Geospatial Data Services in the University Libraries: Recommendations for Development

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June 2019

For many years University Libraries Geospatial Services has provided support for researchers and instructors in finding and providing access to geospatial data. More recently University Libraries Geospatial Services has also provided other forms of research and instructional support, including geospatial application-centered support. This past fiscal year we in the University Libraries Geospatial Services worked to develop a plan for further development for the near future, including recommendations to the University Libraries for resource and staffing needs.

Gathering Information Towards Service Development

Towards this effort University Libraries Geospatial Services disseminated a survey about geospatial needs to the Virginia Tech (VT) community. This survey was conducted through Qualtrics and received 126 responses: roughly half from VT faculty, a quarter from VT grad students and a quarter from staff members, extension agents etc. See Section II for the survey results.

We also conducted an environmental scan of VT's peer institutions and the geospatial services their research libraries provide. This environmental scan focused on the following six institutions: Clemson, Illinois Urbana-Champaign, Maryland, Virginia, North Carolina State and Penn State. Section III shows the results of this environmental scan.

The survey results and environmental scan, coupled with our current understanding of the Virginia Tech geospatial community, lead us to the following growth opportunities and development recommendations for our services.

Growth opportunities and Recommendations

Growth opportunities are shown in normal font while recommendations for service development are shown in italics.

1. We have established services for providing long-term access to geospatial data; continue to improve these services.
    a. *Digitize and georeference physical map collection through assistance of GEOG internship and student workers.*
    b. *Curate/catalog digital and physical geospatial data resources and make this catalog (GeoData) accessible online.*
2. VT geospatial community would benefit from more integration, and from better coordination of geospatial research and instructional services across the institution. However, there is no active coordinating body.
    a. *Engage the VT geospatial community by taking a larger governance role in existing Office of GIS group (OGIS) to*
        i. *better coordinate and communicate institutional geospatial service offerings for the VT community.*

ii. *Catalyze VT geospatial community integration.*

3. There is a need at VT for geospatial application-centered support, especially for novices. (**This support is provided by research libraries at our peer institutions**)
    a. *In concert with other VT geospatial service providers, continue providing this application-centered support.*
    b. *Expand consulting expertise to cover web-mapping services, and potentially drone mapping applications.*
    c. *Develop introductory training material/workshops where useful; first we should determine what other geospatial training is being provided to the VT geospatial community.*

To fully take advantage of these opportunities and implement these recommendations, the University Libraries Geospatial Services will need a) continued support for GeoData and digital image processing, b) continued resources to provide students (both interns and wage workers) with experiential education opportunities, and c) an increase in personnel towards application-centered support and geospatial community engagement.

Before we embark on addressing our recommendations, especially 2 and 3, we will engage other key geospatial community stakeholders (e.g. Enterprise GIS, the Center for Geospatial Information Technology) to ensure our initiatives are aligned with the geospatial community's interests and needs.

Following are supporting sections:

- Section I - A description of Geospatial Services' past and current service provision and more recent accomplishments
- Section II - Results from a VT-wide Survey on Geospatial Needs, distributed and analyzed in Spring 2019
- Section III - Results of an environmental scan of VT's peer institutions and the geospatial services their research libraries provide

Section I - University Libraries Geospatial Services

Geospatial services provides support for patrons, frequently researchers, in finding, accessing and working with geospatial data. Geospatial data typically consists of maps, planimetric data in the form of shapefiles, and imagery; content that is frequently used for research. Our support focuses on supporting researchers who have little to no experience working with geospatial resources, specifically those who are inexperienced in using geospatial applications (most commonly ArcGIS).

Geospatial data discovery, acquisition, and introductory support to ArcGIS are services that Ed Brooks has been offering for over a decade now and remain a primary service of our geospatial unit. However, ever-increasing amounts of commonly-used geospatial data are available online (e.g. through Google Earth) , helping users find geospatial data is a service that has diminished in recent years. Geospatial data services has started focusing on the consolidation of current physical collections and streamlining content access through our centralized geospatial data repository, GeoData. Further, with help from the library development team who set up our GeoData application, we've been able to transition from a sole focus on content management and start providing more support and training for ArcGIS and other geospatial software.

With the development of a GeoData application for storing geospatial data, we have worked to standardize a workflow for cataloging and digitizing the geospatial data we acquire. Use and enhancement of this workflow has evolved into an experiential learning opportunity for students. This past year we expanded our cataloging and digitization service to include a Geography Internship. This internship is in partnership with the Geography

department and provides a field experience for geography students who are required to complete a 150 hour internship as part of their degree. During their time with us students create metadata records for maps in our physical collection on the third floor. After creating a metadata record for a set of maps, students conduct an assessment to determine if any of the maps cataloged are of sufficient value. Maps of value are sent to University Libraries Digital Imaging group to be digitized. Once digitized our students then apply some of their skills from their geography coursework to georeference digitized images. Once georeferencing is complete students create a final package that is uploaded to GeoData.

For several years now we have worked with students who supported geospatial services to varying degrees based on their expertise. Last year was the first time we were able to implement a peer mentoring system. We were fortunate to have an exceptional graduate student, Taylor Blackman, who brought new expertise in imagery processing to our services and also helped train our interns how to support geospatial consultations in the Data Transformation Lab. We were also able to hire former geography interns to support our traditional geospatial services while also helping to mentor new geography interns. This pipeline has created an effective transfer of knowledge which has helped us to maximize the learning experience and quality of work that our students are supporting, and we expect to continue this pipeline for the foreseeable future.

Section II - VT-wide Survey Results on Geospatial Needs

University Libraries Geospatial Service Needs Assessment Survey Results Spring 2019

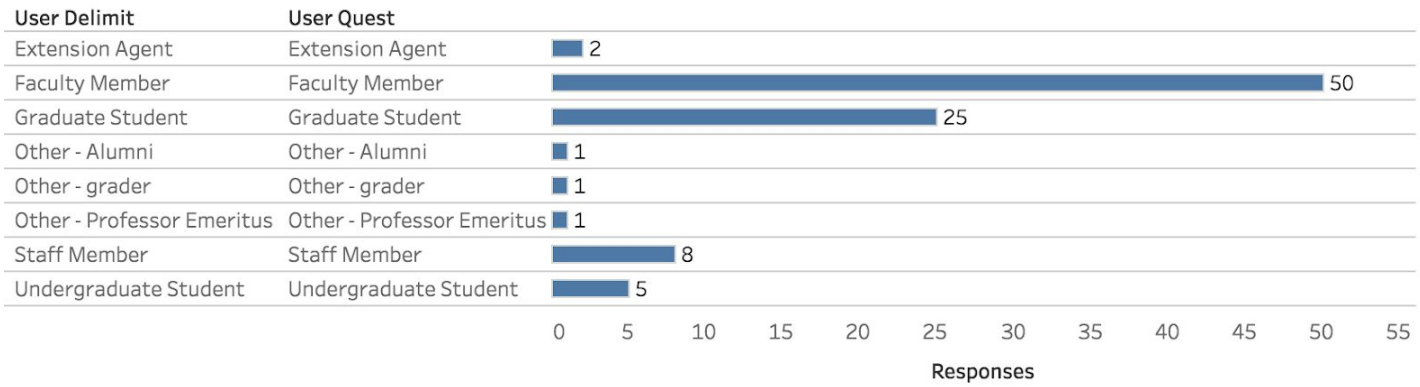
Qualtrics Survey Instrument Linked Here

Q1. Do you wish to continue [this survey]?

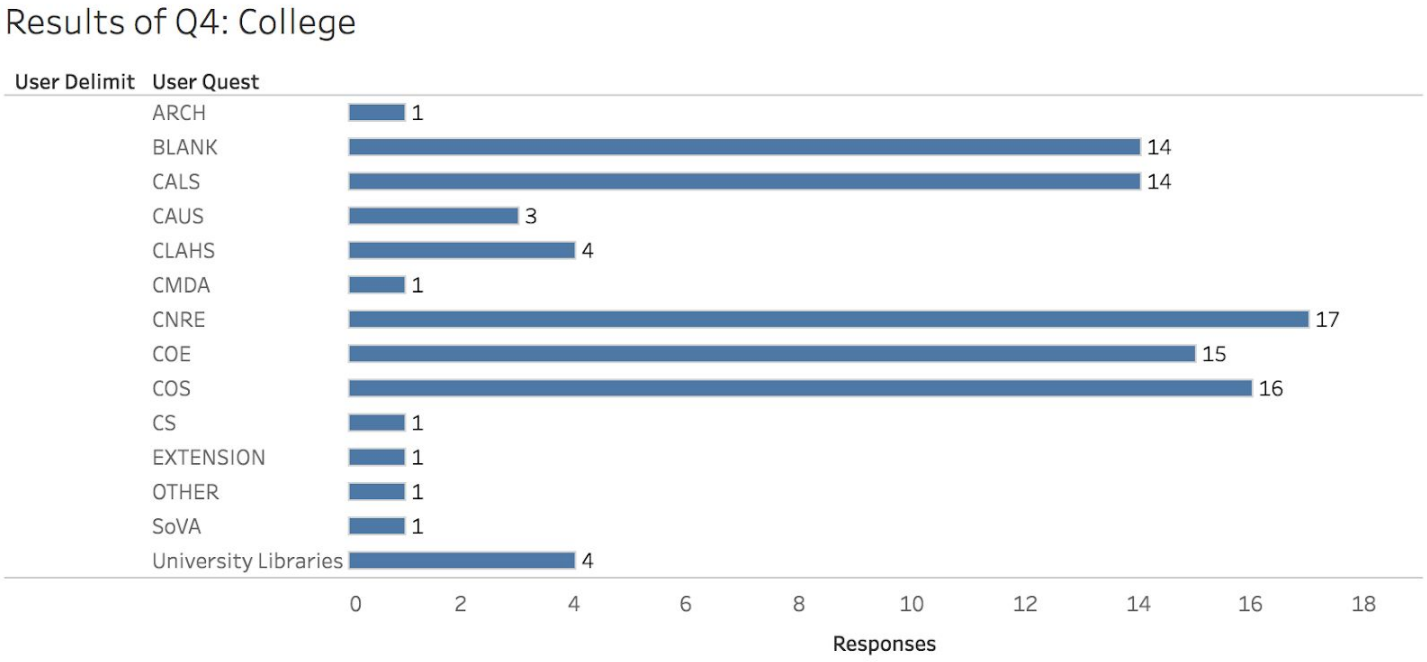
Q2. Are you 18 years old or older?

Q3. Please select which best represents your academic or professional status.

Results of Q3

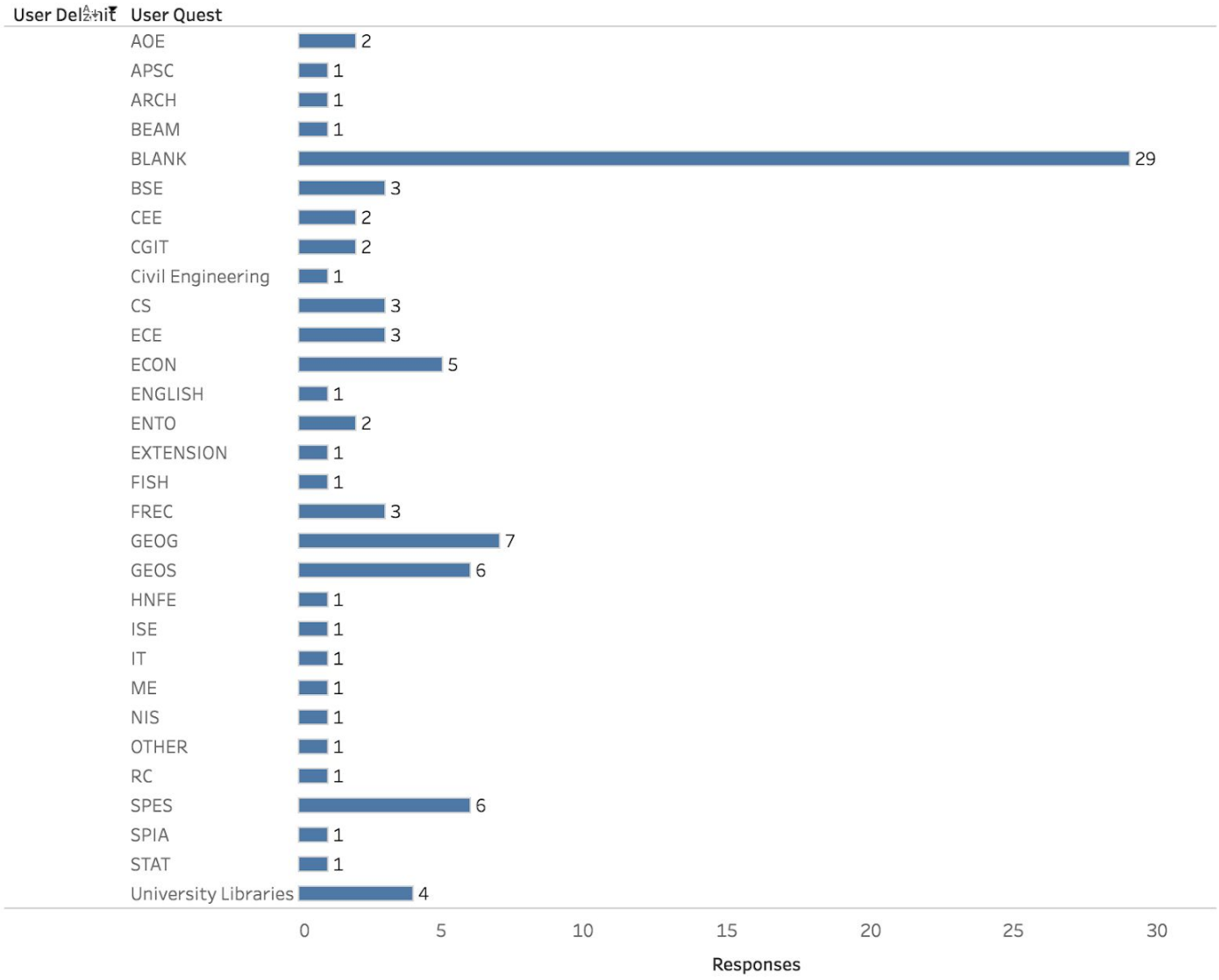


Q4. What is your primary affiliation to Virginia Tech (i.e. College & Department)? If you are not in a College/Department please state your relevant affiliation under 'Other'. - College - Text

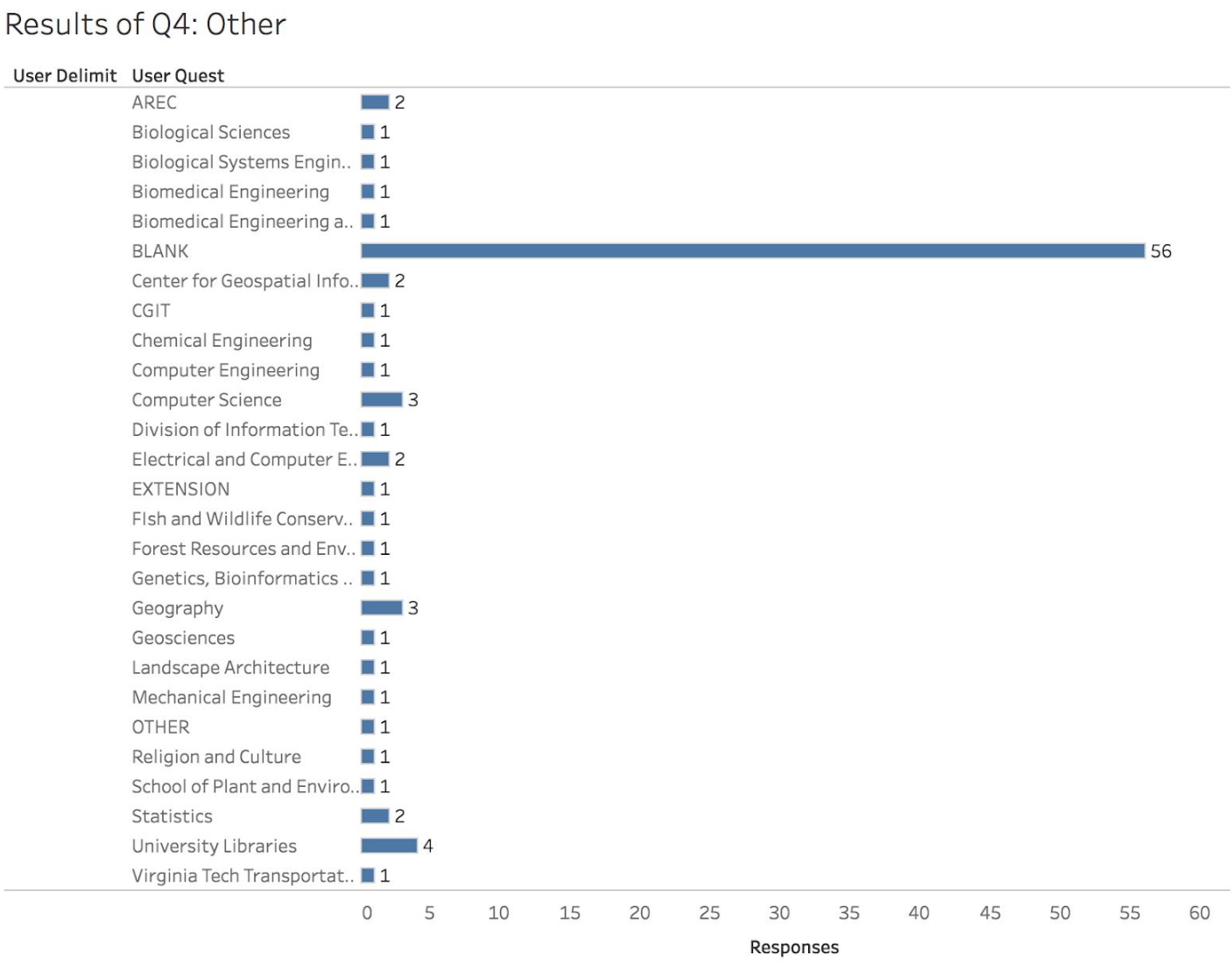


Q4. What is your primary affiliation to Virginia Tech (i.e. College & Department)? If you are not in a College/Department please state your relevant affiliation under 'Other'. - College - Text

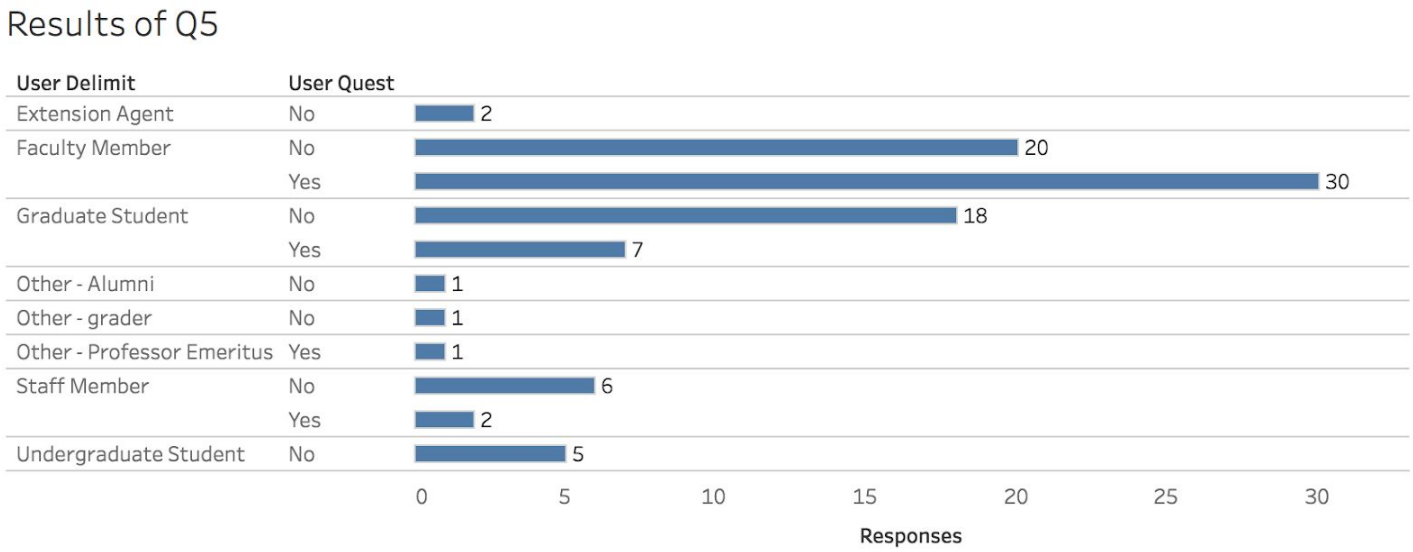
Results of Q4: Department



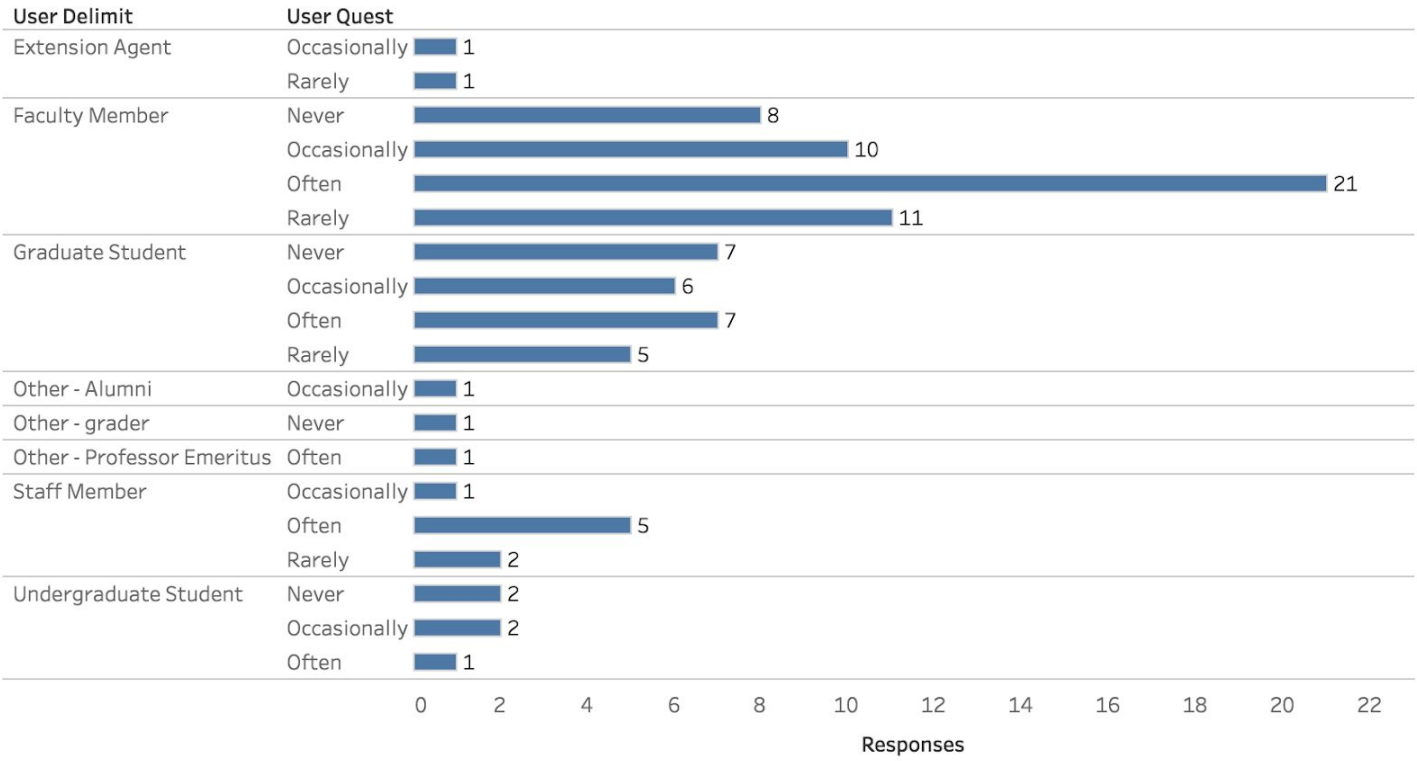
Q4. What is your primary affiliation to Virginia Tech (i.e. College & Department)? If you are not in a College/Department please state your relevant affiliation under 'Other'. - College - Text



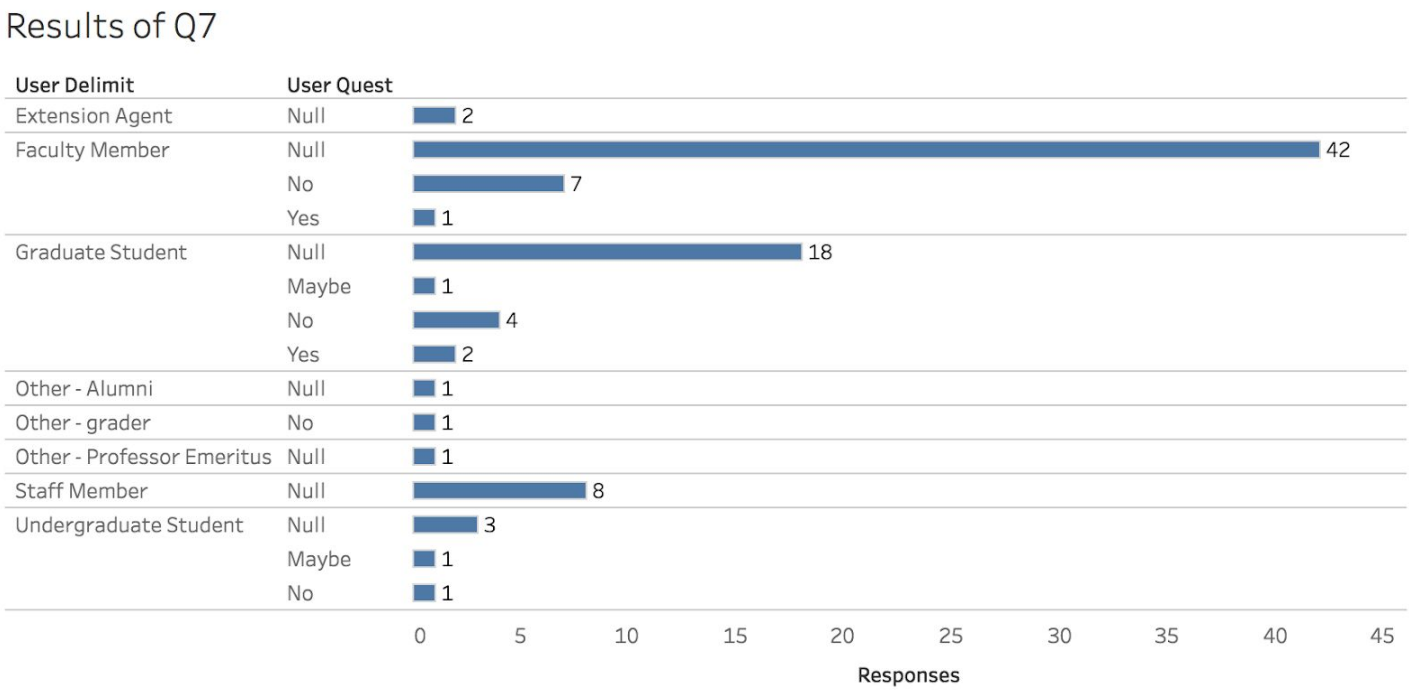
Q5. Do you instruct or plan to instruct others in course(s) or seminar(s) that incorporate geospatial data, techniques, and/or software?



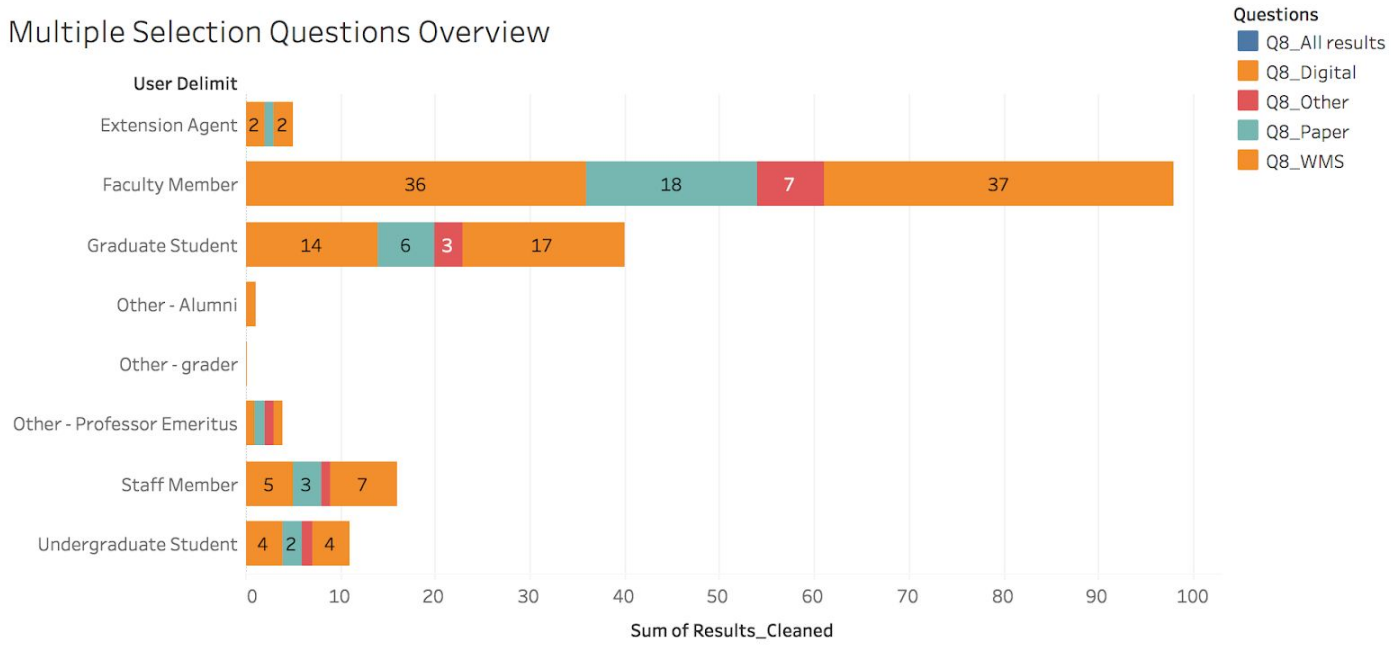
Q6. In the past 5 years, how frequently have you used geospatial information or maps for research or instruction?



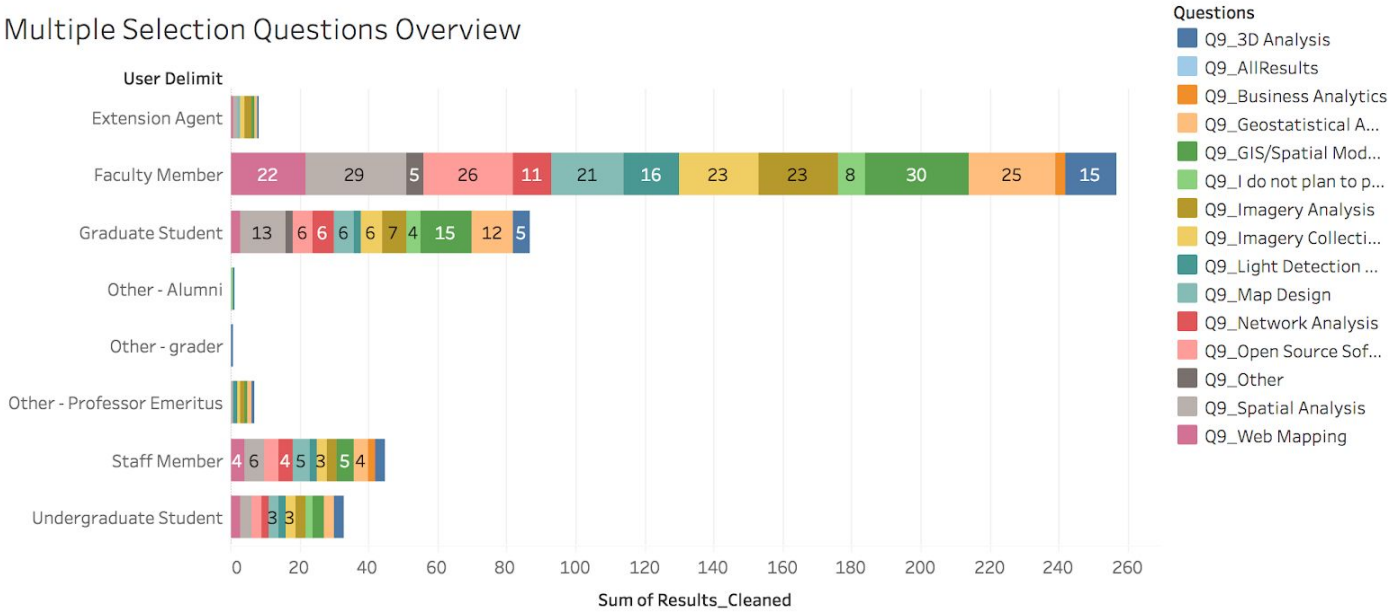
Q7. Do you plan to use geospatial information or maps for research in the near future?



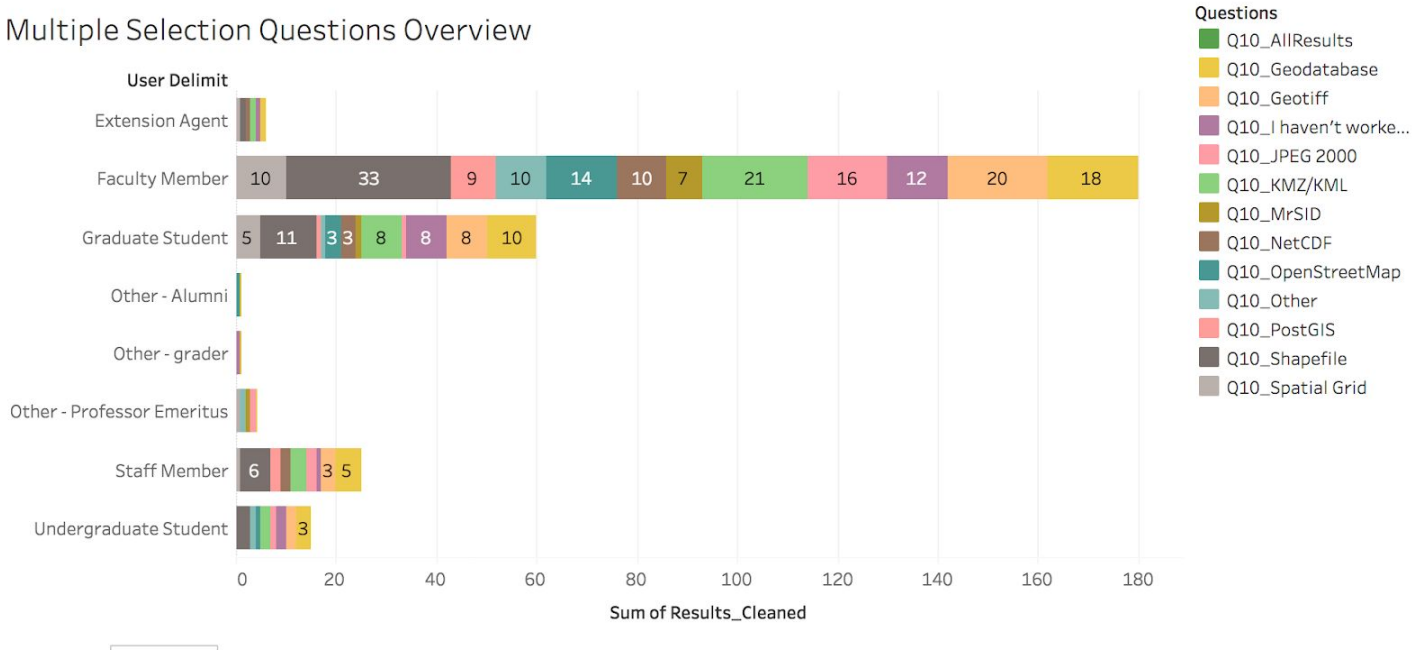
Q8. What type of maps have you recently used for research or instruction, and what types do you expect to use in the near future? Select all that apply. - Selected Choice



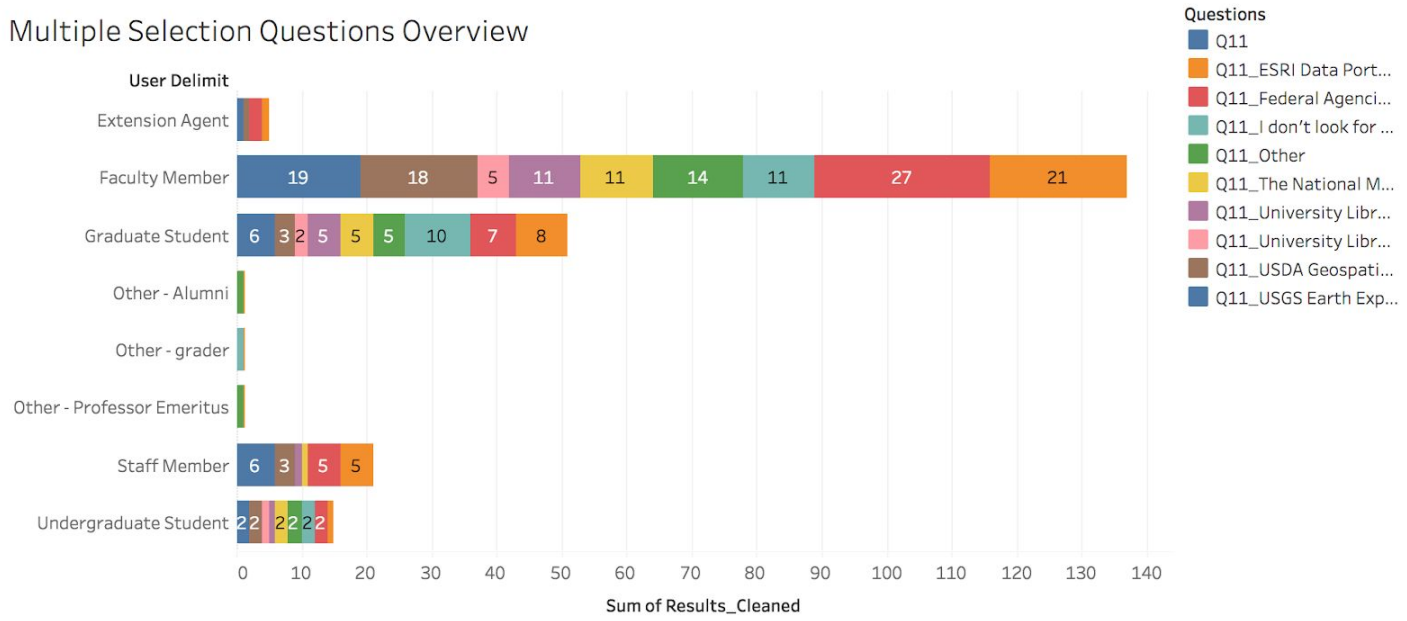
Q9. Do you perform or plan to perform any of the following geospatial processes? Select all that apply. - Selected Choice



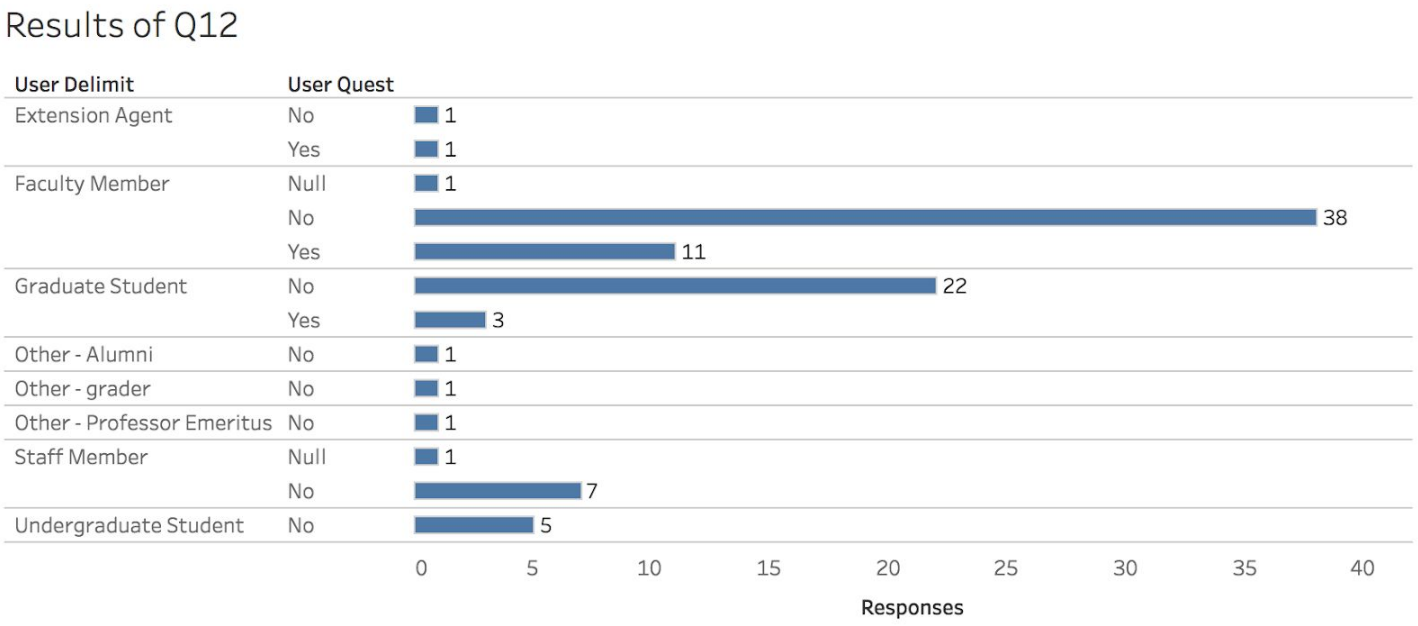
Q10. What geospatial data formats do you regularly work with? Select all that apply. - Selected Choice



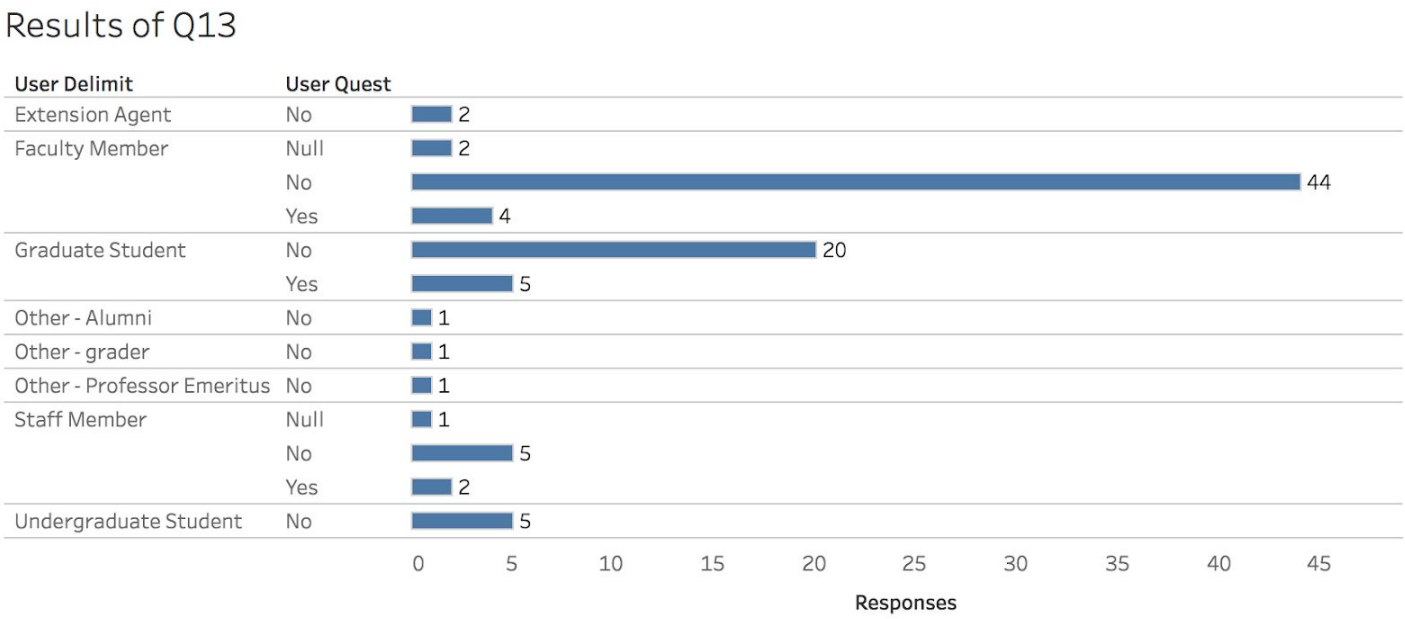
Q11. Where do you typically find geospatial data for your research or instruction? Select all that apply. - Selected Choice



Q12. Do you have any geospatial data that you would like to have archived and hosted by Virginia Tech University Libraries?
If Yes, please give us your e-mail address at the end of the survey so we can follow-up with you about your archiving and hosting needs.



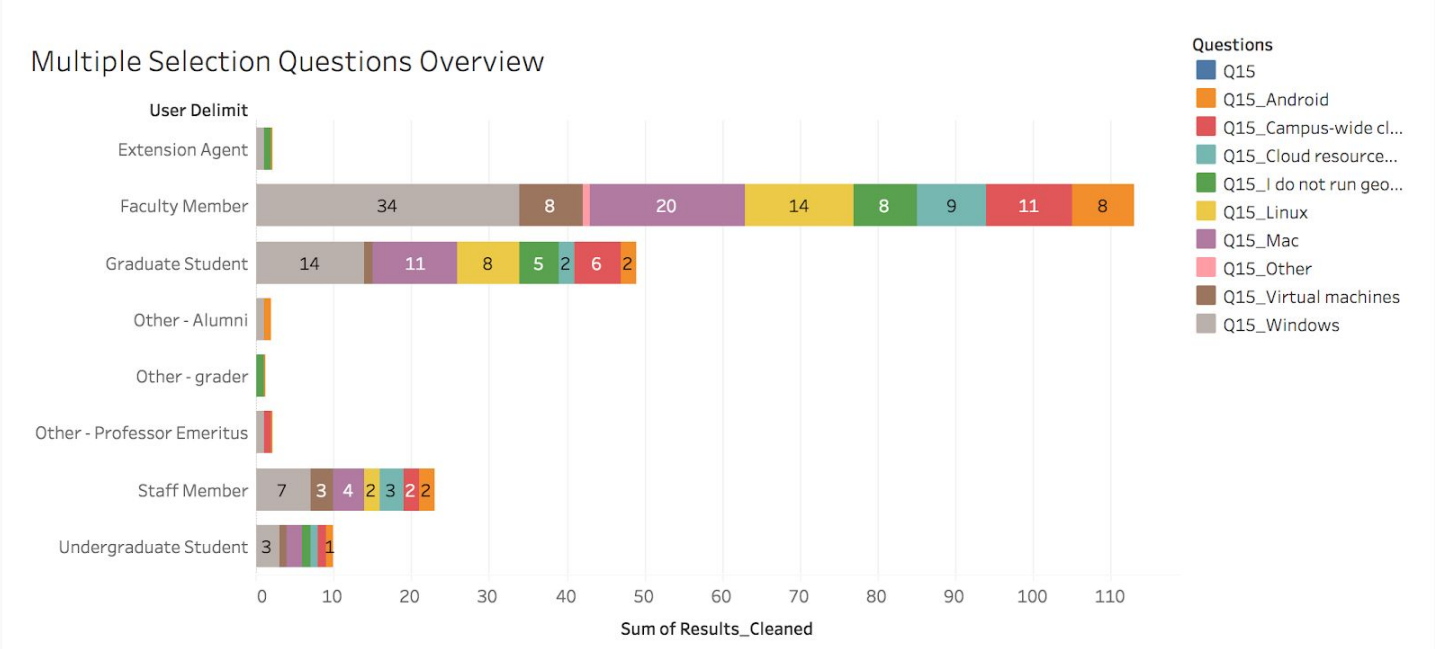
Q13. Are there any geospatial resources that you would like access to for your research or instruction that aren't currently available in a format that is useful for your purposes?



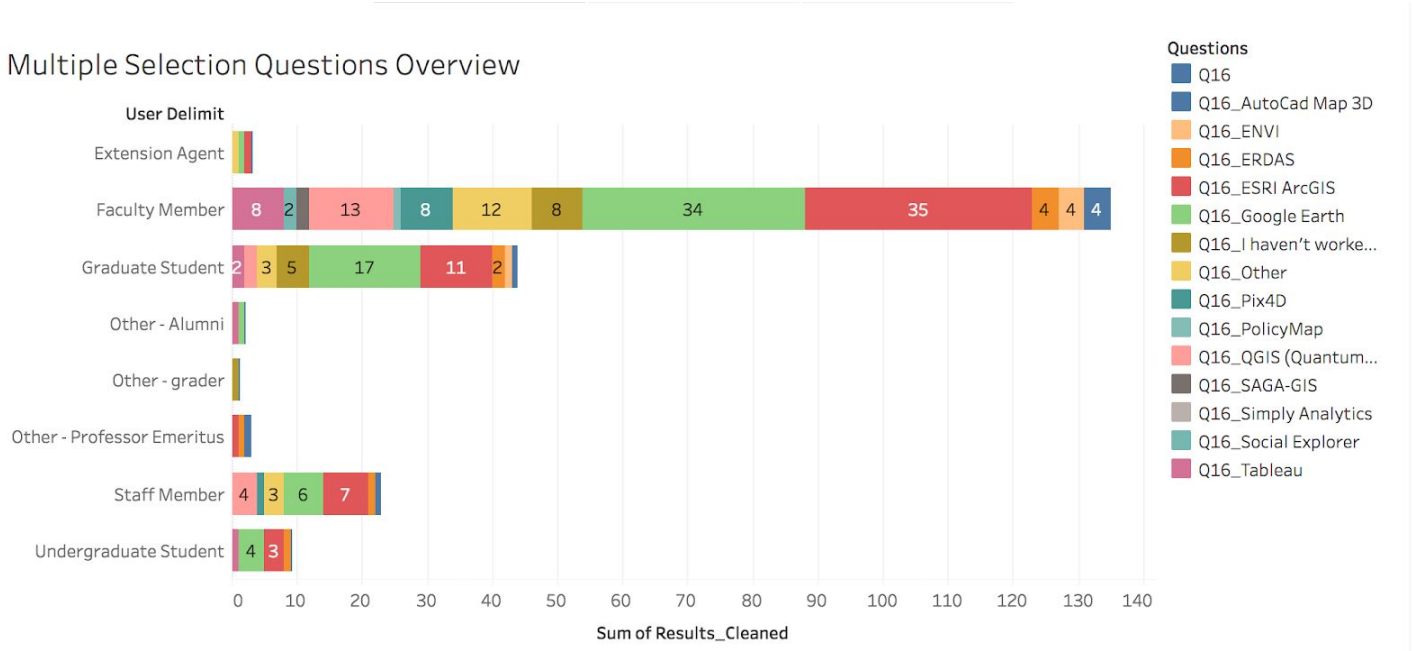
Q14. Please describe the geospatial resources you would like access to, specifying formats as relevant.

- Hi Shane, I stopped in a few weeks ago pertaining to my research on the Fries Fault from Riner to Peaks of Otter areas in Virginia. I'd like to stop in and start focusing on what info I can tease out of the Lidar data I currently don't know how to access. See you soon!
- LiDar maps
- BATHE-METRIC
- Geoserver instances and the X3D extension... in the cloud?
- Need access to this type of service: https://urbanfootprint.com
- Radar Rainfall (forecast, live and historical) in Shapefile/Geodatabase
- Better geospatial data in our Central Log Services so that we can build searches and dashboards for useful network mapping of users.
- Floor plans for VT buildings
- A more thorough accounting of the locations of various network devices, namely access points on campus would enable some of our research to progress faster and more easily.

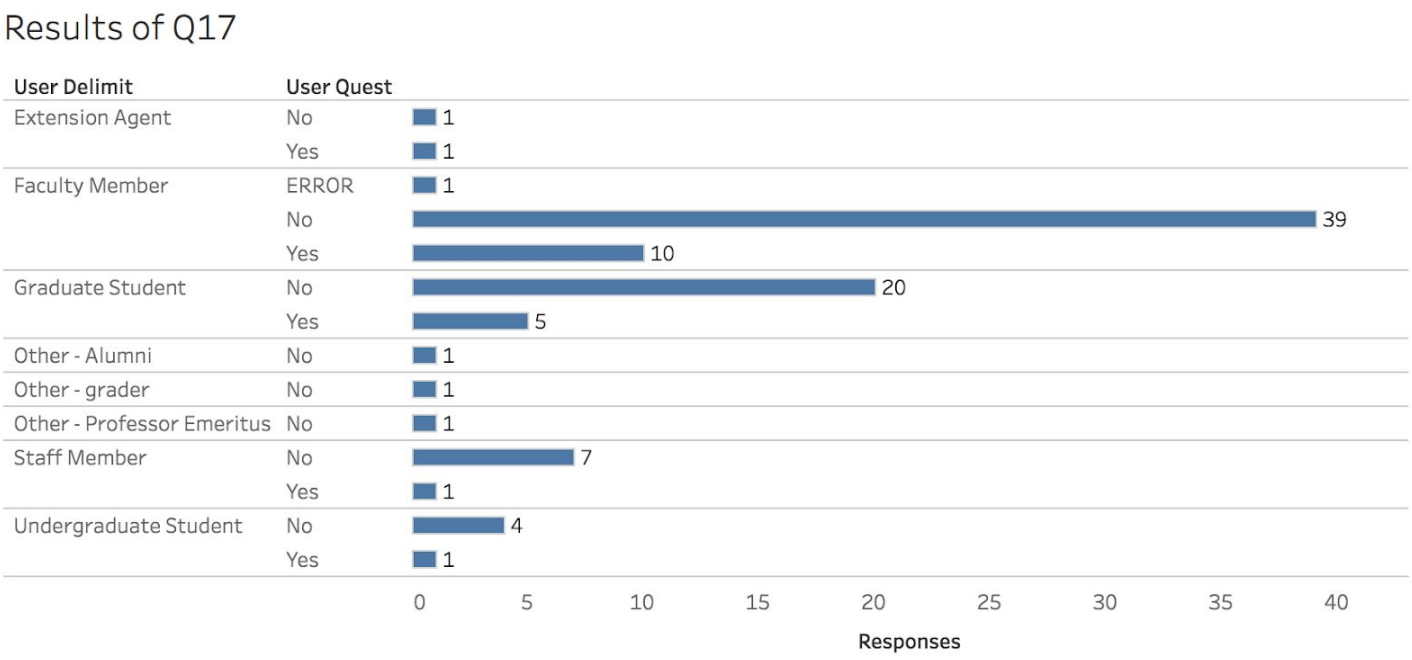
Q15. What platform(s) do you use to run geospatial applications? Check all that apply. - Selected Choice



Q16. What geospatial applications do you use? Check all that apply. - Selected Choice



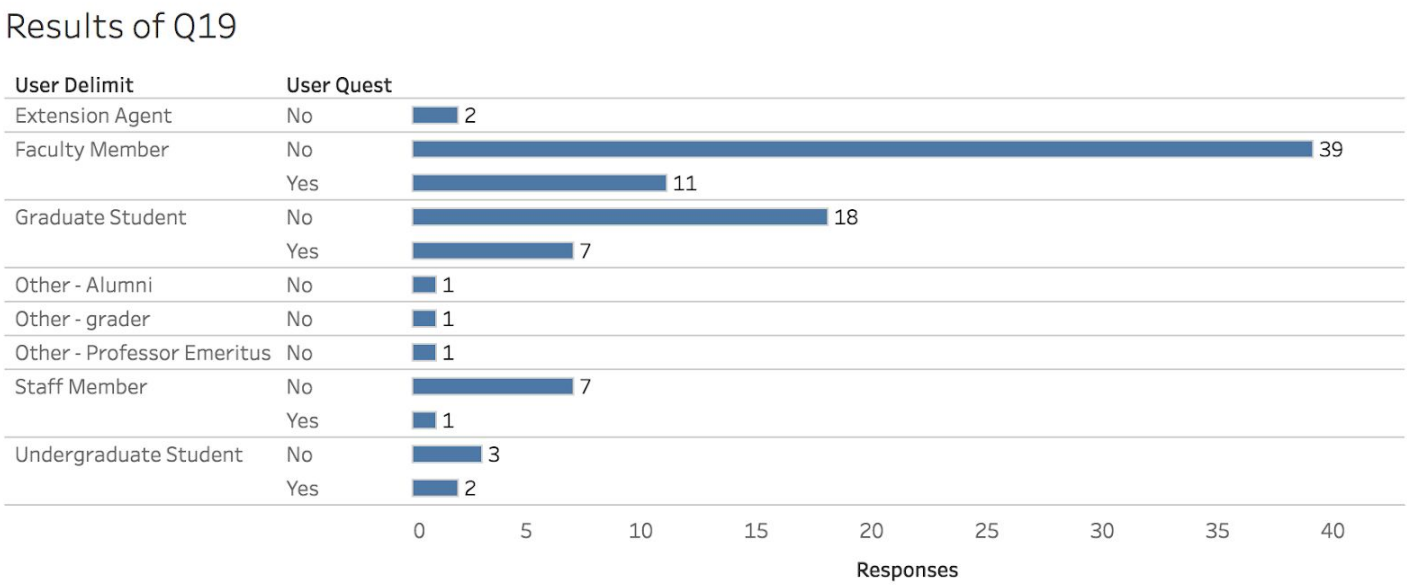
Q17. Do you lack or have limited access to hardware or software resources you feel are needed for your geospatial projects?



Q18. Please list the types of hardware or software you need access to, and briefly describe how these resources would improve your current situation.

- Lidar. I don't really know what hardware/software this pertains to
- Updated Maps of the area
- Having GIS capability would allow us to interface and manipulate geospatial data from the localities we serve
- More computational resources for processing captured data would be enormously helpful
- Data storage. Access large collection of dataset (e.g., point clouds) at one location
- not enough computer access for GIS students, not much knowledge about GIS problems can be found in the library. Also very limited access to downloading programs we are required to run on public computers; cant download most 3D printing softwares on public computers
- Updated software, including ArcGIS
- LASTools (full version, we use educational)
- Reliable deployment of 3D Blacksburg
- https://urbanfootprint.com
- Faster computer, Roads and Highways extension.
- i need none
- Would be nice to have a fleet of rugged tablets that could be checked out by classes for collecting geospatial field data

Q19. Are you currently experiencing any additional challenges or frustrations while processing geospatial data?

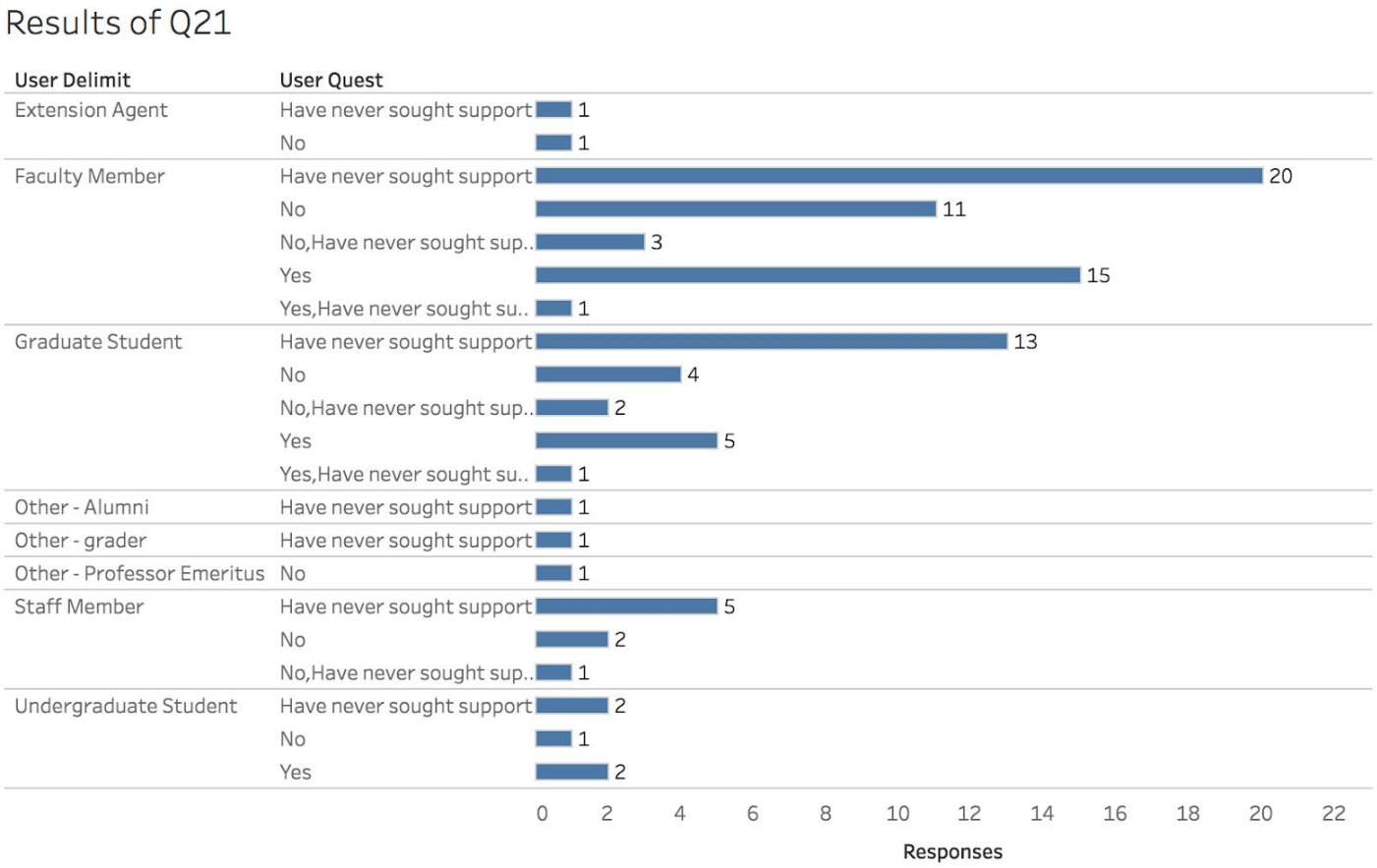


Q20. Please describe the challenges or frustrations you've encountered during your work.

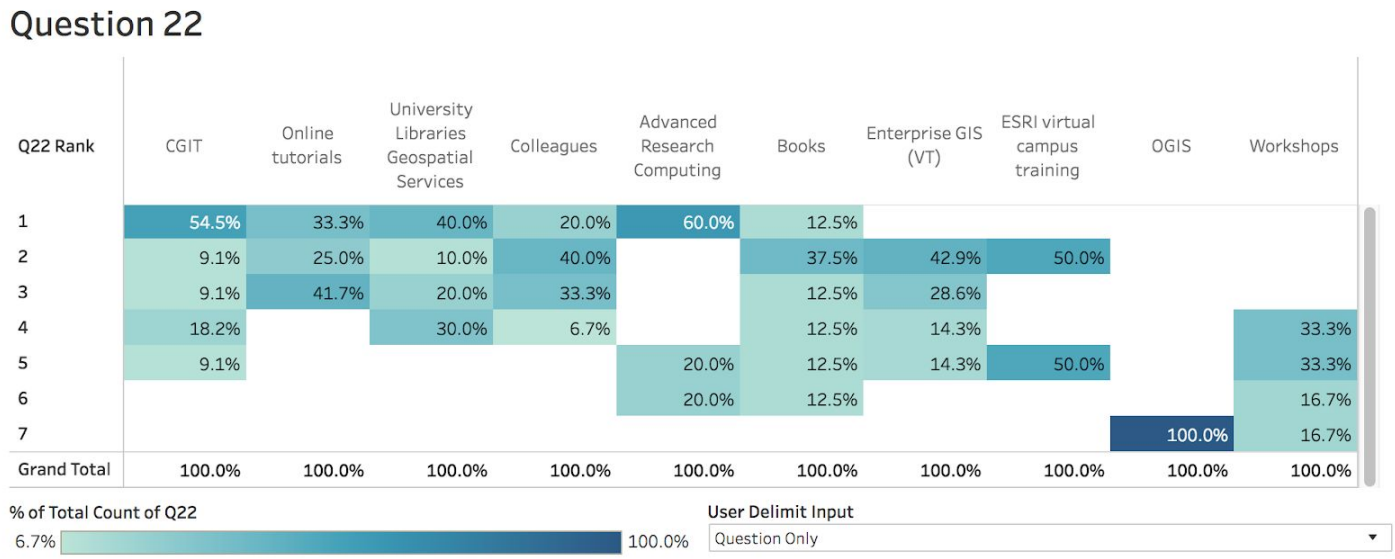
- Google Earth is really choppy for the accessible data I'm working with
- Need better maps
- They are specific and too numerous to list.
- I am not expert in ArcGIS and the program is not handy at all
- Too much to write here
- Lack of resources
- Lack of computational resources and local community of users of the software I'm using
- 1. licensing for certain tools 2. data storage
- The few computers that are available to GIS students often have bugs that disrupt class topics, old processors make processing data for classes take far more time than it should.
- Having problems using the softwares
- Working with outdated versions of Anaconda on ARC which causes compatibility issues with python geospatial libraries
- General lack of availability to the campus ArcGIs Portal and Server
- We collect drone-based lidar, very large point clouds. We have worked with ARC and now have AGISoft on one of the supercomputers, so that's good. but we can't get in remotely I don't think. Also, we could really use full version of LASTools. I think Geography has a license, but we would have to go there to use.
- Programming resources and Open source support - we need more in house expertise
- Need to know how to pair live data to generate alerts for weather monitoring. Need rainfall historical, forecast and live data for every road section for planning purposes.
- Processing time
- Simply the ability to run complex spatial operations on larger datasets. Essentially a hardware issue
- need deeper expertise to learn best practices for complex processing and data fusion/storage

- Choice of software & platform for geospatial applications in teaching
- Layering and Visualizing the maps in ways that are more humanities based. Time.

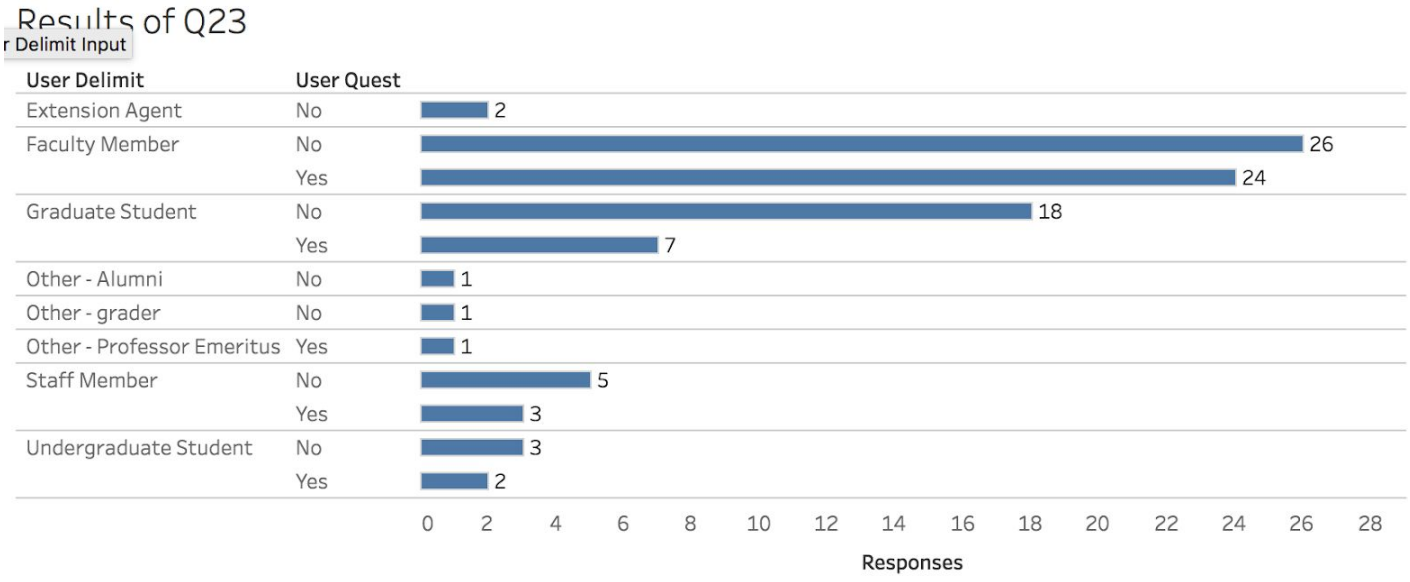
Q21. Do you seek support from University services when you encounter geospatial related problems during your research or instruction?



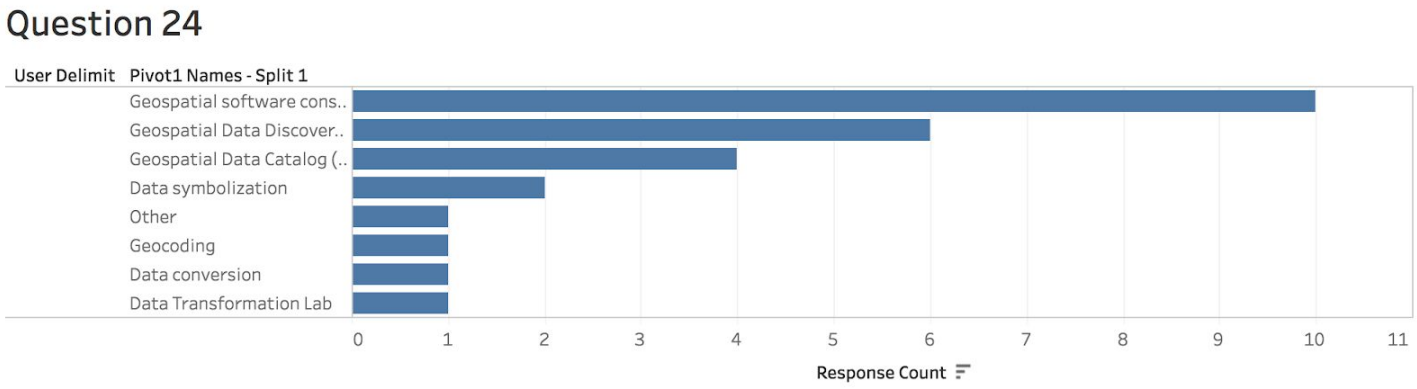
Q22. Of the following support services, please rank the order in which you would typically seek help. You need only rank those services you use. - Groups - Services Used



Q23. Prior to this survey, were you aware the University Libraries offered geospatial services?



Q24. Have you used any of the following geospatial services offered at University Library? Select all that apply. - Selected Choice



Q25. Can the University Libraries follow-up with you about your survey responses? Be sure to give your email address if you had specific items for which you wanted to continue discussion. - Selected Choice (the e-mails of those who answered yes below)

NOT SHARED

Q26. Would you like a copy of the de-identified and aggregate results of this survey? - Selected Choice

NOT SHARED

Q27. Is there anything else you would like to inform us about that you feel would help to improve support for geospatial instruction and research within University Libraries? - Selected Choice
(the responses of those who answered yes below)

- Thanks for your efforts!
- I am not very aware of your services to be honest. Generally create assignments and projects for classes from on-line resources from federal sites etc.
- Is there technical support to write software that will automatically download datasets on a periodic basis?
- I've had very little training in GIS and would be interested in short courses/tutorials.
- I think University libraries does a great job. I have always found they are willing to help as they can and are more than willing to work collaboratively with me.
- CGIT is a key resource for campus, yet they are not hard funded as a university service. Build in deeper expertise (tiered support) with the library geospatial services

Section III - Environmental Scan of Virginia Tech Peer Institutions and the Geospatial Services their Research Libraries Provide

This report is based on comparisons of University Libraries Geospatial Services to the IPEDS (IntegratedPostsecondary Education Data Systems) Peer Institution lists; Land Grant schools across the US and Schev institutions in the Commonwealth.
The categories we used in the comparison are:

1. Staffing:
   a. Professional degree
2. Facilities:
   a. From where in the institution the geospatial support take place
3. Geospatial Services:
   a. Consultations
   b. Drone and/or Web Services offered
   c. Training, ie.. Hands-on-workshops, tutorials & guest lectures
4. Web Site:
   a. Website that convey services offered
5. Geospatial Data Site:
   a. Providing access to geospatial data
6. Computing:
   a. If High Performance Computing options were offered.
6. Outreach:
   a. GIS Users Groups
   b. Listservs

Peer institutions selected based upon the categories above:

Clemson University
Location: Clemson, SC 29634
Enrollment (Total) - 23,406
Affiliations: Land Grant
Organizational Structure: collaboration between the library and the GIS Center. (https://library.clemson.edu/depts/staffweb/update-on-center-for-geospatial-technologies/) and Clemson Center for Geospatial Technologies
Website: https://www.clemsongis.org/

Facilities/Spaces:
1. Training Facility (406A Cooper) for training events
The training facility is a dedicated space for GIS training and workshops, seminars, summer school, webinars, class support, and customized training sessions.
2. Collaborative Space (412 Cooper) Our GIS collaborative space offers a place for groups to work together on their projects.This space features our Augmented Reality Sandbox, a virtual reality station with an HTC Vive, and a projector and screen.

Staff:
Executive Director
Director, UAV & LiDAR Program
GIS Manager
GIS Sys Admin
(2) GIS Interns

GIS Services:
Complimentary Services:
Many of our services are provided at no cost to Clemson students, faculty, and staff.
Fees for Services:
Fees are charged for many CCGT services provided to Clemson faculty, students, and staff and all external entities. These require a formal service agreement filed with CCGT prior to the start of work.

Consultations - Open to all students, faculty and staff on GIS projects free of charge.We support Clemson's faculty and departments who want to learn GIS. We offer specialized, one-on-one consultations to focus on your individual needs and help you to solve your GIS problems.

Training:

1. Our specialists provide workshops and training in the fundamentals of GIS, data management, and in the latest GIS software packages, such as ArcGIS Desktop, ArcGIS Pro, Advanced Data Collection (UAVs, LiDAR, GPS & Mobile Data Collection), Geo-visualization, Open Source GIS, Web Mapping (https://www.clemsongis.org/services) Applications, CyberGIS/Programming & GIS for Engineering and the Environment
2. Tutorials are published Online.
3. Hands-on GIS Workshops - We offer many free, hands-on workshops to help you become a knowledgeable, proficient GIS user. All of our workshops are offered on-demand. When there are at least four people interested in a workshop, we send out a Doodle poll to determine the best time for everyone.
4. We can also provide access to online training for specific departments or disciplines.

Data:
One of its critical functions is to create a centralized data repository of key geospatial datasets that will increase the opportunity for research, instruction, and innovation at Clemson.

Grant Proposals:

1. We provide support for developing geospatial research grant proposals in a variety of ways. We can assist PI's in meeting their needs through our resources, project management, training and high-end technology. We can help find collaborators for specific project tasks and locate faculty or senior personnel to provide project advice.

GIS Project Management:

1. Provide GIS project support to students, faculty, and staff of Clemson University. Below are some of the most recent projects at Clemson University that highlight the broad range of disciplines and techniques happening at our University using the latest GIS tools.
2. Guidance for your geospatial project from start to finish.

Collaboration:
Clemson Center for Geospatial technologies:

1. The primary home for CCGT is in the Cooper Library, where staffed collaboration and training spaces are available to all members of the Clemson community through a partnership between CCIT and the Libraries. Through this partnership, CCGT strives to make resources available to the community, including training and workshops, data services for teaching and research, access to infrastructure for

geospatial analysis (ranging from software licensing for GIS through high performance computing), and support for research and proposal development.

Computing:

INFRASTRUCTURE, SERVER, AND WEB DEVELOPMENT

1. ArcGIS Server - ArcGIS Online - Leaflet - JavaScript - Geoserver

Our team of geospatial technology specialists can assist with the development of GIS data management technologies and web mapping applications through the use of proprietary and Open Source technologies. Our expertise includes ESRI's ArcGIS Server, ArcGIS Online, Portal for ArcGIS, and Open Source technologies such as the Leaflet mapping application, PostgreSQL relational database and Geoserver.

ArcGIS Server: Real-Time GIS:

1. running ArcGIS Server which is a complete and integrated Server for GIS. It is a powerful web service tool of Esri that enables you to create and publish web maps, store and manage centrally large volume of geodata and imagery and distribute maps, models and tools to others within your organization and beyond in a way that fits well into their workflows (https://www.clemsongis.org/services)

CyberGIS -

1. First of its kind that combines traditional GIS services such as desktop GIS with advanced cyberinfrastructure to support data-intensive research at Clemson.
2. Palmetto Cluster is Clemson University's primary high-performance computing (HPC) resource. It is heavily utilized by researchers, students, faculty and staff from a very broad range of disciplines.
3. GalaxyGIS: High-Throughput Computing (HTC) - a High Throughput Computing pool, called GalaxyGIS which is the first GIS Cluster at Clemson, to address the needs of desktop GIS users who needs additional computational power for their GIS analysis.
4. Cypress: Big data - The Cypress Cluster uses the Hortonworks Data Platform distribution of Hadoop and Spark to support data intensive computing and analytics. Cypress is available to all students, faculty, and staff with Palmetto Cluster accounts.

Augmented Reality Sandbox:

1. The sandbox is a great hands-on tool for teaching people of all ages about geography and topography. A specialized Linux program uses a Microsoft Kinect camera to read the sand surface within the box and projects an interactive topographic map onto the sand. Hills, valleys, and rivers can be made with elevation and contour lines and are updated and displayed in real-time, bringing the terrain to life right before your eyes!

Field Data Collection:

1. Offers specialized training and equipment to help you with all of your field data collection needs.

UAV and LiDAR Services:

1. Provides integrated services and support for use of unmanned aerial vehicles/systems (UAVs, or drones) and LiDAR at Clemson across many disciplines and applications. https:// www.clemsongis.org/uav-at-clemson

3D Printed Landscape Gallery:

1. We have expertise in creating 3D printable landscapes from a variety of geospatial data sources, and we are interested in working with faculty and researchers to turn your ideas into a solid reality. Our high quality 3D printers are housed in the Geospatial Center MapperSpace.

Outreach Activities:

1. We provide educational activities for youth organizations which feature our unique spaces and resources.

GeoAmbassador Program:

1. Program provides a way for you to turn your knowledge into a hands-on workshop for your fellow Clemson students.

University of Maryland (College Park)
Location: College Park MD.
Enrollment (Total) - 40,521
Affiliations: IPEDS, Land Grant)
Organizational Structure: University of Maryland Libraries' GIS and Spatial Data Center
Website: https://www.lib.umd.edu/gis

Facilities/Spaces:

1. Library GIS and Spatial Data Center
2. GIS and Spatial Data Computing Lab

Staff:

Geospatial Scientist
Workshop Program Manager & Geospatial Project Coordinator
Geospatial Project Manage
Maps Specialist
Geospatial Specialist
Geospatial Intern
Geospatial Researcher in Residence (PhD student)

GIS Services:
Consultations - GIS and Spatial Data Center Workshop Series: The Libraries frequently offer in-person workshops during the semester. These workshops are open to anyone, but priority registration is given to University of Maryland faculty, staff, and students.The GIS and Spatial Data Center offers customized GIS, remote sensing, spatial statistics, and data visualization guest lectures and course support for faculty. Guest lectures are taught by Center staff in our GIS lab located in McKeldin Library or in your lab of choice. Click here for example guest lectures.

Training:

1. Our services are free of charge and include workshops on GIS, image processing, and statistics topics, customized guest lectures and course support, faculty collaboration and project support.
2. The GIS and Spatial Data Center offers customized GIS, remote sensing, spatial statistics, and data visualization guest lectures and course support for faculty. Guest lectures are taught by Center staff
3. one-on-one consultations on all aspects of geospatial research and teaching

Data:

1. The BTAA Geoportal is a collaboration among Big 10 institution libraries to create a central location for discovering digitized historical maps and GIS datasets relevant to Big 10 institutions. Portal resources are selected.

Outreach Activities:

1. Geospatial Researcher in Residence Program (PhD student)

University of Virginia
Location: Charlottesville Va.
Enrollment: (Total) - 21,985
Affiliations: SHEV/IPEDS
Structure: Library (GIS & Data Visualization)
Website: https://guides.lib.virginia.edu/gis & https://scholarslab.lib.virginia.edu/spatial-technologies/

Facilities/Spaces:

1. Scholars Lab - Spatial Tech
   https://scholarslab.lib.virginia.edu/spatial-technologies/

Staff:

GIS SPECIALIST (2 positions)
3D VISUALIZATION SPECIALIST
3D DATA AND CONTENT SPECIALIST
GIS STUDENT COLLABORATOR

Consultation:

1. The GIS group welcomes consultation with UVa students, faculty and staff as well as community members. Our work includes long-term grand funded research to answering how-to questions from people using our lab computers. If you have research questions, need expert partners, or just simply which button to push, contact us for help.

Training:

1. We provide training, consultations, and collaboration on the latest software, equipment, and methods, including GIS, 3D modeling, laser scanning, aerial drones, photogrammetry.
2. Every Fall and Spring Semester, the UVa Library has a GIS workshop series. All workshops are one hour long and assume no previous GIS experience. Generally, each session is hands-on and teaches on GIS skill or technique. You can read more about our Spring 2019 workshops here. Web Mapping Workshop: (https://scholarslab.lib.virginia.edu/blog/gis-workshops-spring-2019/) & https://scholarslab.lib.virginia.edu/spatial-technologies/ includes web mapping

Data:

1. We maintain large amounts of spatial data and make it available through different mechanisms to help users consume the data.
2. We work to create aids to help people find, use and obtain data from our collections. The include our collection of Charlottesville Sanborn Maps and Albemarle historical aerials.
3. We also help people find data or proxy data. If you can't find something, let us know!

4. The UVa Library maintains a large amount of GIS data from ESRI, various regional localities, UVa and the state on a shared drive to enable easy access and use. Follow the steps below to map a network drive to our shared drive.

GIS Users groups:
The regional GIS users group, Charlottesville Area GIS Users Group (CAGISUG), is a loose organization of many local GIS professionals and other interested people. We meet sporadically but have an email list where most of the messages are about local GIS jobs. UVa has a separate email group for distributing GIS software, licensing, events, etc. news. UVa affiliates can join.

Penn State University
Location: State College PA
Enrollment (Total) - 23,406
Affiliations: Land-Grant/IPEDS
Structure: Library/Center
Website: https://libraries.psu.edu/maps
Facilities:
Donald W. Hamer Center for Maps and Geospatial Information

Staff:
Geospatial Services Librarian
GIS Specialist
Map Specialist
Information Resources and Services Supervisor-Manager
Graduate Assistant

Consultations & Training
Geospatial Mapping & Analysis
We have three main areas of activity: 1) education, outreach, and partnerships; 2) collecting, preserving, and providing access to maps and geospatial information resources; and 3) creating new public domain geospatial datasets of broad interest and/or high research value.
3. Maps & Geospatial: Web-Mapping Tools (https://guides.libraries.psu.edu/mapping)

We maintain a public service desk staffed with personnel that can immediately answer basic questions during open business hours and you can make an appointment for a more in-depth research consultation

Data:
1. PASDA - Pennsylvania's official public access open geospatial data portal
   http://www.pasda.psu.edu/

2. The Donald W. Hamer Center for Maps and Geospatial Information digital map drawer contains the subset of our physical map collection that has been digitized and is not protected by licensing or copyright.
3. Data Archiving and Preservation
Our team will work with you to choose file formats for your data preservation, determine the retention period for your data, and help you determine where you can archive and deposit your data to ensure preservation and discoverability. Submit a consultation request to our team at L-DATA-MGMT@lists.psu.edu.

Penn State users group:
Here at Penn State, we have an campus wide GIS users group. This is a volunteer run group that is made up of GIS professionals from across the University Park Campus. We meet every 6 weeks (or so) to discuss geospatial issues and to keep each other informed about our efforts and practices. Anyone who has an interest in applying geospatial technologies or sciences to their work should feel free to join us. Please feel free to peruse our meeting minutes in the upper right of this page. More info can be found by emailing Dan Meehan.

North Carolina State University
Location: Raleigh, North Carolina
Enrollment (Total) -34,015
Affiliations: Land Grant/IPEDS
Structure: Library and part of Data Services
Website: https://www.lib.ncsu.edu/gis/gisncsu
https://www.lib.ncsu.edu/gis/services

Facilities/Spaces:
1. D. H. Hill Jr. Library
2. James B. Hunt Jr. Library

Learning Commons

Staff:
Data & Visualization Librarian (2) positions
NCSU Libraries Fellow (2) positions

Workshops:

Consultations:
1. On-site, individualized assistance is offered by appointment. Assistance via phone, chat, or email form is also provided.
2. Data Point location: We offer consultations and training on tools for data cleaning and modeling, visualization design, statistical analysis, geospatial data, visualization for the web, and more. Please check the schedule to see when a consultant is available for the tool or method you are interested in. If you have questions, please get in touch with us!

Training:
Library Workshops - Librarians regularly offer GIS-related workshops. Go here and search within the various workshop categories for what may interest you:
Center for Geospatial Analytics (seperate from the library)
Center for Geospatial Analytics - https://cnr.ncsu.edu/geospatial/about/
Unmanned Aerial Systems
Web mapping: https://cnr.ncsu.edu/geospatial/news/tag/web-mapping/

GIS Data:
We provide access to data resources and assist researchers with identifying and using geospatial and tabular data with mapping software. Browse Themes & Sources. Browse by Keywords

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University of Illinois at Urbana-Champaign
Location: Champaign County, Illinois
Enrollment (Total) - 44,087
Affiliations: Land Grant/IPEDS
Structure: Library and part of Data Services
Website: https://www.library.illinois.edu/sc/gis/

Facilities/Spaces:
1. Scholarly Commons

Staff:
Numeric and Spatial Data Librarian

Consultations:
1. Web Map Design and Production
2. GIS Consultation Topics: Data Management, cartography & visualization, Spatial Analysis and Geoprocessing (https://www.library.illinois.edu/sc/gis/consult/)

Training:
1. GIS Workshops (https://www.library.illinois.edu/sc/gis/workshops/)

GIS Community:
1. The University of Illinois has a vibrant GIS community of researchers and professionals.
2. GIS Email Lists