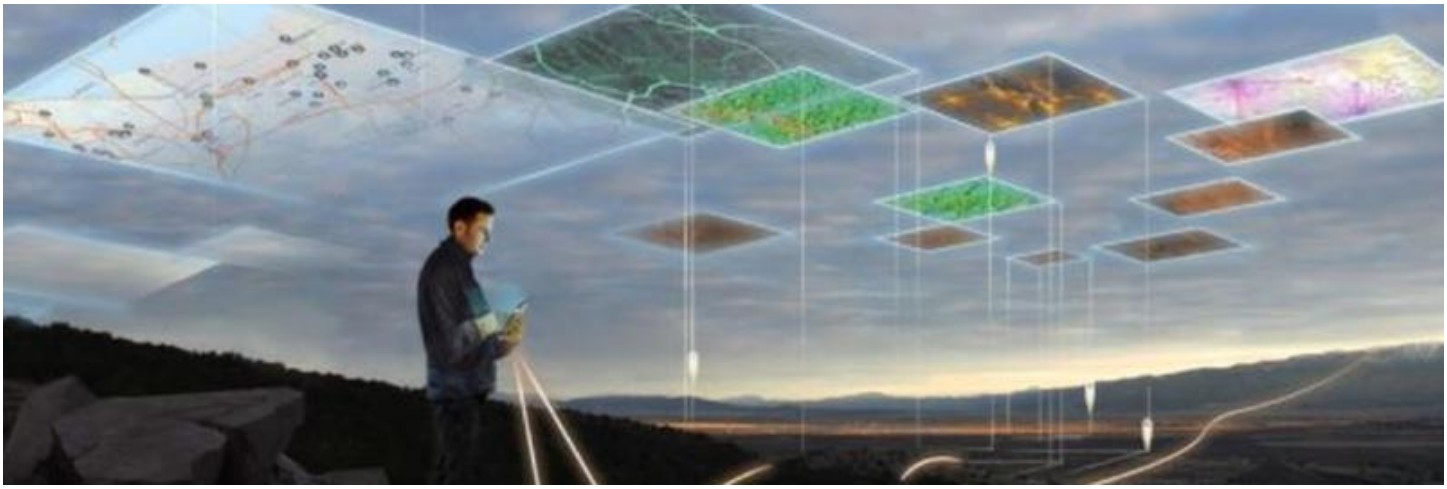


GIS Education: Forces-Trends-Skills: AGIC Conference

Keys to your Geo-Future | Challenges | The Bright Future of the AGIC Community

Joseph Kerski
21 August 2023

Moments

A vision of your future self

The Earth and its People

Adventure

A Positive difference

Your Story

In my case

4 sectors of society

1 Early Geographic Days...

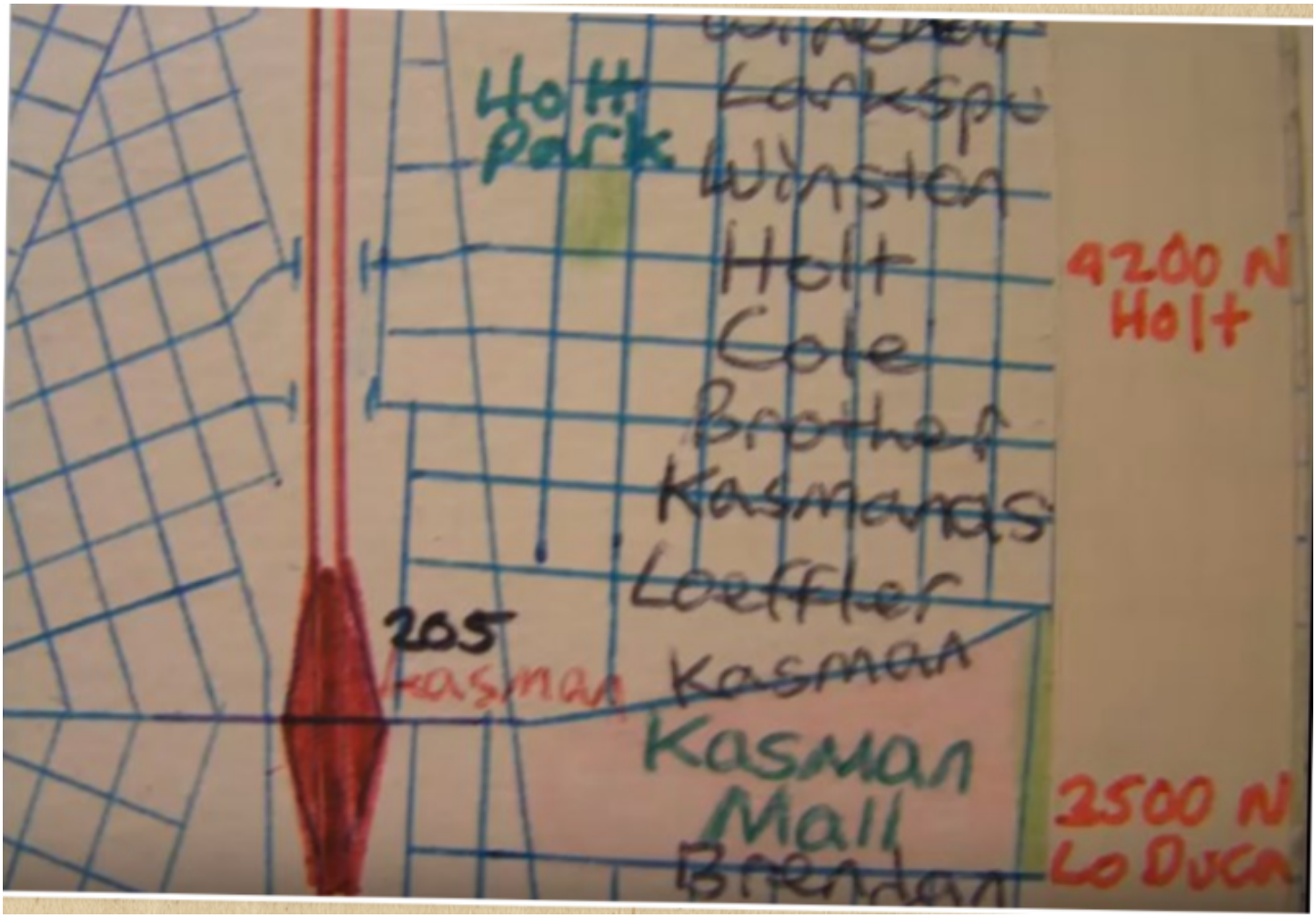
The land of the Ute Mountain Utes.

2 Meeting people and ...

Another example.

... making maps.

3 What are those numbers ...



... in the margins?

4 Getting the angle juuuuust right...

They are all of infrastructure and natural resources: Cliffs, canyons, deserts, alleys, railroad yards, hospitals,

... in urban and rural landscapes.

5 Finding far away AM radio stations at night

6 **The first all-web GIS workshop I ever taught was here!**

Guess the year!

7 You have GIS educational leaders right here in Arizona

https://data.library.arizona.edu/geo

8 Campus visits supporting GIS use

At Arizona State University

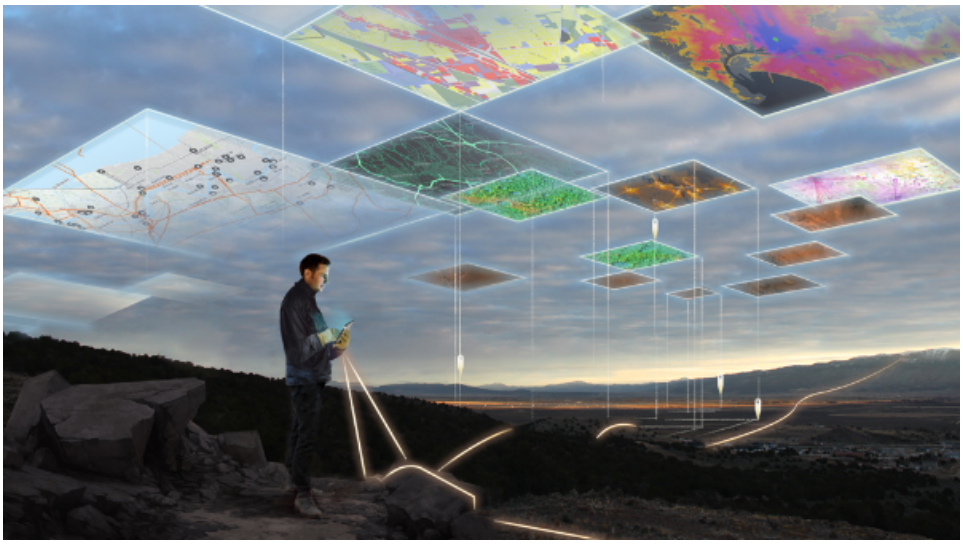
9 I have a great love for this region!

And for wearing my geography ties on hikes to the middle of ... latitude-longitude intersections!

10 Who is a leader here?

What do you want to see in society?

Geotechnologies will continue as a relevant set of tools, data, and methodologies.



At no time in history have we been so empowered, and yet so challenged.

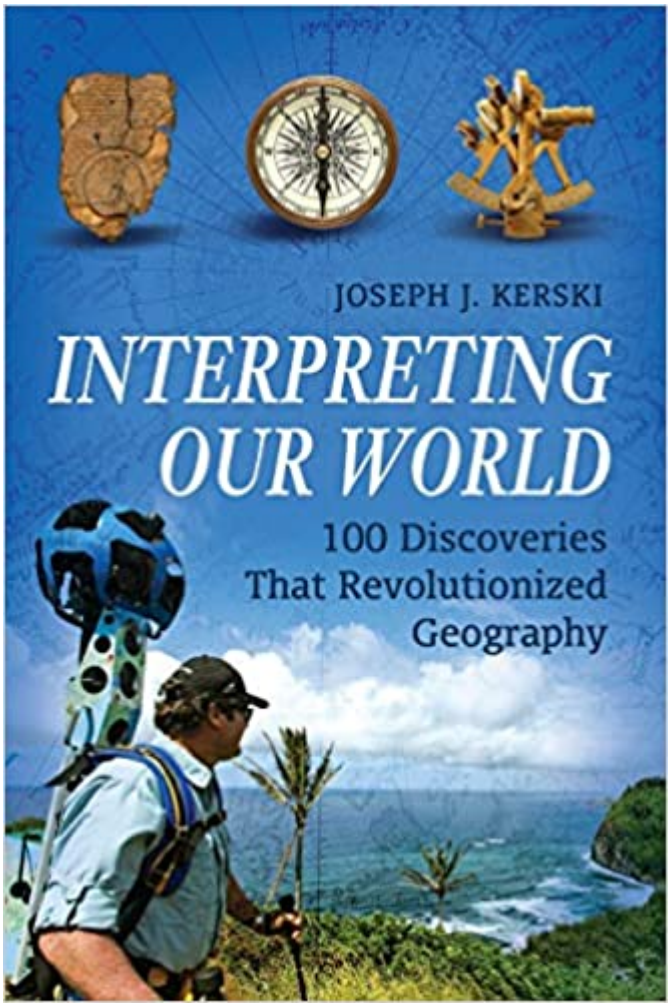
GIS professionals in government, nonprofit, industry, and academia: You have a KEY role in this decade.

You are building the NSDI!

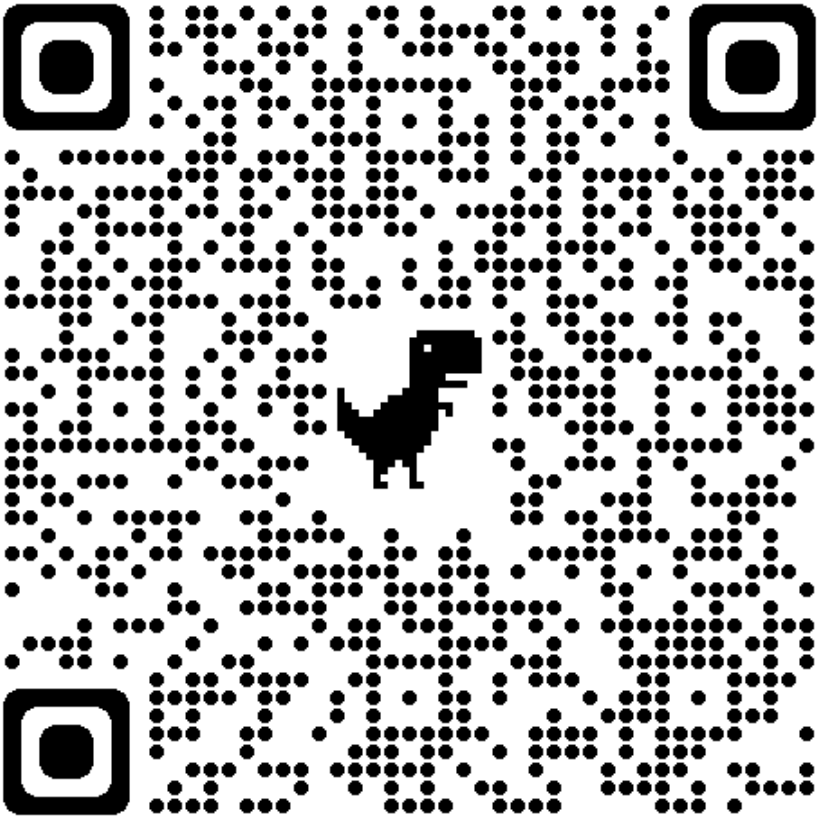
NSDI.

Not just the data, but the metadata, framework, standards, partnerships, the web portals, the community.

You are solving the key 21st Century issues. You are revolutionary.



Interpreting Our World - book.



Interpreting Our World QR code for book.

Changing the way we see the world = That's your job.

The AZGeo Data Hub

AZGeo

The City of Phoenix City Manager's Performance Dashboard

City Manager's Performance Dashboard

Arizona Water's Interactive Maps and Data

Arizona Department of Water Resources

Arizona Department of Emergency and Military Affairs Geospatial Hub

DEMA Geospatial Hub

Tucson Equity Data Strategy

Tucson Equity Data Strategy (TEDS)

Why should you care about geospatial education?

Challenge: Education that: (1) *reflects* and *anticipates* workforce demands. (2) Builds change agents in society.

What do we want the GIS professional landscape to look like in 2030?

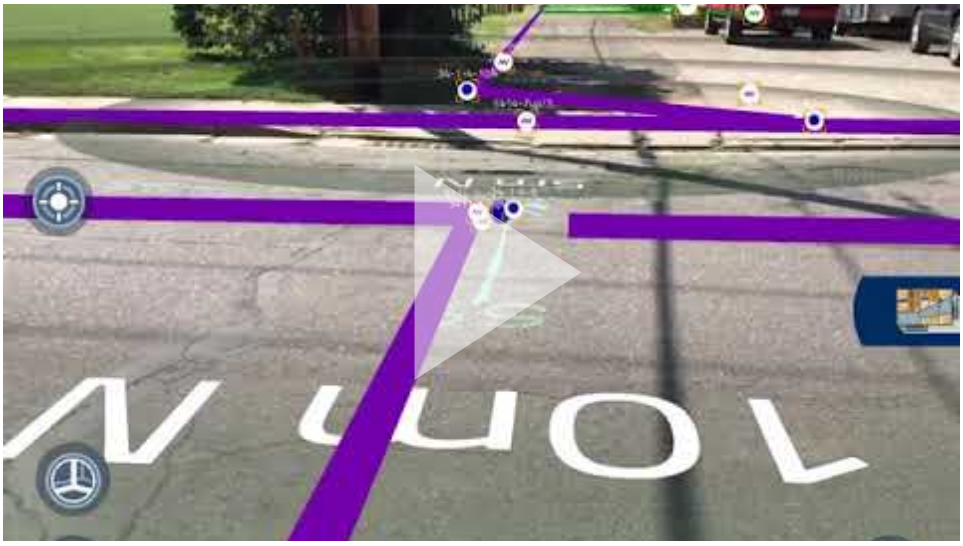
How can you lead the way?

The 5 forces that bring us to a pivotal moment in geospatial technology in

education and society.

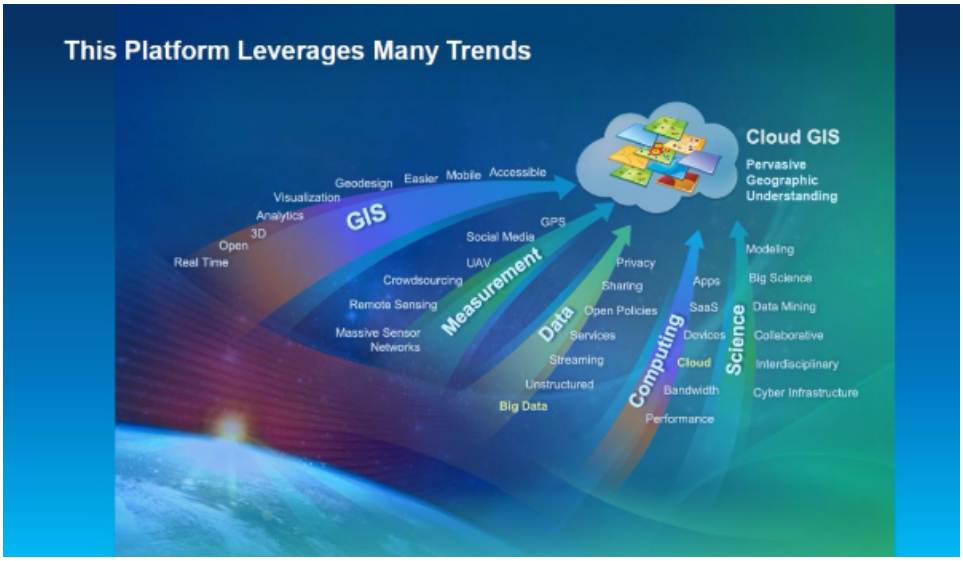
5 forces that bring us to a key moment in GIS in education and in society.

South Dakota State University campus. Imagine if every natural and human-built feature could be instantly captured and mapped?



City of Englewood Augmented Reality Video.

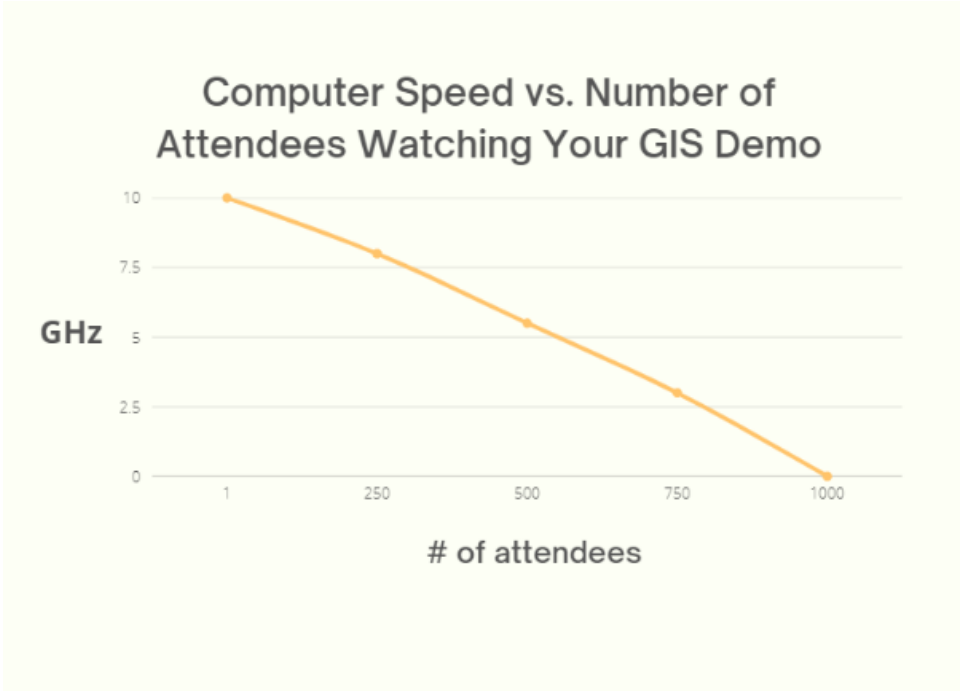
5 Key trends in GIS (Kerski).



GIS is no longer a niche technology and set of methods.

3 GIS Work-Life GIS Tenets

1) Giving demos



How many of you have experienced this?

2) Microsoft Teams notices on Saturday nights...

3) Your file named "Really_Really_Final_6pm_Friday_night.aprx" is unfortunately the name of the file you included in the package to all your stakeholders.

We are in Phase 2 of GIS.

Analyzing traffic accidents in space and time.

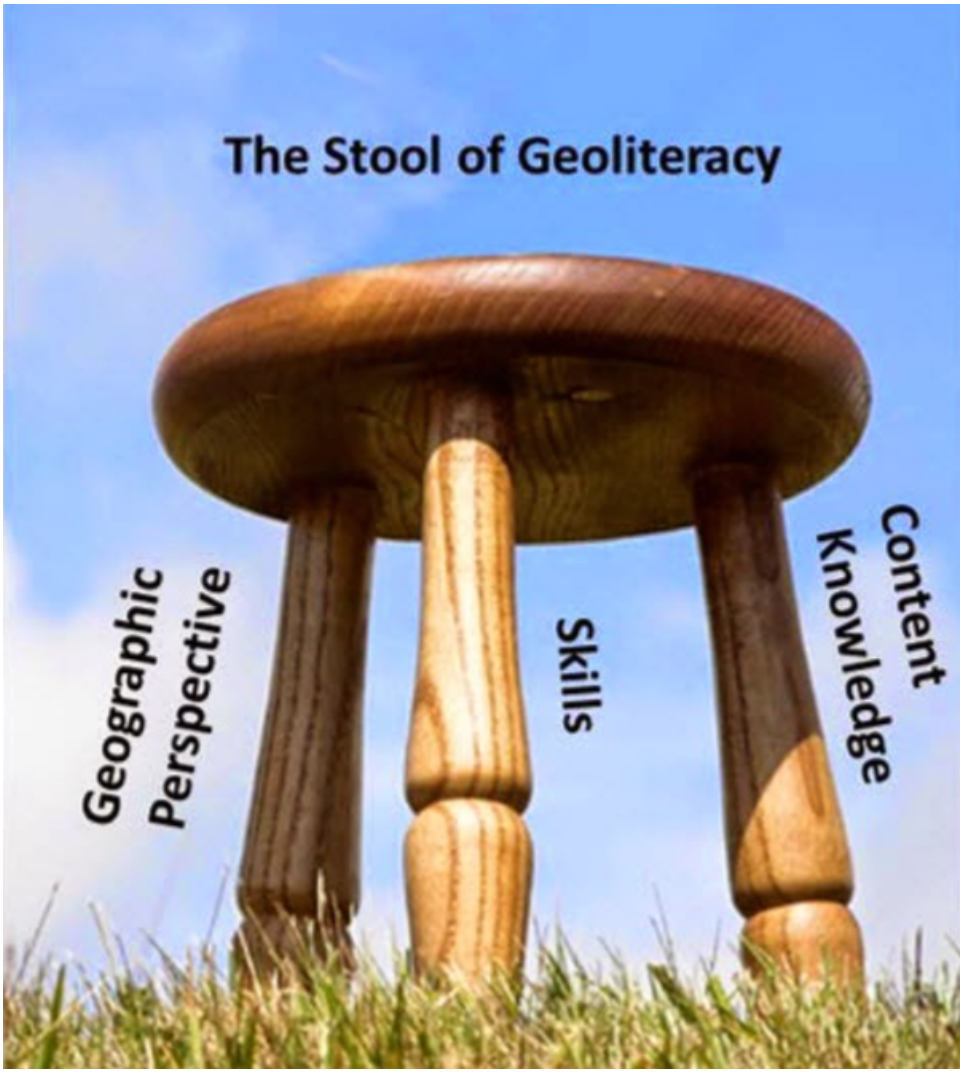
We need another paradigm shift in how we solve problems with technology.

2 pieces of advice:

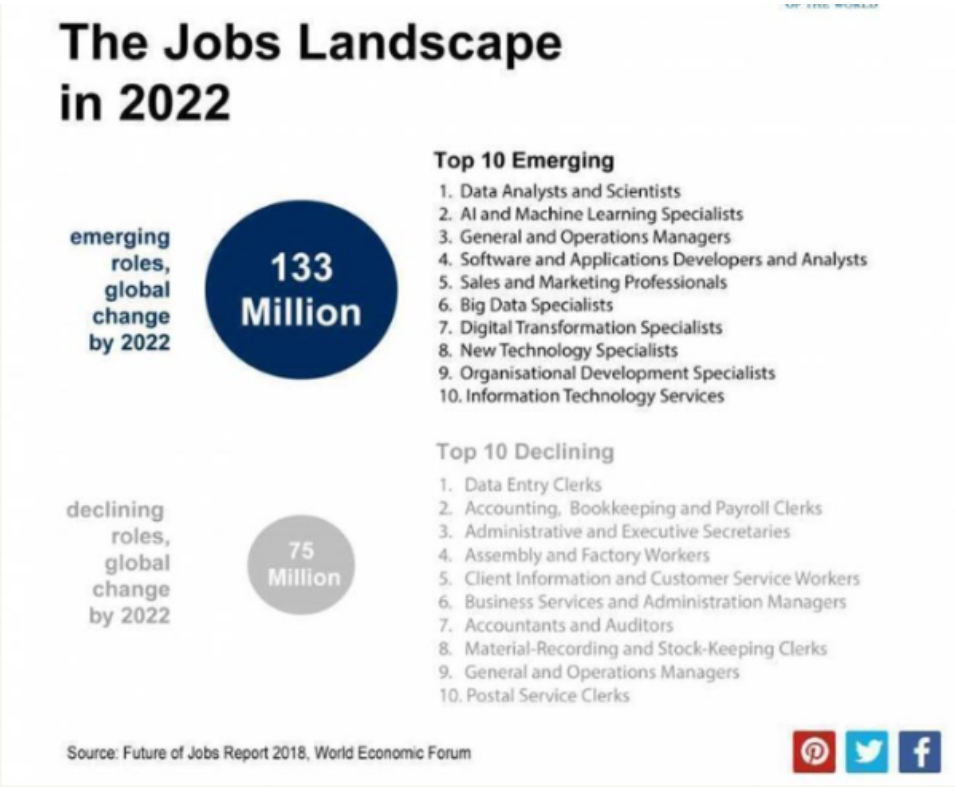
1) Don't stop at the MAP.

2) Don't get too attached to the tools!

*Don't get **too** attached to your tools.*



3 legged geoliteracy stool (Kerski).



Preparing https://www.weforum.org/projects/future-of-work for the future of work.

1. Industries need a shared approach to managing workforce transformations.

2. All stakeholders need a common language for defining and assessing skills.

The World Employment and Industry Outlook

1. Automation, robotization and digitization look different across different industries.

2. There is a net positive outlook for jobs – amid significant job disruption.

3. The division of labor between humans, machines and algorithms is shifting fast.

4. New tasks at work are driving demand for new skills.

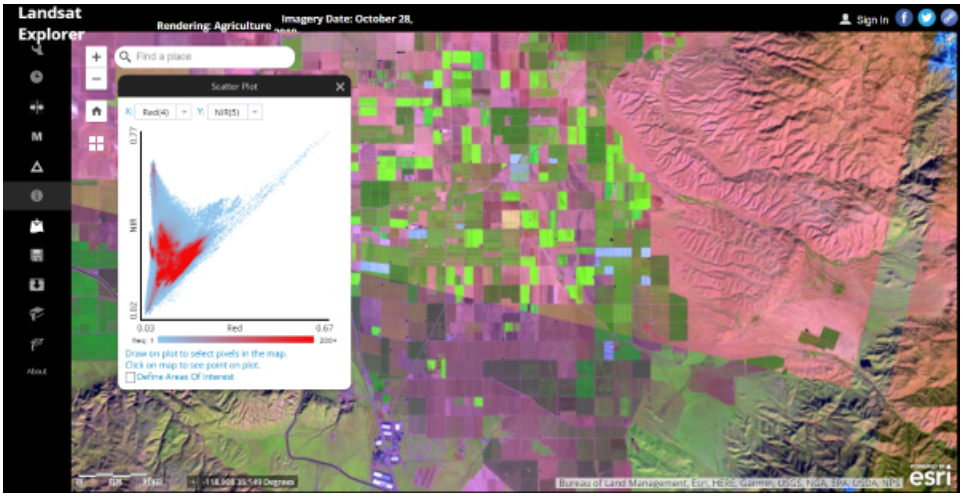
5. We all need to be lifelong learners.

The tools, the workforce, AND education are all simultaneously changing.

My own research:

Online, Engaged Instruction in Geography and GIS Using IoT Feeds, Web Mapping Services, and Field Tools within a Spatial Thinking Framework

https://www.tandfonline.com/doi/full/10.1080/19338341.2022.2070520



What and how should students learn geotechnologies in the 2020s?

Is it still just overlay, buffer, geocoding? Or is it data sharing, field and office apps, integrating models with Python? Or all of the above?

Given the wide variety of tutorials and help files containing graphics and videos, networks and the tools to collaborate, ask questions, and share ideas, students, faculty, and GIS professionals have an amazing variety of learning options at their fingertips.

Tool-based approaches vs. how to solve problems using GIS. See David DiBiase's Stop Teaching GIS essay.

Help students "learn how to learn", emulating resource gathering, networking, and problem solving that they will use in the workplace.

Traditional lesson style and tutorial still has a place in learning, as students using these go through workflow of geographic inquiry, as I did in these 10 lessons.

Holistic ways of learning and knowing Geotechnologies.

Lakota Language: Lakota Wicowoyake Canku owapi

3 Guiding Points for Instructors

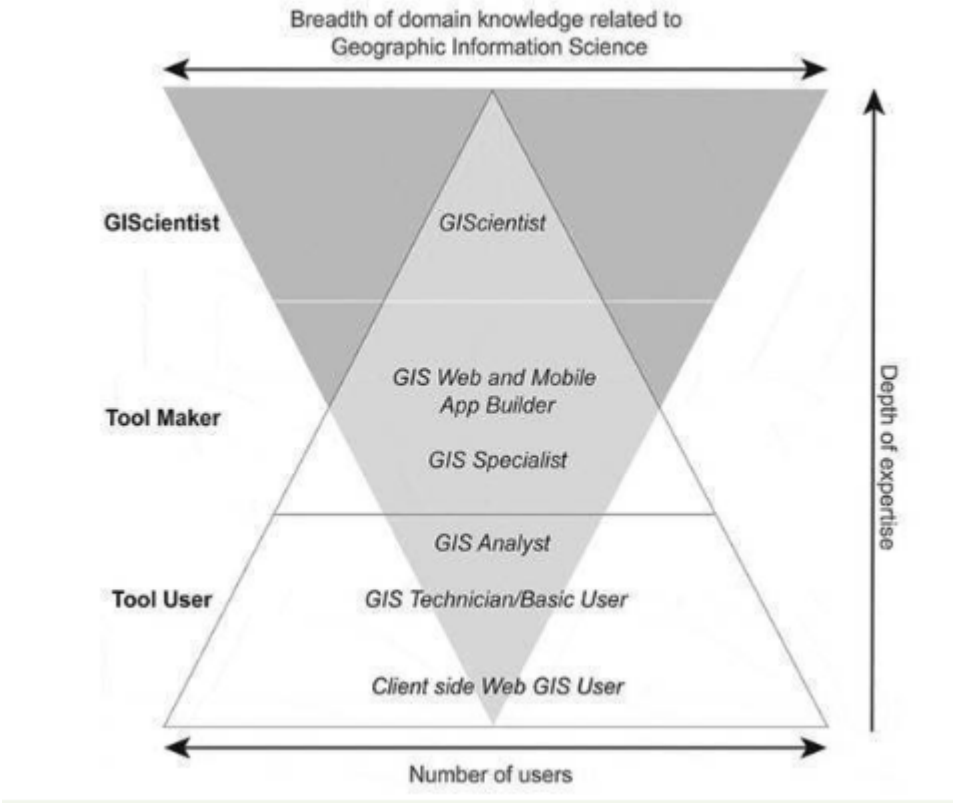
1) As GIS evolves, it becomes more powerful and easier to use.

2) You don't need to create everything yourself.

3) Re-think how we craft educational activities.

Foundations matter. GTCM: https://www.careeronestop.org/competencymodel/competency-models/geospatial-technology.aspx

But - **who** needs to know which components?



Ricker, B. A., Rickles, P. R., Fagg, G. A., & Haklay, M. E. (2020). Tool, toolmaker, and scientist: case study experiences using GIS in interdisciplinary research. *Cartography and Geographic Information Science*, 1-17. https://doi.org/10.1080/15230406.2020.1748113

The geo/enviro/planning community have long been using location as essential part of their analysis.

Now, those with backgrounds in computer science and statistics and programming are using **location** to build better **models:** Spatial Data Science.

Student Work

UAVs and GIS > create campus map. https://storymaps.arcgis.com/stories/0556cbdd4d894a1bb06867c5b0020b54

Drones and GIS

Why are right whales dying?

Why are Right Whales Dying in the Gulf of St. Lawrence?

One teacher who lets the students fly!

GeoInspirations: Erik Bushland, Letting S...

Editor's note: Thank you for joining us for this edition of GeoInspirations. Today our distinguishe...

https://www.directionsmag.com/article/9001

What is the tiny little secret? Just like GIS is too valuable for 1-2 departments in a city, GIS is too valuable for just 1 or 2 departments or programs on a school, college, or university campus!

In primary and secondary schools:

(1) Slow but steady progress in the use of GIS.

(2) Mostly as instructional tool in geography, math, history, science, and for content (teaching WITH GIS).

(3) About 10% is teaching ABOUT GIS.

US K12 GIS

In higher education:

(1) Most GIS is still within GIS | Geography | Enviro programs.

(2) Increasing diffusion in business and health programs.

5 Shining Examples of the Use of GIS in ...

These five university programs in schools of business provide spatial thinking and GIS skills for...

https://www.esri.com/en-us/industries/blog/articles/gis-schools-of-business/

(3) Digital humanities, history, computer science, engineering are still small but growing.

Ten Across StoryMaps

Ten Across collaborates in the cultivation of understanding of the people, places and challenge...

https://gis.asu.edu/project/ten-across-storymaps

Recommendations

1) Real-world examples to foster students who can think spatially and critically, applying theory and practice across many disciplines and problems.

2) The most marketable geospatial professionals can use GUI for any software, but also go a bit further.

3) Advocate for a geospatial librarian on campus.

Geospatial Home

Overview Quick Start Data Management Plans 2023 NIH Data Management & Sharing Policy Resources & Best Practices...

https://data.library.arizona.edu/geo

Map and Geospatial Hub

Maps Geologic, historic, topographic, and other thematic maps. Globes, atlases, and related books...

https://lib.asu.edu/geo

4) Don't overstress about using the latest version of X software, but by the same token, don't teach like it is 1999.

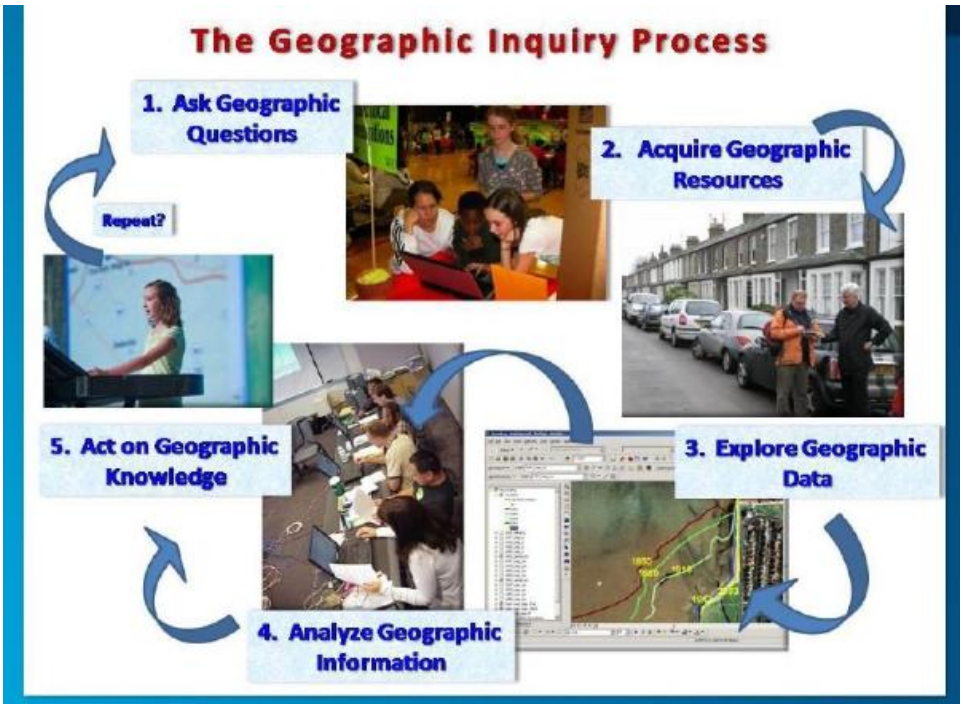
5) Get involved in education: Adjunct, PTO, GeoMentor, GIS Day, be a voice.

How many of you feel 100% adequate in your job?

To accomplish great things, two things are required: (1) A Plan, and (2) Not enough time. --Leonard Bernstein

The 5 Top Skills for GeoTechnology Professionals AND instructors and students.

1. Be curious. This leads to > Tenacity. Asking Good questions is part of the Inquiry Process.



Geographic Inquiry model.

2. Be able to work with data and be critical of it!

Geospatial data book & blog: **https://spatialreserves.wordpress.com**

Spatial Reserves

Understand the ethical implications of what you are doing!

Be critical of data that even YOU generate!

For more, see my **recent presentation on data quality.**

And **my article in Directions Magazine.**

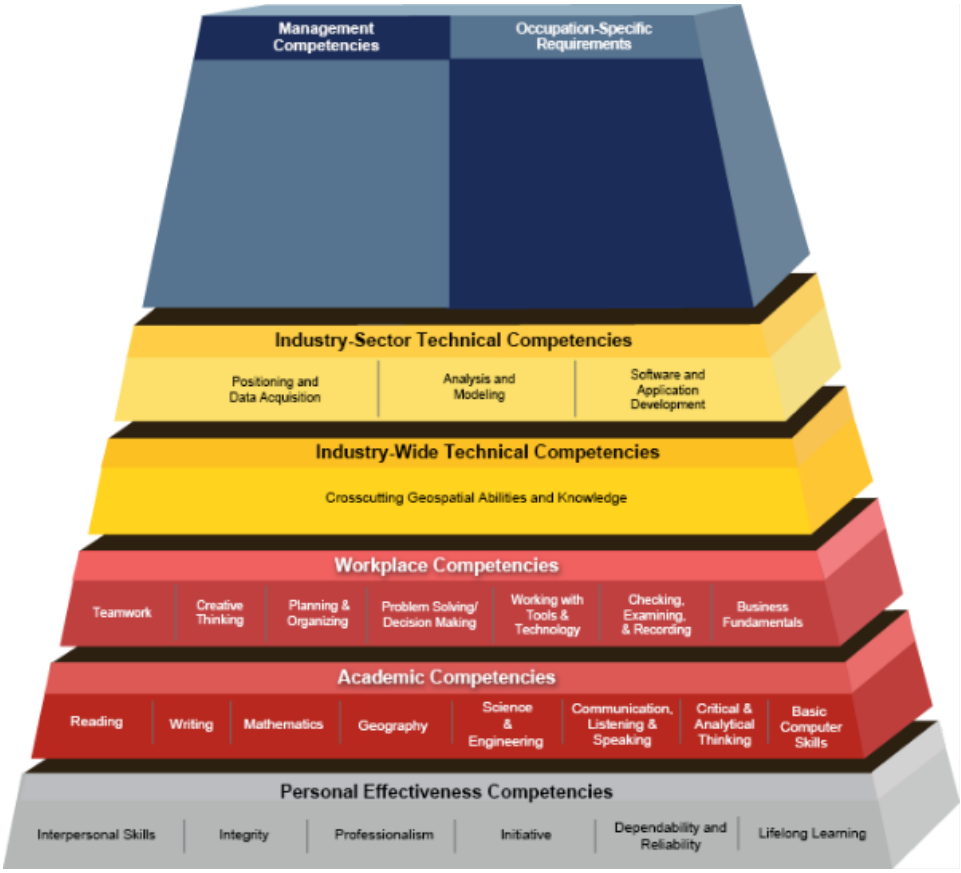
Maps are easy to create, and maps tend to be *believed*.

3. Know your Geographic and Geotechnical Foundations: Skills (spatial stats, coding, web, projections, analysis, classification, etc.), but content knowledge as well and the geographic perspective (scale, systems thinking).

Give back! Who can I mentor? A school, a college or university, others ____?

Who can I connect with to receive mentorship?

Where are your gaps? Use the GTCM as a guide to help you identify gaps. How can you fill those gaps?



4. Adaptability.

Be flexible; be willing to go international; or at the very least, outside of your "disciplinary comfort zone"! Hence, **read.**

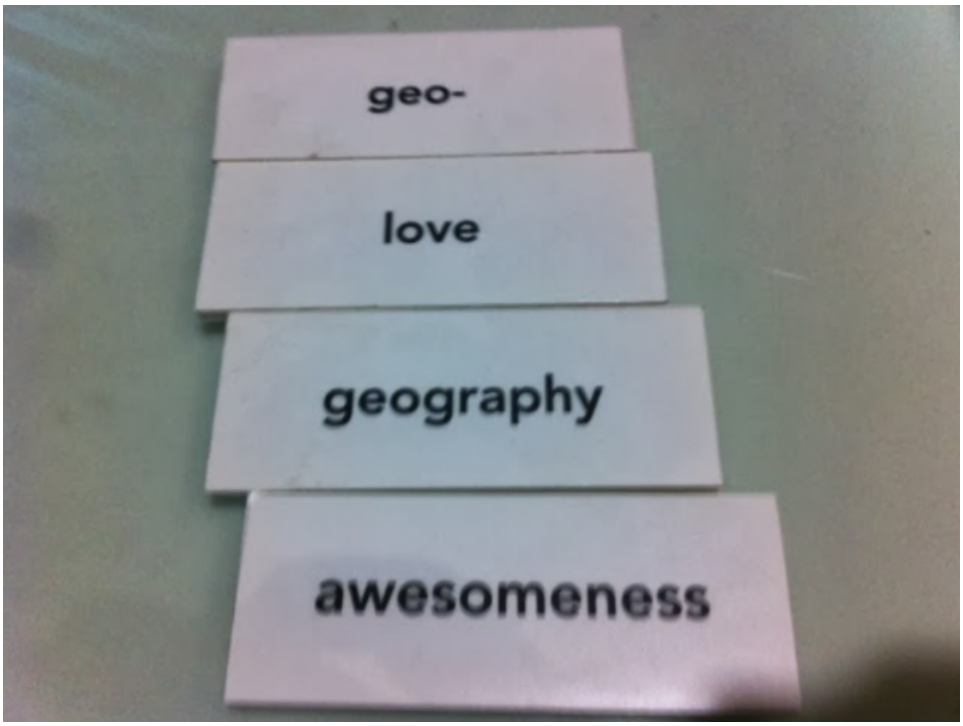
Seek the Center, Luke.

5. Good Communications. Do you have an elevator speech?

Elevator speech on why GIS matters to society

This decade will be exciting for geotechnologies: You have a key role in achieving the goal.

The goal: That wise decisions will be made with the spatial perspective and the use of geotechnologies for a healthier, happier, more sustainable future.



Guess where? Place matters.

Credits

All from Joseph Kerski with sources cited.