

Definitions across the Disciplines: Surveying Primary Sources  
in the Classroom

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**Abstract**

In C.P. Snow's *The Two Cultures* (1959) the divide between scientists and humanists is described as both practical and cultural. That is, scientists and humanists not only perform different jobs, but they also understand the world differently. Humanities for STEM: Using Archives to Bridge the Two Cultures Divide, a two-year research collaborative funded by New York University's Center for the Humanities, re-investigates Snow's thesis through the study of primary sources and archival research.

Archives, often thought to be squarely in the domain of the humanities, also contain primary source documents from the sciences and, therefore, can be used to enhance the understanding of STEM.<sup>1</sup> Because this research collaborative posits that primary sources can aid STEM education and research, it becomes important to define what scientists and humanists understand primary sources to be. Is the term "primary source" part of the conceptual and cultural divide Snow describes?

In order to understand how a primary source is defined by various disciplines, research collaborative members created and disseminated a survey to faculty at New York University. The results of this survey led to an awareness that what is considered to be a primary source varies between disciplines. Although the notion that primary sources contain first-hand accounts of actual events was established across the disciplines, there was disagreement as to which formats were considered to be primary sources. Practitioners in STEM and social sciences considered journal articles and data sets to be primary sources. Humanities professionals were unique in their belief that "physical

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<sup>1</sup> STEM is typically defined as science, technology, engineering, and mathematics. In this research, we have defined STEM broadly. Following the National Science Foundation, we include psychology and the social sciences. In addition, we include medicine, which the NSF typically omits.

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documents from an archive (eg., correspondence, photographs)” were one of the top forms of primary sources. With two working definitions of primary sources, it becomes clear that while faculty in most disciplines insist they are using primary sources, faculty from across the divide may disagree as to which documents are in fact primary sources. The differing definition of primary sources could lead to potential projects for either side: raw data and journal articles in historical contexts for humanities classrooms or innovative uses of letters, journals, and objects in STEM classrooms.

*Keywords:* Primary source, STEM education, humanities education, archives

### **Introduction & Literature Review**

What is a primary source? This seemingly basic question, which often begins an introductory archives or history course, is actually more complex when considering disciplines beyond the humanities. The budding historian may answer confidently that a primary source is a document which provides first-hand evidence of an event, person, or historical time period. The STEM or social science major might agree but may be thinking of an additional format, one that the humanities student would almost certainly find counter to her definition—a peer-reviewed journal article. Although the humanities student may acknowledge that context plays a role in determining a primary source, most likely she would draw the line at a peer-reviewed article, a format which, in her discipline, interprets or analyzes primary sources. However, to the STEM student, a peer-reviewed article easily fits within the definition of a source providing first-hand evidence of an event, in this case the methodology of a particular experiment. The bigger question might not be “What is a primary source?” but whether these two students would ever have this conversation to begin with. Or, as C. P. Snow suggested in 1959, do these students operate in two different cultures, within spheres so distinct that differences between basic academic terms are never discussed?

Integrating primary sources into the college curriculum has become increasingly popular since the 1990s (Corbett, 1991; Mazak & Manista, 1999; Johnson, 2006; Carini, 2007; Krause, 2008; Mitchell, Seiden, & Taraba, 2012). As the use of primary sources in education gained momentum, archivists called for ways to assess the learning outcomes of teaching with primary sources. Elizabeth Yakel led the way, in 2004, with her article

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“Information Literacy for Primary Sources: Creating a New Paradigm for Archival Researcher Education.” Despite this increase in the use and assessment of primary sources at the undergraduate level, understanding how a primary source is defined across disciplines has not been examined. In part, this is because most of the research in the area of teaching with primary sources has been conducted by archivists. While archivists might acknowledge that “the term ‘primary sources’ can itself be defined in a variety of ways,” most of the time a primary source is assumed to be archival (Daines & Nimer, 2015). In part, this oversight stems from disciplinary boundaries. If only humanities students visit the archives, then there is no confusion over the term “primary source,” which might have a different meaning to a STEM student.

Although teaching with primary sources is mostly talked about in humanities courses, using primary sources in STEM education has also gained momentum since the 2000s. The visual records of medicine, including anatomical drawings, photographs, and x-rays readily lend themselves to stimulating and comparative examples in the medical classroom (Crowther & Fissell, 2017). Medical objects, such as a 19<sup>th</sup> century surgeon’s kit or a fluoroscope, are also rather easily integrated into the humanities’ conception of primary sources (Gosselar, 2017; Anderson, 2014). Even textbooks can be thought of as primary sources or investigated using the same line of inquiry that humanists apply to primary sources. For example, Jason Fitzgerald, at the University of Pittsburgh, explains that textbooks can be used by social studies students to examine what counts as “official” or “legitimate” knowledge and to think critically about the particular social, political, and historical contexts which created their own textbooks (2009). Similarly, Scott Roberts of Central Michigan University, argues that if textbooks are used as an educational tool

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alongside primary sources, they are part of the deep inquiry process in which students may critically analyze the textbook, the primary source, or both (2014). In both of these cases, the textbook is not only operating alongside primary sources, but is itself transformed into a primary source through the lens of its cultural creation. But, what about the stickiest of all secondary sources—the peer-reviewed article? According to humanities and archival definitions, this source, one which compiles and analyzes other primary sources, is the most difficult to transmogrify into a primary source. However, in the sciences, a peer-reviewed article easily fits the definition of original materials that have not been interpreted by a second party (in science, this would be a review article). Library research guides from various university libraries support this definition of a journal article as a primary source in the sciences (University of Minnesota Bio-Medical Library, 2009; UAlbany Libraries, 2018; Schoeder, 2018). It is possible that STEM professionals are aware of this divide. For example, the introduction of the Michigan State Libraries' research guide states, "Primary sources in the sciences are different from primary sources in the humanities or social sciences" (Schoeder, 2018). But does this mean that humanities faculty and students or archivists are clued into this disciplinary difference?

**Humanities for STEM: Using Archives to Bridge the Two Cultures Divide**

Our work with STEM archives and undergraduate engineering students began in 2013 at the New York University Tandon School of Engineering. Throughout various courses in the Technology, Culture, and Society Department, we introduced engineering undergrads to materials in the school's archives and were excited by not only the students' interest in the archives, but also in their development of critical thinking skills

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(Anderberg, 2015; Leslie & Anderberg 2015; Leslie & Anderberg, 2016). The more we thought about it, the more we recognized that asking STEM students to puzzle through primary source documents was a very similar activity to asking them to solve engineering problems. In both cases the students may be missing vital information, needed to develop strategies to uncover that information, and had to use their reasoning skills to arrive at potential solutions. We were inspired by this disciplinary crossover and eager to learn more about how to best use and assess the use of primary sources in STEM education and research.

In 2016, we applied for a grant from the New York University Center for the Humanities to form a two-year multi-disciplinary research collaborative called Humanities for STEM: Using Archives to Bridge the Two Cultures Divide. The research collaborative was comprised of teaching faculty from science, humanities, and writing departments, as well as librarians, archivists, researchers, and graduate students. As we began to talk to our science and social science peers in our research collaborative, we were struck by the realization that the definition of a primary source is not static across disciplines. As a humanities professor and an archivist, we had routinely espoused the humanities' definition of a primary source to our engineering students and we usually were thinking about archival materials when we used the term primary source. In this respect, Humanities for STEM did exactly what we had hoped it would do: expose us to other ways of thinking and to forge bridges across the disciplinary divide. As a result of discussions with this group, we created a survey to learn more about what NYU faculty from all disciplines think about primary sources and how they use them in their teaching.

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Another motivation for our survey was the Ithaca S+R US Faculty Survey 2012. As a note to their study, the authors comment:

We recognize that some terms may be used differently in different fields—for example, what scientists recognize as a “primary source” may be different from what humanists would use that term to describe. (12)

The authors do not, however, elaborate on this difference. This lack of definition becomes significant when faculty members were asked if they used primary sources in their classrooms. Of the science faculty respondents, nearly 40% said they assign primary sources to lower division undergraduate students “to read or otherwise engage with” and nearly 60% said they assign primary sources to upper division undergraduates “to read or otherwise engage with” (17-18). Although humanities faculty report assigning primary sources to their students more often, 80% and 90%, respectively, we cannot actually draw a clear comparison if we have not identified what these faculty members mean by “primary source.” If we assume a primary source is something that comes from the archives, then it appears that the science faculty are actually using archival collections rather frequently in their classes. However, when we consider that science faculty may be defining a primary source as a journal article-- a source that most humanities faculty would consider a secondary source-- these percentages become almost meaningless. To our research collaborative, defining the term “primary source” was not merely a caveat, it was the main question.

### **Methodology**

The members of the Humanities for STEM research collaborative brainstormed questions to determine what faculty knew about primary sources and how they used them in the classroom. A survey, intended to take 15 minutes to complete, was created in

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Qualtrics and tested by members of the collaborative. Some of the questions were adaptive, which meant that there were up to 56 questions to answer.

The questions sought to understand how often faculty define primary sources and how they use various types of material in their teaching. Because our preliminary thinking showed that there was some disagreement on the definition of a primary source, we asked for an open-ended response for a definition of a primary source and then asked what materials a respondent uses that might be called a primary source. We also asked respondents to gauge their students' familiarity with primary sources and discuss the way they used them in the classroom. Finally, we asked demographic questions about the faculty member's background.

To collect responses, a link was sent out to various faculty email groups at New York University. The survey link was also sent out to various program administrators with the request to forward it to their faculty. Reminders were sent to library lists, Center for the Humanities mailing list, and contacts generated by the collaborative. The survey was open in March and April, 2017.

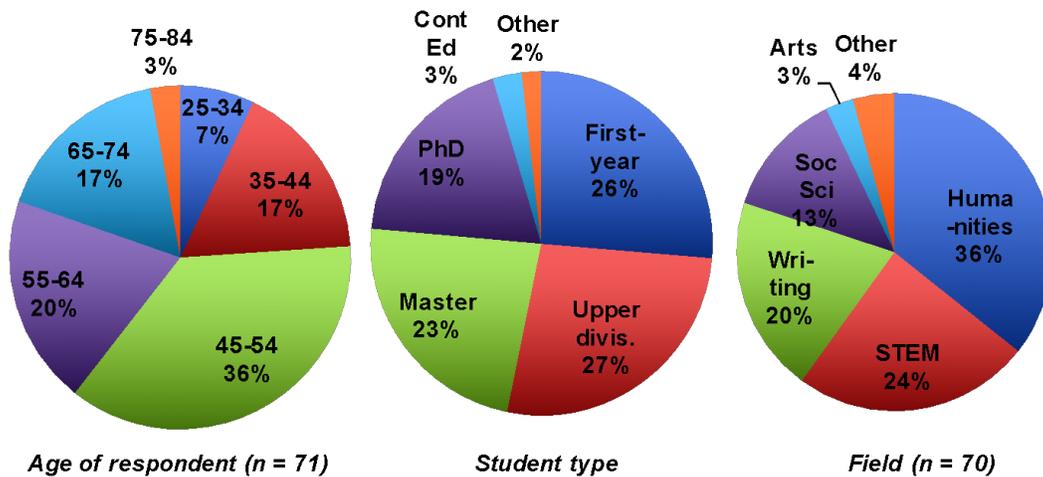
### **Results**

There were 124 attempts to respond to the survey. Three faculty declined to participate, thirty started the survey but did not finish anything in a meaningful way, and ninety-one people responded enough to be included in our results (but note that the actual number of responses varies by question, usually around 70). Twelve of NYU's schools and institutes represented, with the College of Arts and Science being the highest (35) and the Tandon School of Engineering being second (14).

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Respondents reported an average of twenty years teaching and thirteen years teaching at NYU. As seen in Figure 1, there was a balance of responses by the age of respondent, level and type of students taught, and respondent's field.

Figure 1: Demographics of Respondents



There were, as expected, wide range of responses to the question of what is a primary source. General themes were that a primary source is something from the moment that provides context, being produced in the past. The notion of a firsthand account by someone who had a role in the events was often repeated. Some noted that the definition was particular to one's field. Respondents in STEM noted that data sets and journal articles are primary sources.

Answers to the opened-ended question "What Is a Primary Source" were analyzed using inductive qualitative coding. Most of the respondents (40/78) defined a primary source as an original work, or a document of the moment or person under study. Just as many respondents (40/78) used examples of document formats in order to define a primary source. Along with the expected format types of correspondence, photographs, and archival records, 14 respondents mentioned journal articles and 11 respondents

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mentioned data sets as primary sources. The word “context” was used, or context was alluded to be a key component to identifying a primary source in 11 out of 78 responses.

The next survey question provided a list of formats and asked respondents to indicate which formats fit their definition of a primary source. As seen in Figure 2, the top five formats were archival documents (75 responses), digitized materials from a museum or library (70), museum documents or objects (67), audio or visual recordings (67), and journal articles or books (63).

When broken down by the discipline of the respondent, however, a more nuanced breakdown appeared. As seen in Figure 3, humanities professionals were more likely to consider museum objects as primary sources, while journal articles were the highest rated for STEM and social science. Writing instructors were most likely to consider archival documents a primary source.

*Figure 2: Which Are Primary Sources?*

| <i>Description</i>  | <i>Count</i> |
|---|--------------|
| Physical documents from an archive (e.g., correspondence, photographs)            | 74           |
| Digitized material from a museum, library, or archives                            | 69           |
| Physical documents or objects in a museum exhibit                                 | 66           |
| Audio or visual recordings (e.g., oral histories, music)                          | 66           |
| Publication (e.g., journal article, book) studied for its historical time period  | 63           |
| Physical objects from an archive (e.g., scientific equipment, models)             | 61           |
| Content from a primary source that is reprinted or transcribed in a modern format | 59           |
| Physical object that you or the school owns                                       | 56           |
| Digital material found on the Internet or elsewhere                               | 52           |
| Raw data sets   | 47           |
| Other 1, other 2  | 21           |

*Figure 3: Top Five by Discipline of Respondent*

| <i>Humanities</i>                | <i>STEM</i>                | <i>Social Science</i>     | <i>Writing</i>                          |
|----------------------------------|----------------------------|---------------------------|---|
| Museum documents or objects (24) | Journal article, book (15) | Journal article, book (9) | Archive documents (14)                  |
| Archive documents (23)           | Archive documents (12)     | Archive documents (8)     | Digitized museum, library, archive (14) |

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|   |   |  |                                 |
|---|---|--|---------------------------------|
| Digitized museum, library, archive (22) | Digitized museum, library, archive (12) | Digitized museum, library, archive (7) | Audio or visual recordings (13) |
| Audio or visual recordings (22)         | Reprinted or transcribed content (10)   | Audio or visual recordings (7)         | Archive objects (13)            |
| Reprinted or transcribed content (22)   | Archive objects (10)                    | Owned object (7)                       | Owned object (12)               |

The list allowed for respondents to add additional items, and answers included professional objects (source code, the built environment, contracts, project schedules, budget estimates, handbooks, and government documents), personal experience (interviews, experiments, observed behaviors), and other objects from the humanities (memoirs, art, architecture, theater or dance performances, political protests).

Overall, as seen in Figure 4, we observed a good deal of use of primary sources in the classroom at all levels, with the highest number of individuals stating they used primary sources “often” in all groups except instructors of masters students. Indeed, respondents to the survey often said they used primary sources (according to their own definition) much more than other media, as shown in Figure 5. In fact, no matter what range of sources were used, at every level, primary sources were among the top three types of sources used.

*Figure 4: Frequency of Use of Primary Sources at Various Levels*

|              | <i>First-year undergraduate</i> | <i>Upper-division undergraduate</i> | <i>Masters</i> | <i>Doctoral</i> |
|--------------|---------------------------------|-------------------------------------|----------------|-----------------|
| Never        | 15%                             | 8%                                  | 7%             | 9%              |
| Rarely       | 21%                             | 22%                                 | 24%            | 22%             |
| Occasionally | 29%                             | 29%                                 | 36%            | 28%             |
| Often        | 35%                             | 41%                                 | 33%            | 41%             |

*Figure 5: How Often Primary Sources Are Used in Comparison to Other Material*

| <i>Types of Sources<br/>in a Classroom</i>                                      | <i>First-year</i> | <i>Upper level</i> | <i>Masters<br/>student</i> | <i>PhD<br/>student</i> | <i>Continuing<br/>ed.</i> |
|---|-------------------|--------------------|----------------------------|------------------------|---------------------------|
| Textbooks or textbook chapters  | 2.8               | 2.6                | 2.2                        | 2.5                    | 3.0<br>(Tie)              |
| Peer reviewed journals and<br>scholarly articles                                | 3.3<br>(Second)   | 3.4<br>(Second)    | 3.7<br>(Top)               | 3.9<br>(Top)           | 3.0<br>(Tie)              |
| Films, audio, artwork, or other<br>non-textual sources                          | 3.2<br>(Third)    | 3.1<br>(Third)     | 3.1                        | 2.9                    | 2.3                       |
| Scholarly monographs or edited<br>volumes published by an academic<br>publisher | 2.7               | 2.9                | 3.4<br>(Third)             | 3.7<br>(Second)        | 2.7                       |
| Non-scholarly books   | 2.5               | 2.3                | 2.1                        | 2.0                    | 1.7                       |
| Blogs or social media   | 2.1               | 2.1                | 2.0                        | 1.9                    | 1.7                       |
| Primary source materials (as<br>defined from above)                             | 3.5<br>(Top)      | 3.5<br>(Top)       | 3.6<br>(Second)            | 3.6<br>(Third)         | 3.0<br>(Tie)              |

The specific examples of primary sources faculty used in their classrooms reveal both the range of formats that may be considered primary sources, as well as the specificity of formats to a discipline. For example, a Food Studies professor cited a baby food jar and cookbooks, whereas a Sports Management professor included a published memoir and “tours of facilities” as examples of primary sources used in teaching.

From this summary of examples of what primary sources faculty use in a classroom, a wide range of definitions about what constitutes a primary source is evident. There is a healthy representation of material from archives that is not controversial in this context. There are also newer ideas about primary sources, such as raw data. Whether or not live artistic performances – or a direct experience of an experimental result - are primary sources is an intriguing question that will be addressed in the next section.

We asked respondents to rank their students' familiarity with primary sources on a scale of 1 to 5, with 1 being "not at all familiar" and 5 being "extremely familiar." Our respondents thought that their students were slightly familiar (2.2) before the class used

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archival materials and moderate to very familiar (3.6) afterward. Respondents stated that they did not do much formal assessment of their students' use of primary sources. Overall, slightly more than half stated that they used regular classroom activities, such as papers, exams, and projects, to assess their use of the primary sources. The other half of respondents said no, were unclear, or did not answer. Three faculty said they used a survey and two stated that they "should" use some sort of formal assessment.

Many respondents felt that their students were unfamiliar with primary sources before their class. From those who were very negative on their assessment, the reasons they gave tended to be along the lines of the lack of unfamiliarity with the genres of information, with most students being familiar with secondary sources and thus cannot distinguish them from primary sources. Their earlier education, one wrote, "focuses on a very narrow definition of literacy." Many were colorful in their explanation. "The Internet is a giant Xerox machine," one said, "so this is their go-to on everything."

No faculty member reported that their students were "extremely familiar" with primary sources before their class. Those who thought the students were moderately to very familiar pointed toward individual students' interest. By chance, sometimes students were exposed in earlier classes, or perhaps there was a personal interest that drove a student or a love of reading. Some thought students had good familiarity if one points out the "everyday" primary sources they see, and others noted that some disciplines (like history) stress the use of primary sources before the students entered their classrooms.

In reporting their students' challenges in engaging with primary sources, some themes emerged. One was simply that it is an unfamiliar domain, with the result that the students not sure what to do. Another problem was the lack of historical context that

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would be needed for analysis. Several pointed to the adverse effect of what might be called an Internet “lookup” culture. Others pointed to logistical issues of time and scheduling, or more general educational issues like motivation and frustration with the task.

It was instructive to analyze the response of faculty who reported the outcome of the working with primary sources as “low.” These faculty said that critical thinking, analysis, and judging credibility are all difficult activities and were likely to blame the habit of seeking instant access from the worldwide web. The problem of lacking broad historical context to analyze primary sources was noted. Additionally, these faculty who reported lower achievement noted that students, when they use sources, tend to use them to add to what they want to say as opposed to seeking a variety of voices.

Those faculty who reported the end result more positively said similar things, but with a different spin that noted an opportunity for development. They noted it was a challenge to find a point of entry into the primary source and using secondary sources to add to it. Similarly, they would say that the students are just starting out in their fields, which tends to lead to a superficial analysis. Another challenge they saw was asking students to think on their own; when engaging these sources, students want to agree or disagree with them, not analyze what they find. Other issues like the students’ lack of patience and the challenge of reading dated language were reported.

The most commonly cited challenge for students using or analyzing primary sources was the need to engage in critical thinking in terms of historical and cultural contexts, source, credibility, audience, and relevance (33/62 respondents). Students’ unfamiliarity with using and analyzing primary sources was also frequently mentioned

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(13/62), and this may partly explain the critical thinking challenge. Many students have not worked with primary source documents in the past and so when confronted with primary sources they are being asked to develop new ways of thinking and new processes for conducting research. An equal number of respondents (10/62) mentioned trouble in finding, accessing, or scheduling the time to use primary sources and challenges in reading or seeing old or dated language on documents. Rounding out the top challenges included adverse effects of Internet usage, i.e., expecting immediate answers (5/62) and what we defined as “affect,” which included general frustration, laziness, or lack of motivation (5/62).

Similarly, it is instructive to separate comments regarding the challenges instructors had in using primary sources by the degree to which the instructors found it challenging. Those who found using primary sources challenging noted that it can be time-consuming and that it is hard to find archives that fit subject. Some noted that students are unwilling to think of different kinds of texts in the classroom. Others noted logistical situations that seemed insurmountable: having to move a class to a “fortress” to use sources.

On the other side of the spectrum, again, the challenges were not too different but they were expressed in a different manner. Those who did not find using primary sources too challenging said that part of the issue was logistical, for example using digital media to study physical objects in class and coordinating access. Another type of response related to the education situation: they said it was challenging to motivate students to organize their time or to get them to recognize they were doing a new kind of assignment.

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Finally, some said the challenge was finding a diversity of source materials that could be used in their classes.

A question about the importance of primary sources can be broken down by class level. We asked for a numerical score of how important using primary sources was at the level or levels at which each respondent teaches, with 5 indicating “very important.” In Figure 6, the results separated by class level mostly point toward professional outcomes, but there is also a concern that students of all levels learn how to think about the information they receive. The trend was that faculty reported greater importance at the higher levels of education, with the exception of continuing education.

*Figure 6: Why Are Primary Sources Important in the Classroom?*

| <i>Level</i>    | <i>Score (5 is extremely important)</i> | <i>Comments</i>   |
|-----------------|---|---|
| First year      | 4.3                                     | <ul style="list-style-type: none"> <li>● Understand organization of knowledge</li> <li>● Need to learn how to evaluate sources</li> <li>● Form own interpretation, encourage critical thinking</li> <li>● Give students a sense of control over knowledge</li> <li>● Foundation for future work</li> </ul>            |
| Upper undergrad | 4.4                                     | <ul style="list-style-type: none"> <li>● Understand knowledge in their discipline</li> <li>● Find out what they can do, rather than what others have done, with information</li> <li>● Develop good habits for later on in their careers</li> </ul>   |
| Masters         | 4.7                                     | <ul style="list-style-type: none"> <li>● Need to be familiar with actual scholarship in their fields</li> <li>● Graduate school is about independent thinking</li> <li>● Understand key thinkers in their field</li> <li>● Starting to learn how to create new knowledge and primary sources are important</li> </ul> |

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|                      |     |   |
|----------------------|-----|---|
|                      |     | <ul style="list-style-type: none"> <li>● Job preparation</li> </ul>   |
| Doctoral             | 4.8 | <ul style="list-style-type: none"> <li>● Cannot finish a dissertation without seeing primary sources</li> <li>● Criterion of original contribution to the field requires primary courses</li> <li>● Later will be teaching with primary sources, so need to know how to use them</li> </ul> |
| Continuing education | 3.7 | <ul style="list-style-type: none"> <li>● No comments</li> </ul>   |

### Discussion

The findings from STEM practitioners show that there is an opportunity to broaden the range of what is considered a primary source in a STEM classroom beyond just data and journals. Can letters, photographs, and other archival sources be used in the STEM classroom? Physical objects seem to be a source of potential opportunity; although these are used in STEM classrooms, the respondents did not report visiting museums. For example, could an historic set of microscope lenses from a museum or archives be used in a physics course?

In the reverse direction, it would seem like humanities faculty have something to learn from STEM faculty. Using historical journal articles from the field might be a worthy activity. In addition, humanities scholars and archives that are generally devoted to the humanities should be more cognizant of preserving and presenting data sources for analysis.

The commonalities between the groups also point out some opportunities for educational programs on the part of archives. Few faculty have used assessment as part of the activity; coming up with a template of what this looks like and how it can improve

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instruction would be helpful. It is also clear that many faculty felt challenged by articulating the rationale for using primary sources in the classroom, which is something that archivists could do. Some faculty have made connections to creating or identifying so-called current primary sources, and this might be an educational program an archive might offer as a background for further activity.

A commonality across all groups-- STEM, humanities, social science, and writing-- is a contention by some that a direct experience is a primary source. It is uncertain whether the attitude of our respondents is more widespread, but the notion that first-hand experience, rather than first-hand documentation, is a primary source was unexpected. Although expressed differently in different fields, there was a common theme that getting students to experience things personally instead of using an intermediate (secondary) source recurred. In what way can looking at a work of art, conducting an experiment, or interviewing subjects be a primary source? Most would probably think that the idea of a source is that it is something outside one's own experience, requiring a different kind of analysis.

**Conclusion**

The sample size of this survey is quite small, and although NYU is diverse, we are coming from one university. These initial findings, however, can serve as a pilot study for a broader investigation including other schools.

This survey shows that while there is some agreement across disciplines about what a primary source is, there are disciplinary differences when identifying which formats are considered primary sources. Faculty members who identified as science or social science disciplines tend to agree that a peer-reviewed journal article is a primary

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source. This may be surprising to humanities faculty, who would consider a journal article a secondary source. This divergence in the definition of a primary source goes to the heart of different disciplinary practices. For a scientist, the peer-reviewed journal article lays out the exact parameters of the experiment and acts as direct documentation of the experimenter's observations. By contrast, peer-reviewed journal articles in the humanities are almost always an analysis of primary and secondary works. Some faculty members identified firsthand experiences as primary sources. This was a surprising finding and perhaps requires further investigation to understand the distinction between what might be called a primary experience and a primary source, which might be a record of that experience.

The survey has set up a set of opportunities for outreach surrounding primary sources, and archival materials, in particular. While many STEM faculty members may respond in the affirmative to using primary sources in the classroom, archivists should be aware that these faculty are more likely to be referring to contemporary journal articles rather than archival sources. This mutual understanding of the term “primary source” as it relates to STEM is not only beneficial for beginning an outreach conversation with a shared vocabulary, but it should also help the archivist to think about appropriate archival materials for the particular discipline and instructor. While an engineer’s personal diary may be fascinating, it might not lend itself to insights into her inventions in the same way that her lab notes, technical reports, and patents might. That is, the archival records of invention-- which may include photographs, lab notebooks, blueprints, patents, or objects-- may lend themselves more directly to instruction in the STEM classroom than the archival records of the person. This understanding frames archival outreach to STEM

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faculty differently than outreach to humanities faculty, who are more likely to be interested in personal motivations, which might be reflected in diaries, correspondence, and photographs. This is not to say there is no overlap in archival formats that could be used in the STEM and humanities classrooms, but that the materials may be used and understood in different ways. If the archivist has thought about this before the initial outreach to a faculty member, there is a better chance that both parties will understand how and why they would use archival materials in the classroom. Understanding these differences from the outset also allows for both sides to borrow methods in the use of primary sources from each other. STEM students could benefit from understanding the cultural context, or constraints, and motivations of a scientist or laboratory group as they learn what it is to conduct science in the “real world,” which requires partnerships and funding. Humanities students could benefit from seeing primary sources as data, or perhaps turning primary sources into data, in the case of digital humanities.

Future research in this area includes expanding the survey beyond one institution, addressing the challenges, for faculty and students, of using primary sources in the classroom, and developing assessment tools for lesson plans involving primary sources in both STEM and humanities classrooms.

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