CHAIN BRIDGE GROUP

CAA/SAH Survey Report | May 5, 2015, Revised July 7, 2015

Introduction

During the spring of 2015, the CAA-SAH Task Force to Develop Guidelines for Promotion and Tenure in Digital Art and Architectural History (the Task Force), conducted a survey to gather CAA and SAH member perspectives on current practices and procedures for evaluating digital art and architectural history for promotion and tenure.

Methodology

Survey Instrument

The survey comprised 12 closed-ended questions, including dichotomous, multiple choice, (five-point) scale, and matrix questions. Several of the questions had contingent sub-questions, for a total of 18 possible closed-ended questions. The survey also included one open-ended question, intended to capture any general feedback from respondents.

The questions were selected and designed by the Task Force, with support by independent consultant Alice Lynn McMichael and by Raym Crow of Chain Bridge Group. Project resources precluded pre-testing of the survey.

Populations & Samples

Given the size of the samples and the resources available to the project, an online survey method was used. The survey was administered via a web-based survey tool (SurveyMonkey) to three groups in March and April 2015:

- 2,884 CAA members known to be academic professionals, based on the CAA membership data (administered between March 13 and April 3, 2015);

- 780 CAA members known to be students, based on the CAA membership data (administered between March 13 and April 3, 2015);

- 223 CAA members known to be department heads, based on the CAA membership data (administered between March 13 and April 3, 2015); and

- 2,580 SAH members (administered between April 20 and May 22, 2015).

Margins of Error

The lists of CAA and SAH academic members are considered to represent the complete population for each group. The respondents to the survey represent the samples for each population (*viz.*, CAA regular academic members, CAA student members, and SAH academic members).

Exhibit 1 shows the margin of error, at a confidence level of 95%, for the results for each population. This margin-of-error calculation assumes a degree of variance in answers of 50%. (For questions where respondents' responses are tightly clustered, the confidence level will be higher than 95%. However, given the limitations to the sampling technique, we have not calculated confidence levels for individual questions.)

Exhibit 1: Margins of Error for Population Samples

Population	Population Size	Sample Size	Response Rate	Margin of Error*
CAA academic member, faculty	2884	217	7.5%	6.4%
CAA academic member, students	780	60	7.7%	6.4%
CAA academic member, department heads	223	18	8.1%	22.2%
SAH members	2580	142	5.5%	8.0%

Survey Analysis } MoE   *At 95% confidence level.

The margin-of-error calculations assume a truly random sample of each population.[1] However, as the respondents to this survey were self-selected, and as no systematic analysis of non-respondents has been attempted,[2] the sample is, in reality, a convenience sample.[3] As the sample is not random (i.e., it does not represent a cross section of the target population), the margins of error indicated in the exhibit understates the uncertainty in the results and the difference between the survey results and the target population as a whole. As a result, the margins of error shown in the exhibit imply a precision for the survey results that is, in fact, lacking.

Although the margins of error for the CAA and SAH surveys appear roughly similar, the CAA respondents were concentrated in the principal academic ranks and graduate students, while a relatively large percentage (27%) of the SAH respondents did not indicate an academic rank, further shrinking the comparable sample size. The margin of error for individual questions is higher than for the sample overall (due to nonresponses and the distribution of responses[4]), lowering our confidence in the analysis by academic rank for the CAA respondents and rendering analysis of the SAH responses based on academic rank virtually meaningless. Despite this lack of statistical confidence, the similarity between the CAA and SAH responses increases our intuitive confidence in the results.

In an attempt to assess the responses of department heads as a subgroup, the project solicited responses from a CAA list of department heads (de-duplicated against the full list of members). Although the response rate for this group was higher than for the other populations, the small size of the population resulted in a margin of error above +/-20%. As a result, the data from that population was not included in the analysis.

Survey Limitations

As already noted, time and resource constraints dictated the use of a convenience sample. Within the limits described above for the confidence intervals and margins of error, the survey responses represent the entire academic memberships of CAA and SAH. However, the responses cannot be used to infer the results of the larger population of art and architectural historians outside the CAA and SAH memberships.

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[1] In a probability sample, each possible respondent from the target population has a known probability of being included in the sample.

[2] To the extent one accepts the explanation for the non-response of non-tenure faculty discussed below, that explanation should increase confidence in the calculated margin of error.

[3] A convenience sample selects subjects because they are readily accessible, rather than using random sampling and other probability sampling techniques.

[4] Confidence in the accuracy of the responses depends, in part, on the percentage of the sample that gives a particular answer. If, for example, 99% of the sample gives the same response, the chances of error are lower, irrespective of sample size. However, if the responses are evenly distributed over multiple answers, the chances of error are much greater.

The sample sizes are insufficient to allow cross-tabulation of responses beyond professional rank for CAA respondents (for example, by institution type). As already noted, the small sample size and margin of error for SAH members does not allow us to draw meaningful conclusions by academic rank. However, the responses for the SAH survey as a whole tend to be proportionately and directionally congruent with those of the respondents to the CAA survey. We have indicated below where responses to the SAH survey differ significantly from those to the CAA survey.

Results

Demographics

The distribution of the CAA survey respondents by professional rank reflects that of the CAA membership overall, with one significant exception. While tenured and tenure-track faculty and graduate students are represented proportional to the membership overall, non-tenure track faculty (including adjunct faculty and lecturers) are seriously underrepresented in the survey responses. Such non-tenure faculty represent over a quarter of the CAA membership, but account for less than 4% of the survey responses.

It is tempting to attribute the lack of response to the survey by non-tenured faculty to indifference to tenure and promotion criteria in which they may perceive little direct investment or benefit. However, without systematically interviewing non-respondents, it is impossible to determine the cause of the non-response with any confidence.

The missing non-tenure demographic notwithstanding, when the CAA membership distribution by professional rank is adjusted to exclude the adjunct/non-tenure faculty, the distribution of the survey responses reflects the distribution of the membership overall (see Exhibit 2).

Exhibit 2: CAA Member Distribution by Professional Rank

Professional Rank	All Members	Members Except Adjuncts	Survey Response
Full	19%	26%	26%
Associate	18%	24%	27%
Assistant	14%	19%	18%
Adjunct/assistant (non-tenure)	26%	--	4%
Graduate student	22%	30%	22%
Other	1%	2%	3%

CAA Art History Mbrs-Rank

For the reasons described above, the responses by academic rank described below are based on the CAA respondents. We have noted those instances where the SAH member responses differ markedly from those of the CAA respondents.

Respondent Experience with Digital Research Tools

As context for understanding respondent interest in, and understanding of, issues pertaining to digital research tools, the survey queried respondents' current and future use of such resources (Q4 and Q5).[5]

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[5] The question numbers used in this report refer to the numbering in the SurveyMonkey reports.

Most CAA respondents, across all professional ranks, have never used data gathering and imaging tools (83%), data analysis and visualization tools (80%), three-dimensional modeling (75%), digital storage and preservation tools (73%), and geospatial analysis tools (65%). The responses were similar across professional ranks, although assistant professors and graduate students were slightly more experienced with most of the tools than other ranks. See Appendix A, Exhibit A-1, for detail.

SAH respondents appear more likely overall to have used digital tools in the past and to plan to use them in the future, especially three-dimensional modeling and geospatial analysis tools.

Exhibit 3: Past & Future Use, All Ranks

Digital Tool	Have Used in Past	Will Use in Future
Data gathering & imaging	17%	90%
Data analysis & visualization	15%	88%
Geospatial analysis	35%	74%
Three-dimensional modeling	25%	72%
Storing & preserving	27%	94%
Organizing & annotating	54%	97%
Writing & disseminating	58%	98%
Other digital tools	73%	97%

Survey Analysis | Q5 Future use

Over half of respondents have used writing and dissemination tools (58%), organizing and annotating tools (53%), and other digital tools (73%). Again, the responses are similar across professional ranks, although use was slightly more prevalent amongst assistant professors and graduate students. See Appendix A, Exhibit A-1.

Although use of most types of digital tools is not yet widespread, use of all the tools is anticipated to increase in the future. See Exhibit 3 and Appendix A, Exhibit A-2, for detail.

Respondents Receiving Tenure Based on Digital Scholarship

As further context, respondents indicating that they received tenure or a promotion based on work that involves digital scholarship (Q8) includes 20% of full, 21% of associate, and 6% of assistant professors.

Exhibit 4 summarizes the types of digital scholarship on which tenure or promotion was based among those groups.

Exhibit 4: Type of Digital Scholarship Used for Tenure or Promotion

Type of Digital Scholarship for Tenure or Promotion	Full	Associate	Assistant
Data gathering & imaging	7%	0%	0%
Data analysis & visualization	7%	0%	0%
Geospatial analysis	14%	7%	0%
Three dimensional modeling	7%	7%	0%
Storing & preserving	14%	7%	0%
Organizing & annotating	21%	0%	30%
Writing & disseminating	71%	80%	100%
Other	21%	27%	0%

Survey Analysis | Q9 Tenure

Important Characteristics of Digital Research Tools

Two questions gathered perceptions of the relative importance of various characteristics of scholarly digital resources and satisfaction with those characteristics in current resources (Q6 and Q7).

Exhibit 5 shows the ranking of importance of major resource characteristics for all ranks combined for CAA and SAH, respectively. All the characteristics are considered important, with the weighted average responses for individual characteristics ranging from 3.7 to 4.5 on a five-point scale (with one being "not important" and five being "very important").

Exhibit 5: Importance of Digital Resource Characteristics, All Ranks

Importance of Characteristic or Function	CAA Respondents		SAH Respondents	
	Rank	Weighted Avg. Score	Rank	Weighted Avg. Score
Permanently archived	1	4.50	3	4.38
Documentation of the resource is available	2	4.47	2	4.42
Ease of use	3	4.46	1	4.47
Peer reviewed	4	4.38	5	4.15
Permanent citation	5	4.35	4	4.27
Pedagogical value	6	4.21	6	4.01
Financially sustainable	7	4.01	7	3.93
Underlying data available	8	3.73	8	3.86

Survey Analysis | Q6 Characteristics

Exhibit 6 shows how CAA respondents of each professional rank prioritized the importance of major resource characteristics.

Exhibit 6: Importance of Digital Resource Characteristics, by Professional Rank

Importance of Scholarly Digital Resources Characteristics & Functions	Full Professor	Associate Professor	Assistant Professor	Graduate Student
Peer reviewed	5	2	2	3
Documentation of the resource is available	3	3	4	1
Permanently archived	2	1	1	2
Financially sustainable	6	5	6	5
Underlying data available	7	7	7	6
Permanent citation	4	4	5	4
Ease of use	1	3	3	2
Pedagogical value	1	6	6	4

Survey Analysis | Q6 Characteristics

All ranks place relatively more importance on permanent archiving (weighted average score of 4.50), documentation of the resource (4.47), and ease of use (4.46), and relatively less importance on the availability of underlying data (3.73), financial sustainability (4.01), and permanent citation (4.35).

Peer review is considered important (being ranked in the top 3) by all ranks except full professors, for whom it ranked fifth. Full professors also rank pedagogical value as the most important characteristic (tied with ease of use), while it fell towards the bottom of the list for the other ranks.

Relative satisfaction with the characteristics of digital resources is similar across professional ranks, and clusters in the middle of a five-point scale (1 being "not satisfied and 5 being "very satisfied"). Exhibit 7 shows the ranking of satisfaction with major resource characteristics for all ranks combined for CAA and SAH, respectively.

Exhibit 7: Satisfaction with Digital Resource Characteristics, All Ranks

Satisfaction with Characteristic or Function	CAA Respondents		SAH Respondents	
	Rank	Weighted Avg Score	Rank	Weighted Avg Score
Pedagogical value	1	3.16	1	2.99
Documentation of the resource is available	2	3.02	4	2.81
Ease of use	2	3.02	2	2.92
Peer reviewed	3	2.97	3	2.85
Permanent citation	4	2.90	5	2.69
Permanently archived	5	2.86	6	2.63
Underlying data available	6	2.81	7	2.50
Financially sustainable	7	2.71	8	2.43

Survey Analysis | Q7 Satisfaction

Digital Activities for Tenure & Promotion Consideration

Respondents were asked whether six types of scholarly digital activities should be considered for tenure or promotion, using a five-point scale to indicate that an activity should never, seldom, sometimes, usually, or always be considered (Q10).

There is little variation in responses to the question by professional rank. Exhibit 8 presents a summary of the responses for all ranks for CAA and SAH. See Appendix A, Exhibit A-3, for detail.

Exhibit 8: Activities for Consideration for Tenure or Promotion, All Ranks

Scholarly Activity	Never		Seldom		Sometimes		Usually		Always	
	CAA	SAH	CAA	SAH	CAA	SAH	CAA	SAH	CAA	SAH
Applying data visualizations	3%	6%	12%	9%	44%	41%	21%	28%	20%	17%
Using three-dimensional models	6%	8%	14%	11%	43%	39%	20%	27%	17%	15%
Using geospatial models	5%	8%	11%	10%	44%	36%	21%	33%	19%	14%
Scholarly blogging	12%	19%	26%	21%	39%	44%	11%	12%	12%	5%
Creating digital research tools	1%	5%	9%	9%	27%	23%	31%	30%	32%	33%
Creating teaching tools	1%	6%	8%	4%	26%	23%	33%	31%	32%	35%

Survey Analysis | Q10 Activities for T&P

Scholarly blogging is the activity deemed the least worthy of consideration for tenure and promotion, with over 38% of all respondents indicating that it should never or seldom be considered and only about 22% of CAA respondents and 17% of SAH respondents indicating that it should usually or always be considered.

Creating digital research tools and creating teaching tools are the scholarly digital activities thought most worthy of consideration in tenure or promotion decisions, with approximately 65% of all respondents indicating those activities should usually or always be considered, and only about 10% indicating that they should never or seldom be considered.

Criteria for Evaluating Digital Scholarship

A series of questions probed the existence of (or, more accurately, awareness of) explicit departmental criteria for evaluating digital scholarship, as well as satisfaction with the criteria themselves (Q11–13).

Looking at the responses of CAA tenure-track faculty, 3.3% indicate that their department has explicit criteria for evaluating digital scholarship, 87.4% indicate that their department does not have explicit criteria, and 9.3% do not know whether such criteria exist.

The distribution of responses is similar across ranks. As over half of graduate students indicate that they do not know whether their department has explicit criteria, the small remaining sample has been excluded from the analysis.

Given that only six CAA respondents and six SAH respondents (about 3% of the total CAA sample and about 4% of the SAH sample) indicated that they were aware of explicit departmental criteria for evaluating digital scholarship (Q11), responses to the questions regarding satisfaction with such criteria (Q12) and satisfaction with the types of scholarship covered by the criteria (Q13) need to be treated cautiously.

Exhibit 9 summarizes faculty satisfaction with key criteria, for all faculty ranks, for CAA and SAH.

Exhibit 9: Satisfaction with Evaluative Criteria for Digital Scholarship for T&P, All Ranks

Evaluative Criteria	Very unsatisfied		Somewhat unsatisfied		Neither satisfied or unsatisfied		Somewhat satisfied		Very satisfied	
	CAA	SAH	CAA	SAH	CAA	SAH	CAA	SAH	CAA	SAH
Explicit written documentation	0%	17%	0%	17%	0%	33%	43%	17%	57%	17%
Clearly expressed	0%	17%	0%	17%	0%	33%	43%	17%	57%	17%
Publicly communicated	0%	17%	0%	0%	0%	33%	43%	33%	57%	17%
Comprehensive & specific policies	0%	33%	0%	0%	43%	33%	14%	17%	43%	17%

Survey Analysis | Q12 Criteria Satisfaction

Exhibit 10 summarizes faculty satisfaction with the range of digital scholarship covered by the evaluative criteria, for all faculty ranks, for CAA and SAH.

Exhibit 10: Satisfaction with Digital Scholarship Covered by Evaluative Criteria, All Ranks

Coverage of Criteria	Far too narrow	Somewhat too narrow	Appropriate	Somewhat too broad	Far too broad
CAA	7%	7%	36%	21%	29%
SAH	17%	33%	33%	17%	0%

Survey Analysis | Q13 Criteria Satisfaction

Confidence in Approaches for Evaluating Digital Scholarship

Respondents were asked to indicate their confidence in their own ability to evaluate digital scholarship, as well as their confidence in the ability of departmental and university tenure and promotion committees to evaluate digital scholarship (Q14).

Exhibit 11 summarizes the CAA responses to each approach for each professional rank.

Exhibit 11: Confidence in Approaches to Evaluating Digital Scholarship, CAA, By Rank

Own ability to assess digital scholarship	No confidence	Little confidence	Neither confident or unconfident	Somewhat confident	Very confident
Full professor	5%	12%	22%	37%	24%
Associate professor	3%	19%	24%	46%	9%
Assistant professor	0%	11%	35%	44%	11%
Graduate student	7%	16%	7%	46%	23%
A departmental T&P committee's ability to assess digital scholarship	**No confidence**	**Little confidence**	**Neither confident or unconfident**	**Somewhat confident**	**Very confident**
Full professor	6%	26%	38%	20%	11%
Associate professor	7%	43%	24%	24%	1%
Assistant professor	19%	34%	32%	11%	4%
Graduate student	18%	23%	36%	18%	5%
A university T&P committee's ability to assess digital scholarship	**No confidence**	**Little confidence**	**Neither confident or unconfident**	**Somewhat confident**	**Very confident**
Full professor	6%	33%	32%	20%	9%
Associate professor	14%	41%	33%	10%	1%
Assistant professor	21%	45%	26%	6%	2%
Graduate student	14%	27%	34%	18%	7%

Survey Analysis | Q14 Confidence

Respondents are confident in their ability to assess digital scholarship, with graduate students being most confident in this regard. All professional ranks are more confident in their own ability to assess digital scholarship than they are in the ability of departmental or university tenure and promotion committees. Associate and assistant professors, in particular, indicate less confidence in departmental and university tenure and promotional committees than full professors and graduate students.

The SAH responses, for all ranks, summarized in Exhibit 12, largely mirror the distribution as the CAA responses.

Exhibit 12: Confidence in Approaches to Evaluating Digital Scholarship, SAH, All Ranks

SAH, All Ranks	No confidence	Little confidence	Neither confident or unconfident	Somewhat confident	Very confident
Own ability to assess digital scholarship	6%	10%	18%	49%	18%
A departmental T&P committee's ability to assess digital scholarship	14%	31%	30%	23%	2%
A university T&P committee's ability to assess digital scholarship	19%	30%	28%	19%	5%

Survey Analysis | Q14 Confidence

Existence & Perception of Criteria for Evaluating Collaborative Work

A series of questions probe the existence of explicit departmental criteria for evaluating collaborative work, as well as satisfaction with the criteria themselves (Q15–17).

Looking at the responses of CAA tenure-track faculty, 21.4% indicate that their department has explicit criteria for evaluating collaborative work, 65.4% indicate that their department does not have explicit criteria, and 13.2% do not know whether such criteria exist.

The distribution of responses is similar across ranks. As over 70% of graduate students do not know whether their department has explicit criteria for collaborative activity, the small number of graduate student responses has not been included.

Given the smaller CAA sample indicating awareness of explicit criteria (39 responses), the questions regarding satisfaction with a department's criteria for evaluating collaborative work (Q16) and satisfaction with the type of scholarship covered by the criteria (Q17) have a higher margin of error than most other questions.

Exhibit 13 summarizes faculty satisfaction with key criteria, for each faculty rank.

Exhibit 13: Satisfaction with Evaluative Criteria for Collaborative Work, CAA, By Rank

Explicitly documented	**Very unsatisfied**	**Somewhat unsatisfied**	**Neither satisfied or unsatisfied**	**Somewhat satisfied**	**Very satisfied**
Full professor	0%	9%	46%	27%	18%
Associate professor	0%	7%	13%	73%	7%
Assistant professor	7%	20%	27%	40%	7%
Clearly expressed	**Very unsatisfied**	**Somewhat unsatisfied**	**Neither satisfied or unsatisfied**	**Somewhat satisfied**	**Very satisfied**
Full professor	0%	9%	46%	18%	27%
Associate professor	0%	14%	29%	50%	7%
Assistant professor	7%	40%	27%	20%	7%
Publicly communicated	**Very unsatisfied**	**Somewhat unsatisfied**	**Neither satisfied or unsatisfied**	**Somewhat satisfied**	**Very satisfied**
Full professor	0%	9%	46%	18%	27%
Associate professor	0%	33%	27%	33%	7%
Assistant professor	7%	27%	20%	40%	7%
Comprehensive & specific policies	**Very unsatisfied**	**Somewhat unsatisfied**	**Neither satisfied or unsatisfied**	**Somewhat satisfied**	**Very satisfied**
Full professor	0%	9%	46%	18%	9%
Associate professor	0%	40%	27%	27%	7%
Assistant professor	20%	33%	27%	13%	7%

Survey Analysis | Q16 Collaborative Criteria

Overall, assistant professors indicate less satisfaction with the criteria for elaborating collaborative activity than associate and full professors. Although the sample size prohibits a high degree of confidence in the accuracy of the results, the responses provide an approximate baseline against which the effectiveness of future educational programs might be compared.

The SAH responses, for all ranks, are summarized in Exhibit 14.

Exhibit 14: Satisfaction with Evaluative Criteria for Collaborative Work, SAH, All Ranks

SAH, All Ranks	Very unsatisfied	Somewhat unsatisfied	Neither satisfied or unsatisfied	Somewhat satisfied	Very satisfied
Explictly documented	4%	4%	24%	41%	31%
Clearly expressed	4%	7%	35%	38%	21%
Publicly communicated	4%	7%	35%	28%	28%
Comprehensive & specific policies	4%	17%	38%	21%	21%

Survey Analysis | Q16 Collaborative Criteria

Exhibit 15 summarizes CAA respondents' satisfaction, by faculty rank, with the range of collaborative activities covered by the evaluative criteria.

Exhibit 15: Satisfaction with Collaborative Activities Covered by Evaluative Criteria, CAA, By Rank

Coverage of Collaborative Activities	Far too narrow	Somewhat too narrow	Appropriate	Somewhat too broad	Far too broad
Full professor	0%	36%	64%	0%	0%
Associate professor	0%	21%	71%	7%	0%
Assistant professor	13%	40%	47%	0%	0%

Survey Analysis | Q16 Collaborative Criteria

Although there is general satisfaction with the breadth of the activities covered, assistant professors are less satisfied with the range of collaborative activities covered by the evaluative criteria than the other faculty ranks.

Exhibit 16 summarizes SAH respondents' satisfaction, for all faculty ranks, with the range of collaborative activities covered by the evaluative criteria.

Exhibit 16: Satisfaction with Collaborative Activities Covered by Evaluative Criteria, SAH, All Ranks

Coverage of Collaborative Activities	Far too narrow	Somewhat too narrow	Appropriate	Somewhat too broad	Far too broad
	7%	28%	55%	7%	3%

Survey Analysis | Q16 Collaborative Criteria

Perceived Barriers to Digital Scholarship

The last close-ended question asks respondents about their perception of five barriers to pursuing digital scholarship (Q18). Exhibit 17 summarizes the CAA results for each professional rank, in approximate order of importance.

Exhibit 17: Perceived Barriers to Digital Scholarship, CAA, By Rank

Barrier to Digital Scholarship	Full Professor	Associate Professor	Assistant Professor	Graduate Student
Lack of training or access to resources	72%	65%	70%	85%
Lack of funding	59%	49%	66%	59%
Lack of credit for tenure or promotion	18%	51%	66%	41%
Inappropriateness for research area	20%	31%	26%	33%
Lack of personal interest	33%	28%	17%	30%
Other	14%	6%	11%	9%
Don't Know	8%	12%	11%	6%

Survey Analysis | Q18 Barriers

Exhibit 18 summarizes the SAH results for all ranks, in order of importance.

Exhibit 18: Perceived Barriers to Digital Scholarship, SAH, All Ranks

Lack of training or access to resources	63%
Lack of funding	63%
Lack of credit for tenure or promotion	42%
Lack of personal interest	18%
Inappropriateness for research area	16%
Other	12%
Don't Know	6%

Survey Analysis | Q18 Barriers

Other barriers to digital scholarship—cited by respondents in response to a final open-ended question—include the lack of clear standards, a perceived lower prestige of digital scholarship, insufficient quality control, lack of sufficient data, and the difficulty of identifying technical collaborators.

Appendix A: CAA Survey Response Tables

Exhibit A-1: Q4, Frequency of Use

Data gathering & imaging	Never	Once	2 – 3 times	4 – 5 times	> 5 times
Full professor	77.9%	0.0%	2.9%	4.4%	14.7%
Associate professor	84.7%	4.1%	0.0%	1.4%	9.7%
Assistant professor	89.8%	2.0%	2.0%	0.0%	6.1%
Graduate student	80.0%	1.7%	5.0%	0.0%	13.3%
Average	83%	2%	4%		11%
Data analysis & visualization	**Never**	**Once**	**2 – 3 times**	**4 – 5 times**	**> 5 times**
Full professor	85.3%	1.5%	7.4%	2.9%	2.9%
Associate professor	90.3%	2.8%	2.8%	1.4%	2.8%
Assistant professor	85.7%	8.2%	4.0%	0.0%	2.0%
Graduate student	80.0%	8.3%	3.3%	3.3%	5.0%
Average	85%	5%	6%		3%
Geospatial analysis	**Never**	**Once**	**2 – 3 times**	**4 – 5 times**	**> 5 times**
Full professor	65.6%	6.0%	13.4%	7.5%	7.5%
Associate professor	68.5%	9.6%	6.9%	0.0%	15.0%
Assistant professor	51.0%	14.3%	20.4%	6.1%	8.2%
Graduate student	75.0%	6.7%	8.3%	1.7%	8.3%
Average	65%	9%	16%		10%
Three-dimensional modeling	**Never**	**Once**	**2 – 3 times**	**4 – 5 times**	**> 5 times**
Full professor	79.4%	5.9%	8.8%	1.5%	4.4%
Associate professor	78.0%	6.6%	6.9%	2.7%	5.5%
Assistant professor	69.4%	10.2%	12.2%	2.0%	6.1%
Graduate student	71.7%	10.0%	5.0%	3.3%	10.0%
Average	75%	8%	11%		7%
Storing & preserving	**Never**	**Once**	**2 – 3 times**	**4 – 5 times**	**> 5 times**
Full professor	70.6%	2.9%	4.4%	4.4%	17.7%
Associate professor	80.8%	4.1%	6.9%	0.0%	8.2%
Assistant professor	77.6%	6.1%	6.1%	0.0%	10.2%
Graduate student	63.8%	5.2%	12.0%	3.5%	15.5%
Average	73%	5%	9%		13%
Organizing & annotating	**Never**	**Once**	**2 – 3 times**	**4 – 5 times**	**> 5 times**
Full professor	50.8%	3.0%	10.5%	9.0%	26.9%
Associate professor	49.3%	6.9%	12.3%	2.7%	28.8%
Assistant professor	39.6%	6.3%	10.4%	6.3%	37.5%
Graduate student	46.7%	6.7%	10.0%	6.7%	30.0%
Average	47%	6%	17%		31%
Writing & disseminating	**Never**	**Once**	**2 – 3 times**	**4 – 5 times**	**> 5 times**
Full professor	50.8%	6.0%	11.9%	6.0%	25.4%
Associate professor	50.7%	8.2%	12.3%	8.2%	20.6%
Assistant professor	32.7%	12.2%	14.3%	6.1%	34.7%
Graduate student	35.0%	5.0%	13.3%	3.3%	43.3%
Average	42%	8%	19%		31%
Other digital tools	**Never**	**Once**	**2 – 3 times**	**4 – 5 times**	**> 5 times**
Full professor	20.6%	3.2%	14.3%	7.9%	54.0%
Associate professor	30.0%	1.4%	17.1%	5.7%	45.7%
Assistant professor	38.6%	4.6%	18.2%	0.0%	38.6%
Graduate student	17.9%	5.4%	23.2%	3.6%	50.0%
Average	27%	4%	23%		47%

Survey Analysis | Q4 Freq of use

Exhibit A-2: Q5, Anticipated Future Use

Data gathering & imaging	Never	Occasionally	Don't know	Moderately	Frequently
Full professor	10.0%	15.7%	22.9%	15.7%	35.7%
Associate professor	12.7%	28.2%	29.6%	14.1%	15.5%
Assistant professor	12.2%	20.4%	34.7%	16.3%	16.3%
Graduate student	6.8%	30.5%	22.0%	17.0%	23.7%
Average	10%	24%	27%	16%	23%
Data analysis & visualization	**Never**	**Occasionally**	**Don't know**	**Moderately**	**Frequently**
Full professor	10.5%	20.9%	35.8%	13.4%	19.4%
Associate professor	14.3%	24.3%	38.6%	12.9%	10.0%
Assistant professor	12.2%	18.4%	46.9%	12.2%	10.2%
Graduate student	11.7%	23.3%	30.0%	23.3%	11.7%
Average	12%	22%	38%	15%	13%
Geospatial analysis	**Never**	**Occasionally**	**Don't know**	**Moderately**	**Frequently**
Full professor	30.9%	17.7%	30.9%	8.8%	11.8%
Associate professor	24.6%	14.5%	37.7%	7.3%	15.9%
Assistant professor	14.6%	22.9%	29.2%	18.8%	14.6%
Graduate student	33.3%	20.0%	30.0%	6.7%	10.0%
Average	26%	19%	32%	10%	13%
Three-dimensional modeling	**Never**	**Occasionally**	**Don't know**	**Moderately**	**Frequently**
Full professor	36.8%	26.5%	25.0%	7.4%	4.4%
Associate professor	31.0%	21.1%	28.2%	8.5%	11.3%
Assistant professor	16.7%	25.0%	39.6%	10.4%	8.3%
Graduate student	28.8%	28.8%	27.1%	8.5%	6.8%
Average	28%	25%	30%	9%	8%
Storing & preserving	**Never**	**Occasionally**	**Don't know**	**Moderately**	**Frequently**
Full professor	7.1%	18.6%	15.7%	25.7%	32.9%
Associate professor	8.6%	22.9%	24.3%	15.7%	28.6%
Assistant professor	2.1%	16.7%	27.1%	20.8%	33.3%
Graduate student	6.8%	20.3%	15.3%	22.0%	35.6%
Average	6%	20%	21%	21%	33%
Organizing & annotating	**Never**	**Occasionally**	**Don't know**	**Moderately**	**Frequently**
Full professor	5.8%	20.3%	15.9%	18.8%	39.1%
Associate professor	5.6%	16.9%	25.4%	23.9%	28.2%
Assistant professor	0.0%	10.2%	20.4%	28.6%	40.8%
Graduate student	1.7%	22.0%	5.1%	25.4%	45.8%
Average	3%	17%	41%		38%
Writing & disseminating	**Never**	**Occasionally**	**Don't know**	**Moderately**	**Frequently**
Full professor	5.7%	20.0%	8.6%	18.6%	47.1%
Associate professor	4.2%	15.5%	21.1%	22.5%	36.7%
Assistant professor	0.0%	6.1%	20.4%	34.7%	38.8%
Graduate student	0.0%	18.6%	8.5%	30.5%	42.4%
Average	2%	15%	15%	27%	41%
Other digital tools	**Never**	**Occasionally**	**Don't know**	**Moderately**	**Frequently**
Full professor	4.4%	10.1%	27.5%	14.5%	43.5%
Associate professor	0.0%	13.2%	35.3%	13.2%	38.2%
Assistant professor	2.1%	6.3%	58.3%	4.2%	29.2%
Graduate student	3.6%	10.7%	39.3%	14.3%	32.1%
Average	3%	10%	40%	12%	36%

Survey Analysis | Q5 Future use

Exhibit A-3: Q10, Worthy of Consideration for T&P

Applying data visualizations	Never	Seldom	Sometimes	Usually	Always
Full professor	3.1%	15.4%	36.9%	20.0%	24.6%
Associate professor	3.1%	12.5%	45.3%	20.3%	18.8%
Assistant professor	2.1%	10.6%	51.1%	21.3%	14.9%
Graduate student	5.6%	11.1%	40.7%	20.4%	22.2%
Average	3.5%	12.4%	43.5%	20.5%	20.1%
Using three-dimensional models	**Never**	**Seldom**	**Sometimes**	**Usually**	**Always**
Full professor	7.7%	16.9%	33.9%	24.6%	16.9%
Associate professor	4.7%	14.0%	42.2%	20.3%	18.6%
Assistant professor	2.1%	8.5%	55.3%	19.2%	14.9%
Graduate student	7.6%	15.1%	41.5%	17.0%	18.9%
Average	5.5%	13.6%	43.2%	20.3%	17.3%
Using geospatial models	**Never**	**Seldom**	**Sometimes**	**Usually**	**Always**
Full professor	7.7%	9.2%	38.5%	24.6%	20.0%
Associate professor	4.7%	12.5%	42.2%	23.4%	17.2%
Assistant professor	2.1%	6.4%	53.2%	19.2%	19.2%
Graduate student	5.6%	14.8%	40.7%	18.5%	20.4%
Average	5.0%	10.7%	43.7%	21.4%	19.2%
Scholarly blogging	**Never**	**Seldom**	**Sometimes**	**Usually**	**Always**
Full professor	16.9%	27.7%	40.0%	9.2%	6.2%
Associate professor	13.6%	33.3%	36.4%	7.6%	9.1%
Assistant professor	6.4%	21.3%	53.2%	10.6%	8.5%
Graduate student	10.9%	23.6%	27.3%	14.6%	23.6%
Average	12.0%	26.5%	39.2%	10.5%	11.9%
Creating digital research tools	**Never**	**Seldom**	**Sometimes**	**Usually**	**Always**
Full professor	1.6%	10.9%	29.7%	35.9%	21.9%
Associate professor	1.5%	13.9%	29.2%	32.3%	23.1%
Assistant professor	0.0%	6.4%	21.3%	31.9%	40.4%
Graduate student	1.9%	3.7%	25.9%	24.0%	44.0%
Average	1.3%	8.7%	26.5%	31.0%	32.4%
Creating teaching tools	**Never**	**Seldom**	**Sometimes**	**Usually**	**Always**
Full professor	1.6%	10.9%	32.8%	35.9%	18.8%
Associate professor	1.5%	13.9%	23.1%	40.0%	21.5%
Assistant professor	0.0%	6.4%	25.5%	25.5%	42.6%
Graduate student	0.0%	0.0%	22.2%	31.5%	46.3%

Survey Analysis | Q10 Activities for T&P