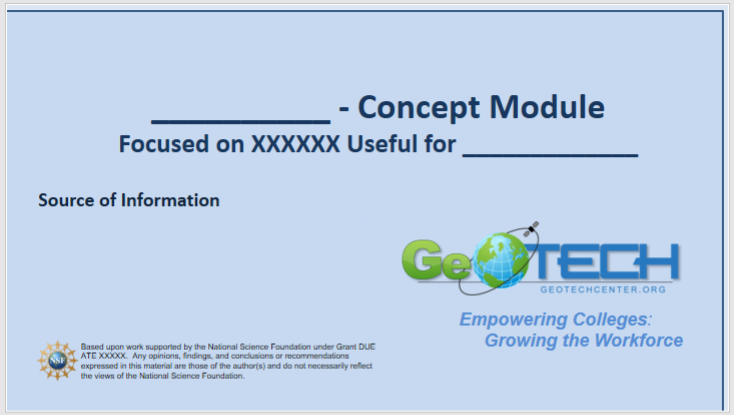
Statistics - Basic Topics, Part 1

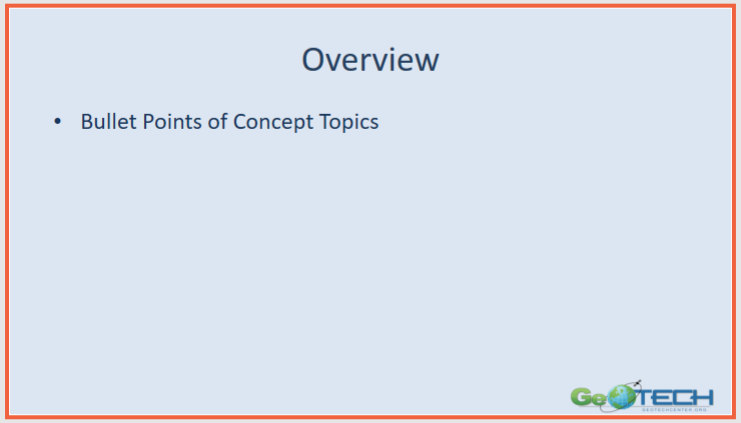
By: **Ann Johnson**

This Concept Module reviews the use of basic statistics for geospatial technology. Topics include descriptive and summary statistics, terms used for different statistical values (mean, median, mode), standard deviation, variance, correlation coefficient and normal distribution.

Learn More

GeoTECH





- **Title Slide**
  - Branding

- **Overview with bullet points for topics**
  - 6 to 8
  - If more, make two modules

- **Last slide, contact info, Licensing and date with version number**

Steps In Order

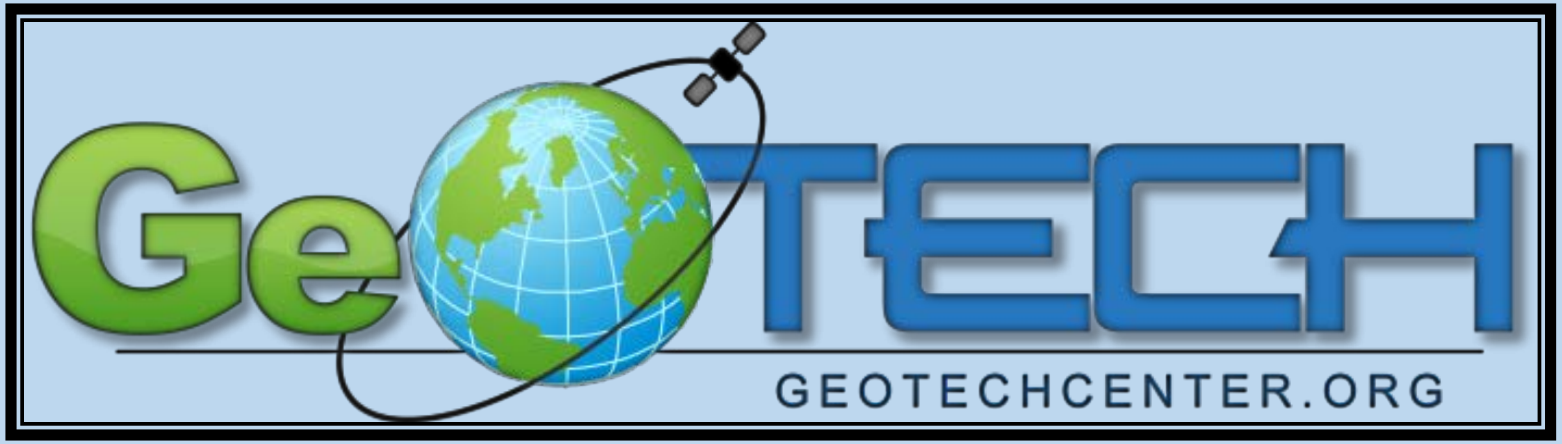
1. Determine Concepts (and topics within Concepts)
2. Design Template – Logo, colors, fonts, 4:16, title slide, licensing, versioning (date and version)
3. Determine “storage” – cloud, Google Drive, Dropbox, etc.
4. Storyboard Concept – and topics
5. Create PPT or other Capture software including any videos and review, review, track Versioning (date and version number)
6. Narrate – script or no script
7. Appoint a YouTube Administrator to Create a Branded YouTube Channel
8. Export into YouTube format (MP4) – key words, description, licensing
9. Closed Captioning – YouTube and corrections (Search YouTube)
10. Track Channel – subscribers, comments, corrections

Resources and Methods to Create a Concept Module

- **Four Different Methods**
  - Annotate each slide individually with Audio within PowerPoint. A transcript of the audio on each slide can be created using Dragon Naturally Speaking (Dragon).
  - In PowerPoint create a narration of the slides using the “Record Slide Show” then Export to create a MP4
  - Use Camtasia from within the PowerPoint
  - Use a video camera, wireless microphone and a green screen
- **Software**
  - Microsoft PowerPoint
  - Dragon Naturally Speak
  - Camtasia (Tech Smith)
  - Adobe Premier
- **Hardware**
  - High quality microphone
  - Desktop camera or video camera with tripod
  - Green screen cloth
  - Lightening if needed

What is your workforce Domain?

- **Hands on activity to determine:**
  - What are the core concepts?
  - What are the topics that should be covered?
- **Design a template!**
  - Colors, logo, content
    - First and last slides
    - Overview and wrap up slide
- **First, here are the current concept modules. Next, lets look at an example video and “common” slides!**



Thank You!

Please contact me if you need help!

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