

4-2020

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Leigh Rupinski
Grand Valley State University, rupinski@gvsu.edu

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ScholarWorks Citation

Rupinski, Leigh, "Bingo! Engaging History of Science Students with Primary Sources" (2020). *Scholarly Papers and Articles*. 66.

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CASE #13

Bingo! Engaging History of Science Students with Primary Sources

AUTHOR

Leigh Rupinski

Archivist for Public Services and Community Engagement
Grand Valley State University Libraries
Special Collections and University Archives
rupinski@gvsu.edu

LEARNING OBJECTIVES ENGAGED FROM [GUIDELINES FOR PRIMARY SOURCE LITERACY](#) BY THIS CASE STUDY

- 3.A. Examine a primary source, which may require the ability to read a particular script, font, or language, to understand or operate a particular technology, or to comprehend vocabulary, syntax, and communication norms of the time period and location where the source was created.
- 4.C. Situate a primary source in context by applying knowledge about the time and culture in which it was created; the author or creator; its format, genre, publication history; or related materials in a collection.
- 4.E. Factor physical and material elements into the interpretation of primary sources including the relationship between container (binding, media, or overall physical attributes) and informational content, and the relationship of original sources to physical or digital copies of those sources.

CASE STUDY LOCATION Grand Valley State University
Allendale, MI
<https://www.gvsu.edu/>

PUBLICATION DATE April 2020

Introduction and Institutional Context

Grand Valley State University (GVSU) is a public liberal arts institution founded in 1960, with an enrollment of approximately 25,000 students. Special Collections and University Archives (hereafter Special Collections) is a part of University Libraries. Special Collections is located in its own dedicated building on the university's main campus in Allendale, Michigan. In 2018, the department increased its staffing levels to three tenure-track faculty librarian/archivists and one full-time professional support staff member. The department's mission is to collect, preserve, and share rare and distinguished book collections and historical records, photographs, media, and artwork to support excellent teaching, high-impact student learning, and active scholarship.

In 2017, University Libraries created a position for Special Collections dedicated to instruction and outreach. In this role of Archivist for Public Services and Community Engagement, Leigh Rupinski works with faculty members across the university to support undergraduate archival research and discovery. Since Rupinski's arrival, Special Collections has seen a steady rise in requests for archival instruction sessions. Almost all of these are "one-shot" sessions of 50–90 minutes' duration. In an academic year, Special Collections' faculty currently teaches approximately 25–30 class sessions. A wide variety of departments request instruction sessions using archival materials including Classics, French, Visual and Media Arts, Women and Gender Studies, and Geography and Sustainable Planning. The primary audience for instructional sessions, however, remains the History department. The opportunities to engage science, engineering, and medical students with Special Collections are quite limited and tend to occur only in lower-level required general education courses.

This case study examines the process of creating an interactive and engaging lesson plan for the History of Science course, HSC 201: The Scientific Revolution. History of Science students tend to be undergraduates majoring in science or medical related fields, rather than the humanities, who need to fulfill an intensive writing or general education requirement. For most, if not all of them, this session would be the first time they experienced hands-on interaction with historical resources. Accordingly, the archivist sought to create a less traditional lesson plan that would foster a sense of fun and interest in the materials. By planning a lesson introducing some simple material culture analysis and primary source literacy skills, Rupinski hoped to engage students in examining materials in ways that stretched their comfort zones without becoming overly mired in the details of historical research methods. Using the Guidelines for Primary Source Literacy, the archivist focused on three learning objectives to guide the lesson plan:

- 3.A. Examine a primary source, which may require the ability to read a particular script, font, or language, to understand or operate a particular technology, or to comprehend vocabulary, syntax, and communication norms of the time period and location where the source was created.
- 4.C. Situate a primary source in context by applying knowledge about the time and culture in which it was created; the author or creator; its format, genre, publication history; or related materials in a collection.
- 4.E. Factor physical and material elements into the interpretation of primary sources including the relationship between container (binding, media, or overall physical attributes) and informational content, and the relationship of original sources to physical or digital copies of these sources.

Both 3.A. and 4.E. emphasize examining sources from multiple angles. 4.C. takes the examination a step further by asking students to then apply prior knowledge and/or learning from the rest of the course to add context to the materials under examination.

Narrative

The Archivist for Public Services and Community Engagement was approached at the beginning of the Winter 2020 semester by one of the three professors assigned to teach HSC 201: The Scientific Revolution. This professor had previously brought sections of a similar class, History of Medicine, to Special Collections. His positive past experiences prompted him to reach out and request a similar 50-minute session for the History of Science students. After examining the primary source materials related to science and technology, however, Rupinski noticed a key difference. While the majority of the medical texts were either in English or had translation copies available in Special Collections, the science and technology texts were split roughly in half, with a significant portion unavailable in English.

In a typical one-shot session, most of the lesson revolves around hands-on document analysis time. For a lower-level undergraduate history class primarily populated by students unfamiliar with historical research methods, the language barrier presented a significant challenge for in-depth engagement and analysis with the sources. Rupinski saw an opportunity to dive into some of the basic concepts of material culture and visual literacy. There was plenty of material to dissect and discuss without delving into the full textual elements.

For the majority of this lesson, though, Rupinski wanted to encourage student learning with a hands-on activity that would be less focused on research methodology than in other classes. Ultimately, she chose to structure the lesson as a Bingo game for a number of pragmatic reasons. First, it was fairly simple to put together game cards and did not require extra materials. Second, Bingo is familiar to most students, which would allow in-class time to be focused on playing. Third, Bingo cards are easily mobile, allowing students to move around to examine materials. They also do not require technology, for which the teaching space is not equipped. Finally, and most importantly, Bingo cards allow for multiple factoids to be shared to engage student curiosity, while still allowing students choice in what questions they focus on answering. Rupinski developed the questions, and then had several student employees test their ability to find the answers and made modifications based on feedback.

For the class session, twenty-two students were seated around two long table groupings, with the primary sources scattered down the middle of the tables so they could be easily accessed from both sides. The first portion of class provided students with an overview of Special Collections. Rupinski prepared a 15-minute slide presentation that covered how to access materials, why registration is required for use, and proper care and handling procedures. The presentation also introduced the range of categories the rare books fell into, including astronomy and astrology, geology, ornithology, mathematics, medicine, locomotion, and other scientific experiments. Materials curated for the class were created anywhere from 1488–1914, and several were reprints of earlier works.

After explaining that some of the works were not in English, Rupinski demonstrated sensory engagement with a sample book about botany. Sensory engagement asks students to first use their senses (in this case, mostly sight and touch) to observe an object prior to engaging in an intellectual study. This way, students are encouraged to think about more than just what the words are on the page. Students used their senses to describe the sample book: How did the book feel? What could they see? Sample discussion questions included: Is the book heavy? What does the paper feel like? Are some

words printed in a different color? Are there illustrations or handwritten notations? After the class made basic descriptive observations about the sample book, the class moved into intellectual engagement with what those observations might mean and also tried interpreting the book's illustrations. The class discussed topics such as what the heft of a book might tell a researcher: a small, pocket-sized book might indicate general usage while a thick, weighty tome might have a more academic purpose. The class also discussed what handwritten notes might indicate and how color plays a role in drawing the eye to key headings or words. The archivist was particularly exhilarated by one student's discussion about why a women's health book might not include illustrations. This short activity met Objective 4.E. and set the students up for success in the following activity.

Following the introduction to material culture analysis, the students were asked to pair up and come to the front to receive matching Bingo cards (see Appendix 1). Rupinski prepared 12 variant cards, so no two pairs would have exactly the same lines for Bingo. Working in pairs, the students were asked to investigate the rare books provided to try and match the correct resource to the questions. Rupinski intentionally created the Bingo cards with a mix of harder- and easier-to-find information to prevent students from feeling frustrated or giving up. To answer some questions, students needed to apply the visual analysis skills practiced earlier to interpret illustrations. For example, one square asked the students to find a primary source that "includes an illustration that the Earth is round." To do so, students needed to interpret and understand the visual image of two sailors on a ship, one able to view land and the other unable to do so based on their positions. For some resources, students also needed to read archaic forms of English, and apply prior knowledge or course learnings to find the correct answers, which correlates to both Objectives 3.E. and 4.C. To make things a little more challenging, Rupinski asked that no resource be duplicated on the card. This made some seemingly easy questions, like "is written in a language other than English," slightly more complicated.

Initially, Rupinski offered prizes of Special Collections swag to groups that were able to complete a full Bingo card during class time. It quickly became evident that this expectation needed to be scaled back to just completing one line. As the 50-minute session neared the last fifteen minutes, however, many groups were close but very few had actually gotten a Bingo. Accordingly, Rupinski made another on-the-spot adjustment and offered groups several chances for hints if they were particularly stuck on a clue. Hints took various forms based on the particular group's needs. For one group, Rupinski checked the Bingo card to see if their answers so far were correct. For another group, the hint involved pointing them towards the general area on the table where the correct book could be found. Offering hints encouraged students who were otherwise reluctant to ask questions to speak up.

Students remained actively engaged in searching through the resources for the entirety of the session. Although they were divided into pairs, Rupinski observed students helping out other groups and sharing resources easily. None of the materials chosen for the activity were particularly delicate, but Rupinski and the professor both made sure to circulate and monitor care and handling while students were working.

Results

Students were given optional surveys to fill out at the beginning of class along with the Bingo cards. Of the twenty-two students present, eighteen students filled out the survey, and all of them indicated that this was their first visit to Special Collections. When asked "What did you find most helpful about the session?" four students answered with a variation of "learning about what this building offers." A side benefit of the session, then, was simply providing exposure to Special Collections' resources to students

that might not have otherwise known about them. Most responses, however, had to do with the Bingo activity. One student said, "I thought it was really informative and gave life to the works we're studying." Another student commented, "Seeing old books gave me a better understanding of the past." Yet another said, "Showing us how to search for everything in the books and making a fun game out of it." A particularly insightful comment read: "The concept of looking and observing old books forced you to learn multiple things." Student responses indicated successful applications of Objectives 3.A. and 4.E. into their use of the primary sources.

On a Likert scale of 1 to 4, students were asked to rate how well they liked or disliked the Bingo activity. 10 students responded with a 4 ("I really enjoyed it!") and 7 answered with a 3. No students answered with a 1 ("I never want to do that again").

In response to the survey question "Please provide any additional thoughts about the activity here," most students answered with some variation of "it was fun." One student commented: "It was hard at times but also taught me how to better look at books."

Following the session, Rupinski debriefed with the course instructor. The instructor was effusive in his praise for the activity and seemed very satisfied with the class objectives. Rupinski noted that students were able to handle and engage with a wider variety of sources in the limited time frame than a typical class session, where students studied one text in-depth. The instructor cancelled a planned short assignment for the students since they had participated so fully in the Bingo activity and actively demonstrated learning throughout the session by reading and analyzing the sources and asking good questions. During the activity, several students asked Rupinski if they could use their phones to double check scientific facts, such as when the first telescope was invented that could see Mars, or names of past Noble Prize winners. The activity prompted them to additional research to better situate the source in context, which speaks directly to Objective 4.C.

Although the survey provided valuable insights into students' perspectives, it is by necessity a fairly superficial assessment. It would be nice to be further integrated into the course as a whole to assess if the skills learned during the session continued to be useful throughout the semester.

Lessons Learned

Rupinski found the challenge of working with science-related resources really exciting. It provided an opportunity to teach to different learning objectives from some of the more standard history courses and to try a new activity to bolster student engagement. In response to student feedback and her own observations, however, there are still areas to improve in future iterations. For example, students needed frequent encouragement to move around and look at all of the resources and not just those situated closest to them at the start of the activity. In addition, the idea of providing hints to help encourage students came fairly late in the session. In future, Rupinski would create clearer activity guidelines to share with students prior to beginning the activity in order to set expectations for moving around and phone usage. This would also be a good time to share the hints option as a way to set up a "safety net" for students who might otherwise find the activity overly stressful.

Finally, time was limited to complete the activity and not every group was able to make a "Bingo" before the session ended. In fact, a number of groups stayed slightly late so Rupinski could check their cards and they could pick up a prize. This meant there was not enough time to have a debrief as a class about what students learned, which resources they found most intriguing, or what questions were the most

difficult to answer. Building in some time for group reflection would not only provide additional assessment for the archivist and course instructor, but it would allow time for students to think more critically about the objectives of the lesson.

In future iterations, particularly within the 50-minute time frame, Rupinski would consider scaling down the Bingo card to a 3x3 or 3x4 grid. This would make completing a full line easier and would give students less resources to sift through overall, which would hopefully allow for the addition of a debriefing period.

Overall, playing a Bingo game introduced non-history majors to historical research concepts in a fun and engaging way. Students learned how to interpret primary sources from multiple angles, regardless of whether or not they could read the full source. Student feedback was overwhelmingly positive and demonstrated that students engaged with the lesson's primary objectives, even realizing that the difficult questions served a purpose to push them toward deeper engagement with the sources.

Being able to see students who are wholly unfamiliar with archives and historical research come away with an appreciation for old books and a sense of confidence in looking at unfamiliar sources was inspiring. Following the success of the activity, the archivist would like to experiment with creating similar activities for different classes to see how well it might translate to courses working primarily with documents rather than rare books, or to introductory history courses as a way to lay groundwork for later archival research visits.

Appendix 1

Sample Bingo Card

Students were asked to fill in the title and author of the resource that best answered the question.

<p>Includes an illustration that the Earth is round</p> <p>_____</p> <p>_____</p>	<p>Part of a trend to display “at-home museums”</p> <p>_____</p> <p>_____</p>	<p>Is written in a language other than English</p> <p>_____</p> <p>_____</p>	<p>Features “volvelles”, or rotating parts, to make scientific instruments</p> <p>_____</p> <p>_____</p>
<p>Nobel prize winner, but the author’s picture is not included</p> <p>_____</p> <p>_____</p>	<p>Includes a recipe for healing a toothache</p> <p>_____</p> <p>_____</p>	<p>Is my favorite of all the ones I studied</p> <p>_____</p> <p>_____</p>	<p>Discusses Adam’s and Eve’s navels</p> <p>_____</p> <p>_____</p>
<p>Illustrates how to make cider</p> <p>_____</p> <p>_____</p>	<p>Depicts the universe with the Earth as the center</p> <p>_____</p> <p>_____</p>	<p>Dedicated to the King as sponsor of the Royal Society</p> <p>_____</p> <p>_____</p>	<p>Has to do with the study of medicine</p> <p>_____</p> <p>_____</p>
<p>Includes illustrations of birds or fish (circle which one)</p> <p>_____</p> <p>_____</p>	<p>Is written in archaic English (i.e., uses “f” for “s”)</p> <p>_____</p> <p>_____</p>	<p>Is composed of a list of “heretical works” and their authors from the Vatican</p> <p>_____</p> <p>_____</p>	<p>Depicts Mars’ moon before it could be seen by a telescope</p> <p>_____</p> <p>_____</p>