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# External Evaluation: Key Studies

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# XSEDE

Extreme Science and Engineering  
Discovery Environment



Supported by OAC 15-48562.

# Overview

- Highlights from Key Studies
  - Annual XSEDE User Survey
  - Annual XSEDE Staff Climate Study

# XSEDE Annual User Survey

Designed as a basic report card for leadership and project managers - a tool to gauge overall awareness of and satisfaction with a wide range of services among a broad range of users; other assessments and feedback mechanisms are deployed throughout the Project to augment these results.

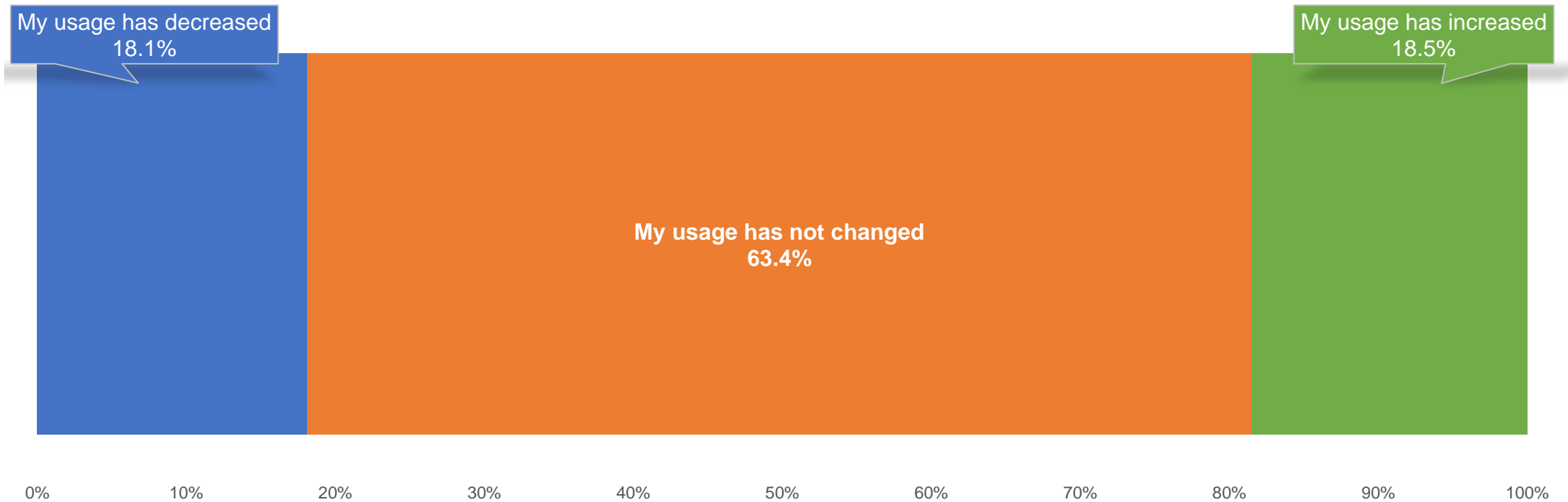
- **Method:** Online survey to a random, stratified sample of 5,000 XSEDE users, plus a full census of Service Providers (67).
  - **Response Rate:** 19%
  - **Survey assesses:** General awareness and satisfaction of the broader population, as well as satisfaction with specialized services targeted to smaller, specific sub-populations.
- **Disaggregation** by user type (i.e., faculty, graduate students, post-docs, etc.), institution type (i.e., MSIs, EPSCoR state institutions, Associate's-degree-granting colleges, doctoral-granting institutions, etc.).
- **Broad dissemination** to all all areas of the project, as well as users, Campus Champions, etc; results inform several project-level KPIs.

# Population Overview

- Respondent profile is comparable to previous years
  - 33% faculty, 30% graduate students, 15% post-docs, and 6% university research staff
- Of respondents indicating they had used XSEDE resources, 31% had been using XSEDE resources for *less than one year*, 26% for *one to two years*, and 43% for *three or more years*
  - Distribution shows more new users (< two years experience) in 2021 than 2020: 49% -> 57% (+8%)
  - The percentage of experienced users (> three years) in 2021 is slightly lower than 2020: 46% -> 43% (-3%)
- 88% of respondents consider themselves to be at least *somewhat experienced* XSEDE users, ranking themselves at 3 or higher on a 5-point scale (where 1 is “not at all experienced” and 5 is “extremely experienced”)
  - Slightly higher than 85% in 2020
- The most typical XSEDE user is likely to be a white/non-Hispanic, male, working at a research-focused/doctoral-granting institution in the physics, biology, chemistry, engineering or computer science field

# COVID-19: XSEDE Users

To date, how has the pandemic affected your use of resources and services allocated by, provided by, or accessed via the XSEDE cyberinfrastructure?  
(N=847)



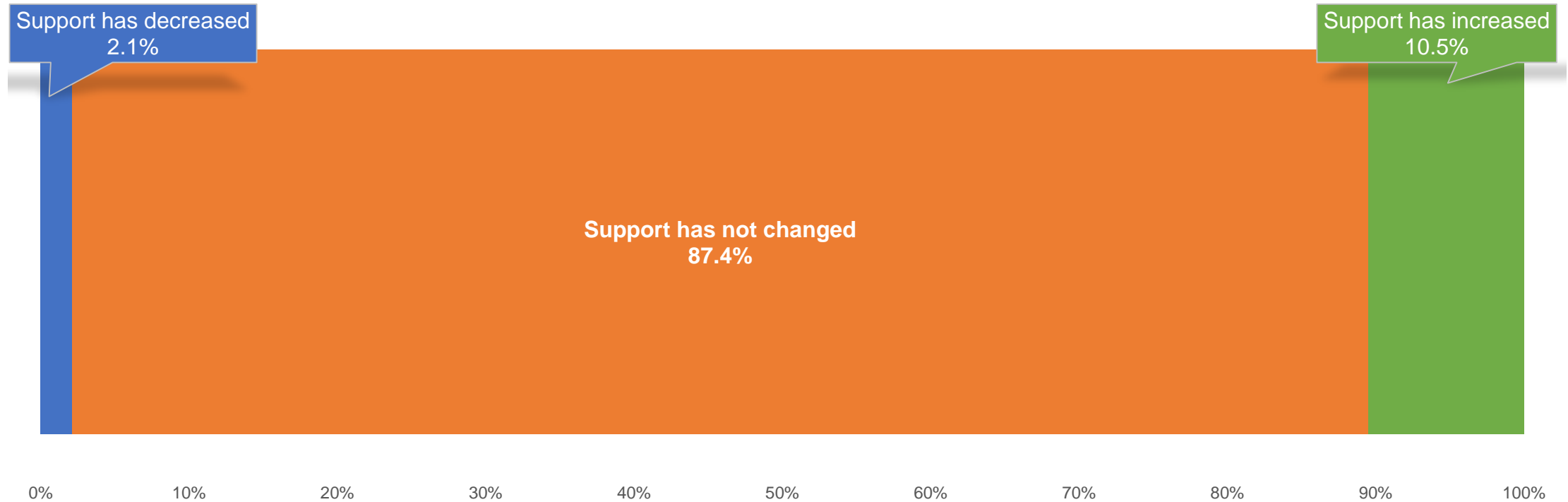
# COVID-19: XSEDE Users

To what extent have your XSEDE allocations been affected?  
(N=786)



# COVID-19: XSEDE Users

During the pandemic, have you perceived a change in the level of support that XSEDE has provided to you?  
(N=764)



# Key Findings

- **Aggregate awareness** is **3.64/5.00**, down from 3.81 in 2020.
  - Awareness always lags satisfaction, in part due to the large percentage of new users each year.
- **Overall satisfaction** with XSEDE services remains high: **4.36/5.00**, down slightly from the 2020 project high of 4.38.
- While satisfaction generally trended downward, decreases were generally modest, indicating the project is mature, stable, and consistently delivering a broad range of services at a high level.
- **Importance** of XSEDE remains high at **4.24/5.00** (Importance in 2020 was 4.21).
- Eighty-three (83) percent of respondents report the use of resources and services allocated by, provided by, or accessed via the XSEDE cyberinfrastructure environment are *important* or *essential* in conducting their research program.



# 2021 Annual User Survey Highlights - Awareness

- **Overall awareness** was down from 2020 in all but one area previously evaluated
- A slight increase in awareness was reported in:
  - Research software portal (2.67 -> 2.73, +2.5%)
- Greatest decreases in awareness were reported in:
  - Extended Collaborative Support Services (ECSS) (2.97 -> 2.64, -11.1%)
  - Campus Champion Program (3.10 -> 2.79, -10%)
  - XSEDE student programs and opportunities (3.06 -> 2.79, -8.7%)
  - Community engagement & enrichment opportunities (3.16 -> 2.89, -8.5%)
  - Cloud resources (2.97 -> 2.73, -8.1%)

# 2021 Annual User Survey Highlights – Satisfaction

- **Overall satisfaction** with XSEDE services remains high: 4.36 (down from 4.38 in 2020)
- As has been the case since the beginning of XSEDE, all areas evaluated were again *significantly* above 3.0 (on a 5.0 scale)
- While satisfaction generally trended downward, decreases were quite modest, indicating the project is very mature, stable, and consistently delivering a broad range of services at a high level
- Highest levels of satisfaction:
  - Help Desk services (help@xsede.org): 4.42
  - Support/consulting services response time: 4.35; effectiveness: 4.32; and availability: 4.32
  - XSEDE User Portal: 4.26

# 2021 Annual User Survey Highlights – Importance

- **Importance** of XSEDE remains high, but dipped from its historical high of 4.43 to **4.24**
  - Project KPI: Sustain the Ecosystem/Operate an effective and productive virtual organization: 4.4
  - 46% of respondents report that the use of XSEDE-associated or -operated resources are **essential** in conducting their research program - down from 48% in 2020
  - Not surprising given where we are in the life of the project – *as the project gets close to its scheduled end date, users begin to factor in other resources, look for alternatives with a longer life, etc.*

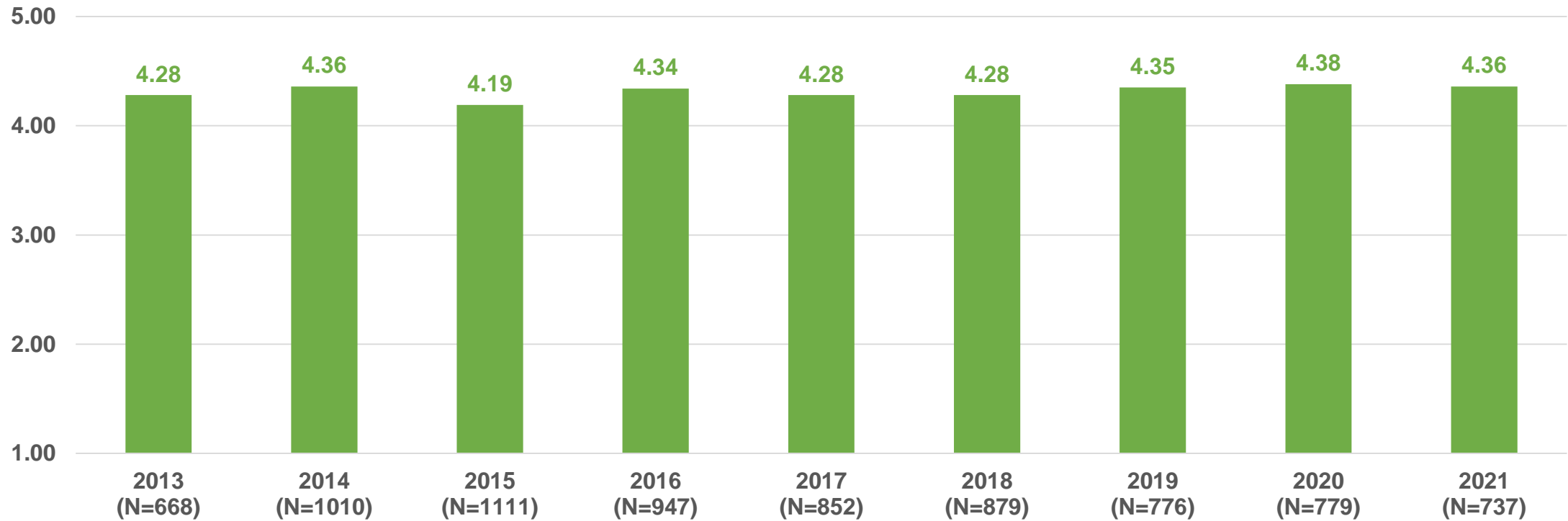
Importance of resources and services allocated by, provided by, or accessed via the XSEDE cyberinfrastructure environment in conducting your work. (1=Not important at all, 5=Extremely Important)									
Year	1	2	3	4	5	N	Mean	% of N = 4 or 5	% of N = 5
2012	2	9	59	129	174	373	4.24	81%	47%
2013	10	17	124	276	352	779	4.21	81%	45%
2014	5	15	111	383	539	1053	4.36	88%	51%
2015	12	17	119	418	552	1118	4.32	87%	49%
2016	4	12	84	338	513	951	4.41	89%	54%
2017	7	30	89	235	576	937	4.43	87%	61%
2018	8	33	84	273	599	997	4.43	87%	60%
2019	7	43	122	264	412	848	4.22	80%	49%
2020	4	46	99	257	369	775	4.21	81%	48%
2021	3	32	96	277	353	761	4.24	83%	46%

# 2021 Aggregate Awareness

- 2021 Aggregate Awareness: 3.64 (down from 3.81 in 2020)
- Project KPI: Deepen and extend use/Raise awareness of the value of advanced digital services; Target: 3.7
  - Items included in aggregate awareness calculation include **only items consistently evaluated each year**, including: Mission, Computational resources, Data storage services, Science Gateways, XUP, Data transfer services, Website, Training opportunities, Online technical documentation; Community Engagement and Enrichment opportunities (f.k.a., Education and Outreach opportunities); Help Desk services, and ECSS
  - New and retiring items are excluded for an apples-to apples comparison

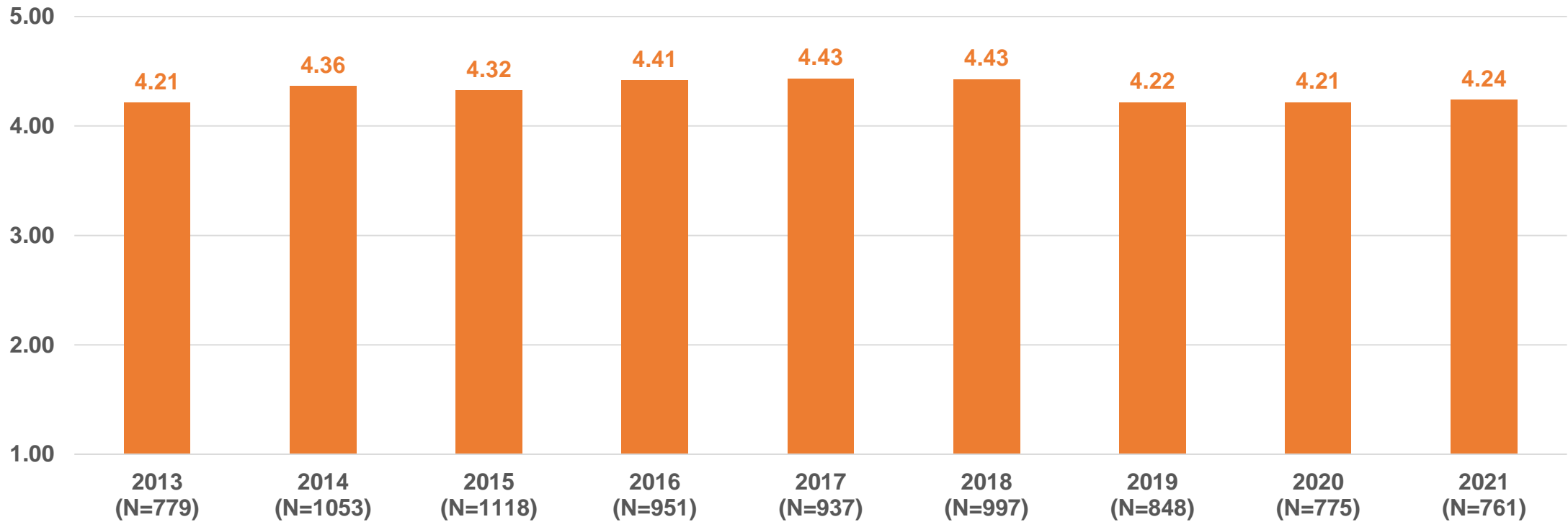
# Satisfaction

Satisfaction with resources and services allocated by, provided by, or accessed via the XSEDE cyberinfrastructure environment in conducting your work.  
(1=Not satisfied at all, 5=Extremely satisfied)

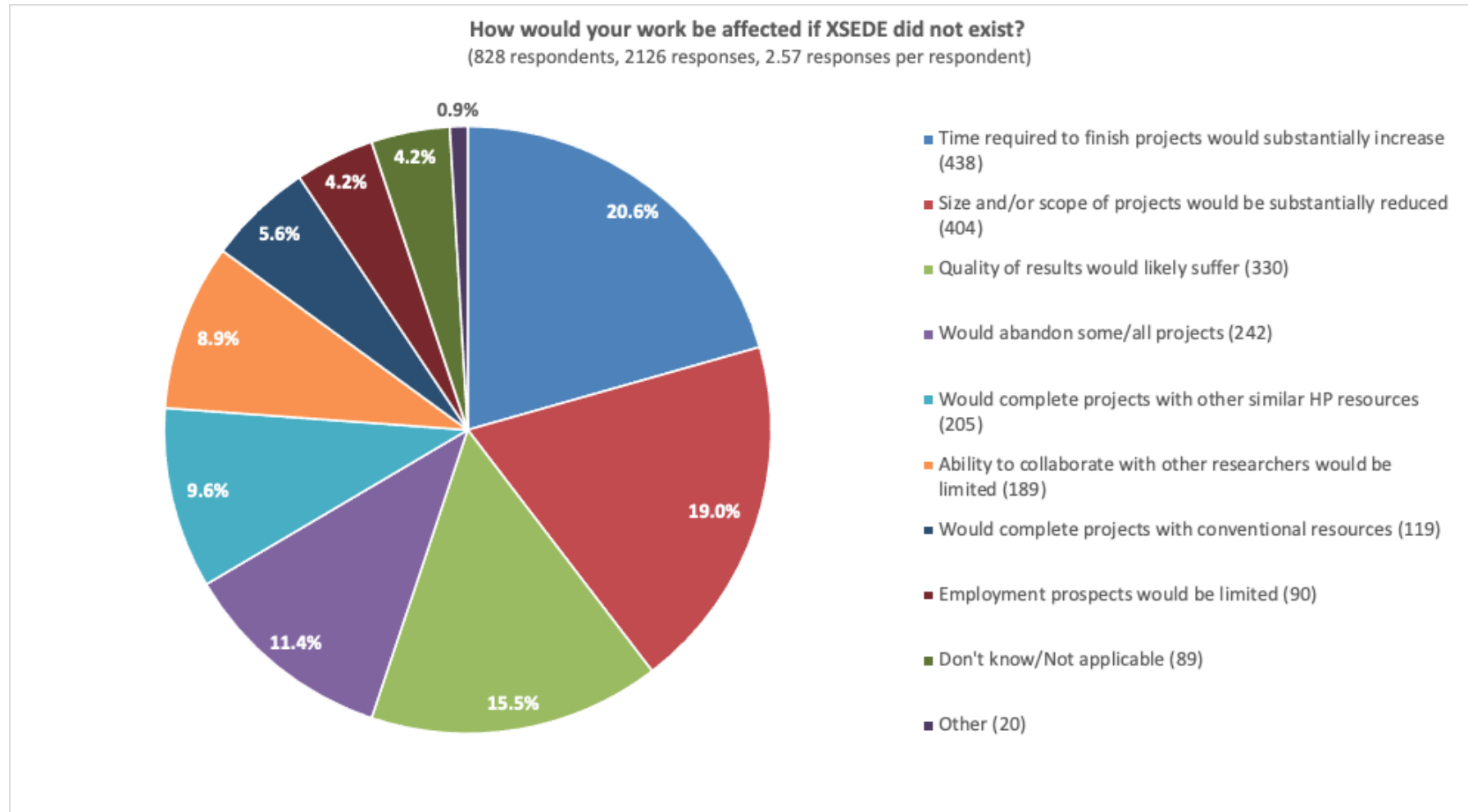


# Importance

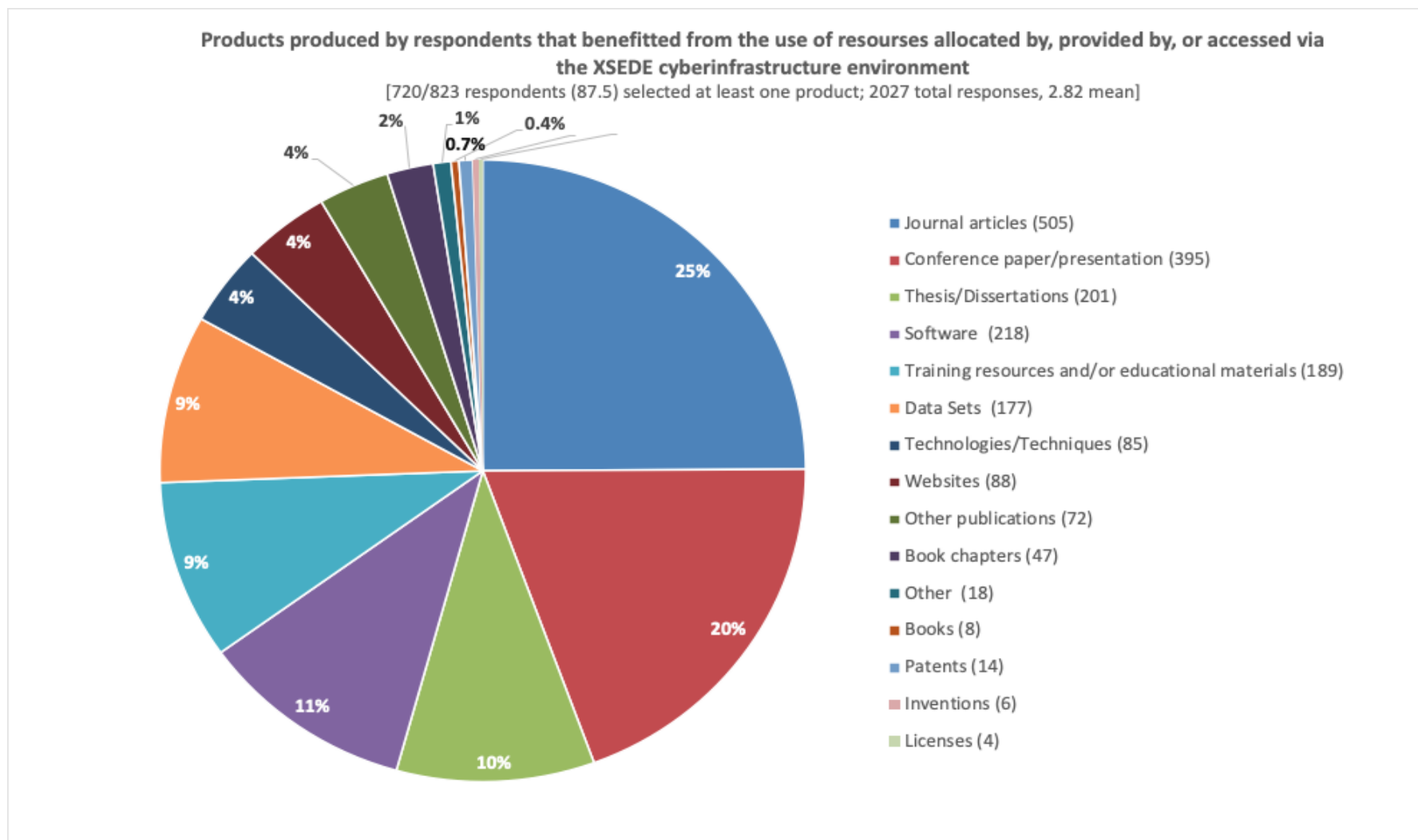
Importance of resources and services allocated by, provided by, or accessed via the XSEDE cyberinfrastructure environment in conducting your work.  
(1=Not important at all, 5=Extremely Important)



# How Would Your Work be Affected if XSEDE Did Not Exist?



# Products Produced





# Mean Training Preference Trends, 2013–2021

- Training preferences have remained remarkably constant over the 2013–2021 period.
- As is the case in 2020, data consistently show preference for self-serve and “just-in-time” training options, i.e., web documentation and online, self-paced tutorials.

Mean Training Preference - Year-to-Year Trend (2013-2021)										
	2013	2014	2015	2016	2017	2018	2019	2020	2021	Annual Trend (range: 3.39-4.41)
XSEDE Web Documentation	4.34	4.38	4.38	4.41	4.32	4.34	4.39	4.32	4.32	
Live, In-Person Tutorials/Workshops	3.41	3.43	3.39	3.43	3.54	3.48	3.49	3.52	3.36	
Live online webinars (formerly Live online tutorials/workshops)	3.70	3.74	3.77	3.85	3.86	3.81	3.85	3.87	3.94	
Self-Paced Online Tutorials	4.16	4.20	4.24	4.25	4.14	4.19	4.20	4.18	4.16	
Recordings of live webinars (with minimal editing)	–	–	–	–	3.88	3.93	3.95	4.03	3.99	
Monthly multi-cast workshops/tutorials (with local moderator)	–	–	–	–	–	3.59	3.55	3.73	3.66	
Monthly multi-cast workshops/tutorials (on youtube.com/xsedetraining)	–	–	–	–	–	–	–	3.88	3.88	

# Satisfaction with XSEDE Software and Service Components

- Items evaluated in this section are much more granular and specific, and, in most cases, have many fewer respondents
  - Two screener questions are used so that only users who have engaged in qualifying activities (e.g., ran batch jobs, used cloud resources, accessed resources via campus federated credentials, etc.) are presented with associated items for evaluation. Users and Service Providers see different activities.
- KPIs
  - Aggregate mean rating of USER satisfaction with XCI software and technical services, capabilities and resources: **4.07** (Target: 4.0/5.0)
  - Aggregate mean rating of SP satisfaction with XCI software and technical services, capabilities and resources: **4.43** (Target: 4.0/5.0)

# What Users Think XSEDE is Doing Right

- *The value of XSEDE has a large multiplier effect that is not measured through traditional metrics. Increasing the access to computational resources drives economic development and increasing that reach through access can have a huge impact. The NFS should recognize that XSEDE is extremely valuable and an investment in the nation's scientific future.*
- *You are providing an outstanding, one-of-a-kind service to the scientific community. It is difficult to overstate the impact that XSEDE has in my own work, and in the fields I work in as a whole. XSEDE is uniquely different from DOE and NASA's computing resources in very important and helpful ways. It's truly exceptional.*
- *XSEDE is broad enough that it offers services to experts but also makes a great effort to attract students and faculty whose main area is not computation.*
- *The use of webinars and remote login access make this an extremely valuable resource for participants who can be located in any part of the country.*
- *The computational resources allocated from XSEDE allow the completion of high-quality research by smaller groups based at smaller universities. These groups usually would not have access to large-scale computing clusters; therefore democratization of the resources through XSEDE allows them to request small allocations that are otherwise "life-changing" for these groups.*
- *XSEDE makes it possible for me to do computational research projects with undergraduates. I am very grateful for this service.*

# What Users Think XSEDE Could Do Better

- *Proposals for compute time take too long to review in a pandemic - or rather, there's not enough time between getting the feedback and the next submission time to actually implement anything. People whose circumstances have become quite challenging (including a higher fraction of women, BIPOC, and disabled people) have trouble allocating their own time to write proposals and run scaling tests. Please consider a more equitable submission system with more reasonable timelines.*
- *The ECSS support should be more formal, including a telecon discussing the problem and clarification of what type of help ECSS can provide.*
- *The portal is slow and cumbersome, with more distracting information than necessary.*
- *I do believe that allocation should be awarded for at least two years. Every year is a lot of work and seems unreasonable to me. In addition it would actually be easier to assess the number of CPUs needed during a longer period of time.*
- *Too small amount of allocation. It is far from sufficient to complete our project.*
- *...Ideally, I'd like XSEDE HPC to be setup in a simpler way, such that I can login directly to my storage directory and just run command line programs without 1) requesting specific nodes, CPUs per node, memory per node, 2) managing batch job loading and queuing, or 3) worrying about data being copied over to specific paths when I'm done, etc. I'd like those things to be all automated behind the scenes. I'd like it to be as simple as using my laptop's terminal command or using our lab's dedicated server.*

# Suggested Improvements/Enhancements

- *For educational use, a library of basic training on topics such as a job scheduler, Linux command line, and moving files to/from the HPC environment would be very helpful. Not all students are proficient in Linux.*
- *Provide complete examples of programming the different paradigms and platforms.*
- *Please increase the default running time limit from 3 days to 1 week.*
- *It seems that the process and information to apply for time is a little fragmented on the site. The specifics of how much time you can apply for is not obvious, and the one example given requested far more time than is normally granted. It would be nice if that was tidied up a little. That being said - it was very easy to apply, and the reviewers were very gracious with my mistakes. Perhaps a pre-review process to make sure you included everything you asked for properly would be helpful. Thank you for this great service!*
- *Outreach to working computational biologists and physician scientists, to help them understand how to build teams using this infrastructure, to distribute tasks, could have major impact in medical research. Too much siloing in standard practice. If you have the capacity you could really change how scientific computing is done. Team formation and organization of collaborative environments should be a high priority.*
- *Move the web documentation over to mkdocs or Antora and host on github so that everyone can contribute. I'd love to have my students improve XSEDE documentation as their first lab project!*
- *The options are overwhelming. In the question on training, I described providing a general, high-level overview to help identify the best resource for their research problem.*

# XSEDE Staff Climate Study

Designed to support XSEDE's organizational health by providing data over time to:

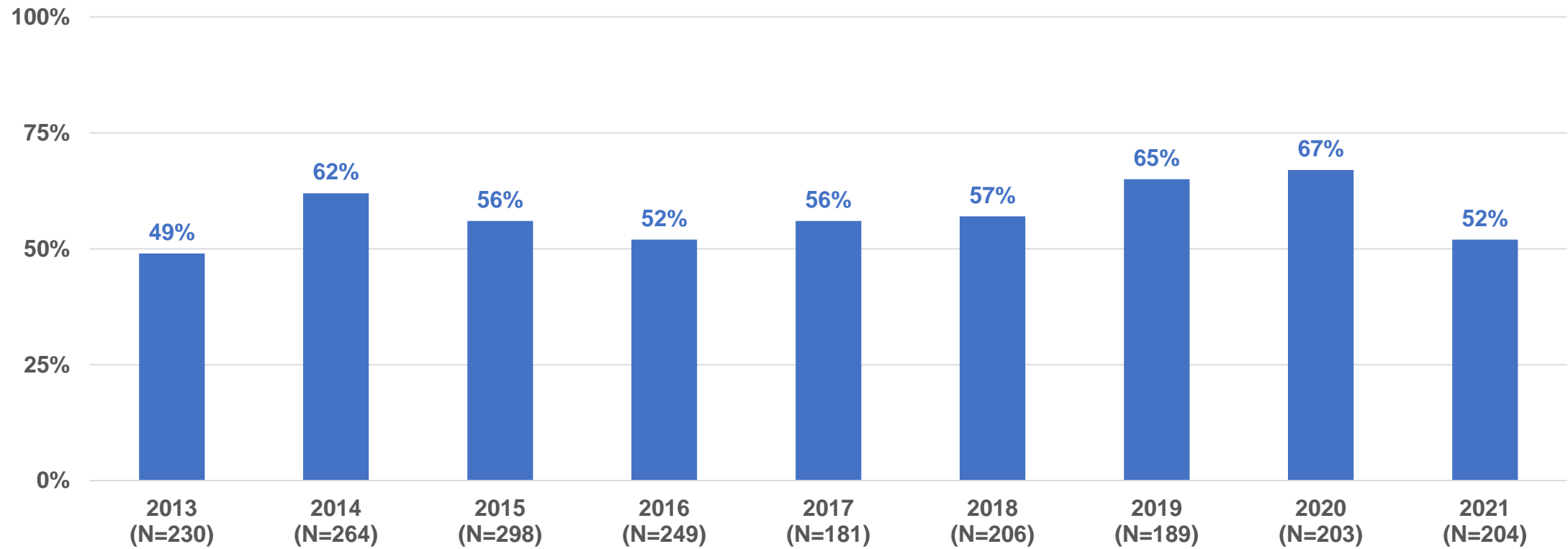
- Better understand current working conditions
- Recognize successes and areas of concern
- Develop responses to improve working conditions
- Improve workplace efficiency and satisfaction

# Method

- Annual online survey to all XSEDE staff and leadership
  - Core items
  - XSEDE specific items
  - May – July administration (extended due to ACCESS proposals)
- Disaggregation by Level 2, 3, site, FTE, length of employment, gender, and race/ethnicity
  - Special requests by L2 and L3 managers
- EXTENSIVE dissemination and interaction around results
- Documentation of XSEDE response to results
  - Quarterly meetings



# 2021 Study Response Rates



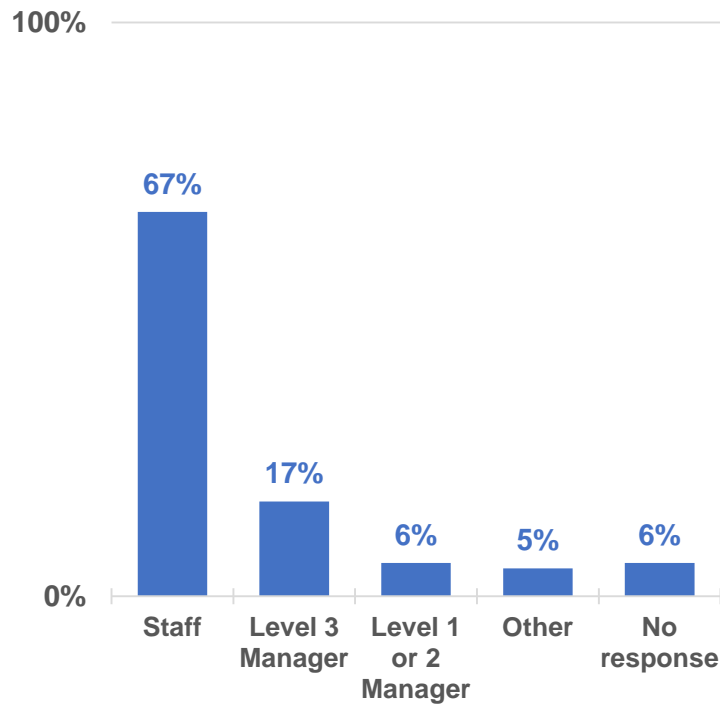


# 2021 Study Response Rate Explained

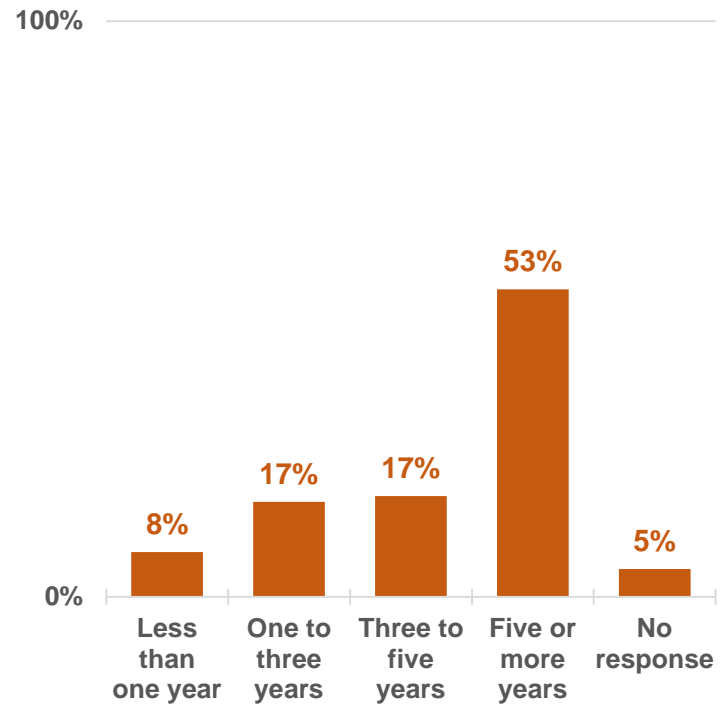
- Total response to 2021 survey was 107/204 (52%)
- In 2021, staff totals were generated by the XSEDE budget office based on most recent billing history.
  - 207 emails were provided
    - 2 opted out
    - 2 email addresses undeliverable
    - 96 no response
  - 107 responses
    - 4 insufficient responses
  - 103 staff responses analyzed

# Respondent Demographics, N=103

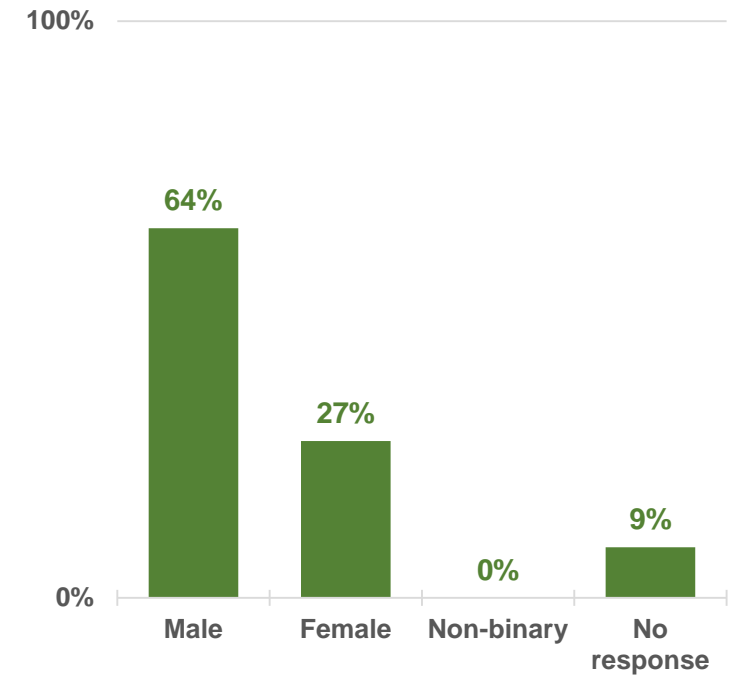
**Staff Level**  
(Self Report)



**Length of Employment**  
(Self Report)



**Gender**  
(Self Report)



# 2021 General Findings

- Both staff and leadership report:
  - Interactions with other XSEDE staff members are positive.
  - Feeling valued and satisfied with their experience as an XSEDE staff member.
    - Feelings of value and satisfaction peak at between three to five years on the project.
    - Those on the project between three to five years feel the least overcommitted.
- There is a steep “onboarding” and acclimation curve reported by individuals on the project less than three years.
- Both staff and leadership report high levels of agreement with their ability to communicate, interact, and get feedback from their program area leadership.

# 2021 General Findings *(continued)*

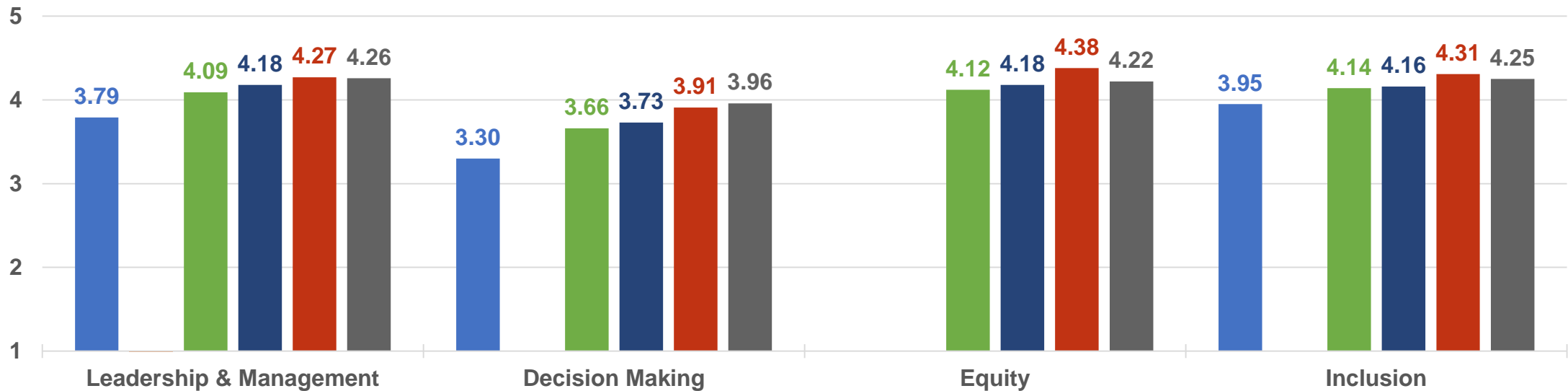
- Agreement with aspects of decision making rose in 2021 for both staff and leadership.
  - Women report having somewhat less input than their male counterparts on decisions affecting their work.
  - Both staff and project leaders remain unclear about how they are evaluated, especially newer staff.
- Women report being less supported by staff and leadership in pursuing their professional goals.
- Positive feelings about equity and inclusion peak between three to five years on the project.
  - Women and BIPOC staff uniformly report lower levels of agreement with *equity* measures.
  - BIPOC staff generally report levels of inclusion on par with their non-BIPOC counterparts, but report experiencing discrimination more often.

BIPOC stands for respondents self identifying as Black, Indigenous, or People of Color

# Index Scores

**Index Scores  
Response Over Time**  
Scale: 1 (Strongly Disagree) – 5 (Strongly Agree)

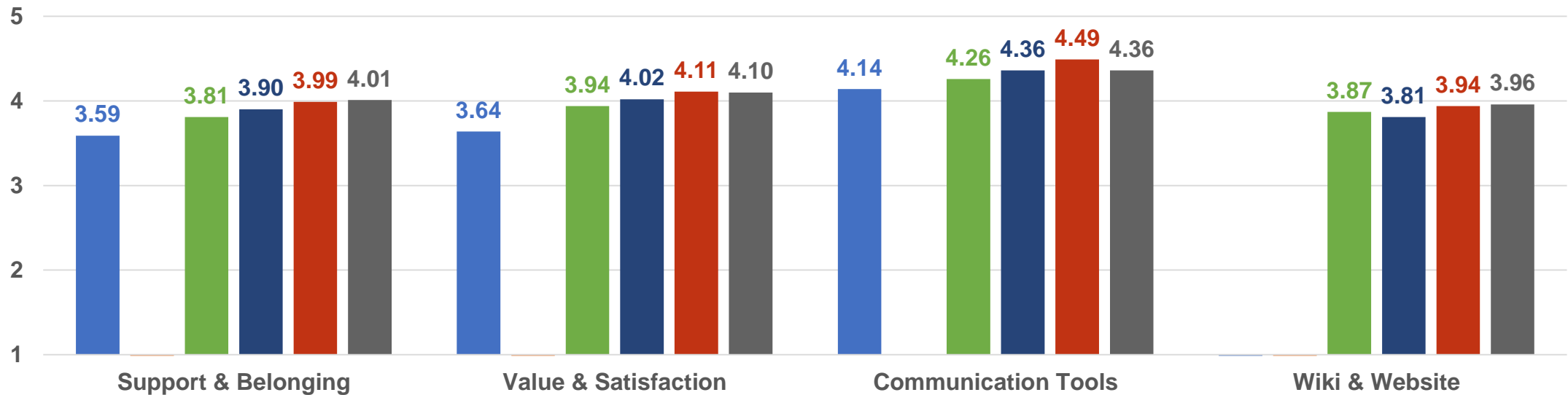
■ 2013 (N=124)   ■ 2018 (N=117)   ■ 2019 (N=115)   ■ 2020 (N=129)   ■ 2021 (N=103)



# Index Scores *(continued)*

**Index Scores  
Response Over Time**  
Scale: 1 (Strongly Disagree) – 5 (Strongly Agree)

■ 2013 (N=124)   ■ 2018 (N=117)   ■ 2019 (N=115)   ■ 2020 (N=129)   ■ 2021 (N=103)



# Leadership & Management: Comments

- *I just haven't been informed on how I am evaluated on XSEDE work; perhaps that will come later as I'm fairly new.*
- *It has not been adequately explained by XSEDE management why I am investing professional hours and energy developing new capabilities for a project that is ending within the year.*
- *I am able to resolve all my issues by talking with other staff, my local supervisor, or my L3. I rarely need to contact my L2 and very rarely need to contact anyone outside my program area.*
- *I have not used any XSEDE training for my area and am unaware of any related training available for my area.*

# Inclusion: Comments

- *I don't feel discriminated against at all, but i don't think that anyone really cares much about my professional academic career goals. i don't really mind though as I'm older and it's sorta like the saying goes....that ship already sailed. :)*
- *You are asking a white male regarding discrimination. I hope you take the answers with this in mind. As a white male I do not witness racial/gender discrimination, but that does not mean that I do not know that these are common.*



# Additional Comments: Suggestions for Improvement

- *Overall, XSEDE is great. The "how I am evaluated as a staff member" has been a "\\_(ツ)\_/" for many years, since XSEDE doesn't do formal evaluations.*
- *I hate to suggest additional meetings, but quarterly All-Staff get-togethers of some (accessible, virtual) form would probably have been / be nice for fostering a stronger sense of community...*
- *Leadership training for managers at all levels*
- *It's out of your control, but having a "what next" plan would have been nice*
- *Let's continue to support each other through the end of the grant and beyond. Let's keep in mind what's most important in the midst of the stress of the transition to ACCESS.*