

CASE #14

Co-curricular Innovation: Teaching about Patents as Primary Sources

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

- 1.B. Articulate what might serve as primary sources for a specific research project within the framework of an academic discipline or area of study.
- 2.A. Identify the possible locations of primary sources.
- 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.
- 3.B. Identify and communicate information found in primary sources, including summarizing the content of the source and identifying and reporting key components such as how it was created, by whom, when, and what it is.

CASE STUDY LOCATION University of Dayton
Dayton, Ohio
<https://udayton.edu/>

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Introduction and Institutional Context

With the rich history of airplane and automotive invention in Dayton, Ohio, and the value of patents as primary sources in mind, librarians Bridget Garnai and Heidi Gauder designed and led two interactive, co-curricular workshops at University of Dayton's (UD) Roesch Library in Fall 2019 and Spring 2020. Their goals were to introduce students to patents as primary sources that influence daily life and expand students' ideas of what kinds of research can be supported by patents as primary sources. To that end, Garnai and Gauder created two workshops centered around patents as primary sources, "Patent Pending: Innovation in Society" and "Dayton Patented." In each of these workshops, participants learned about patents through a mini lecture and a collaborative digital humanities project.

Gauder, the library's history liaison librarian, first saw an opportunity for these workshops as the University's co-curricular residential learning program grew. This program, developed by Housing and Residence Life and known as A Vision for Integrated, Applied and Transformative Education (AVIATE—a nod to Dayton's aviation history), encourages student involvement in campus programming by incentivizing participation with Points Accumulated Toward Housing (PATH). For each PATH-eligible event that a student attends, they receive one point. During the housing selection process, students with the most PATH points have higher priority selections regarding where they would like to live. The University's highly residential campus includes many desirable housing options, all but guaranteeing participation in library programming. As certified campus partners in the AVIATE program, the librarians applied for their workshops to be PATH-eligible; in order to qualify, the workshops were required to meet accessibility standards and at least one learning goal of the AVIATE curriculum.¹ The patent workshops were designed to meet the Community Living learning goal; as noted in the workshop applications, "Patents support the concept of a healthy community, in that they protect and promote innovation. Indeed, one of the basic documents of our society, the U.S. Constitution, includes a patent & copyright clause." Garnai and Gauder saw an understanding of patents and their role in sharing innovation while protecting the rights of inventors as an important part of community living.

AVIATE programming events also require experiential learning, and so both workshops aimed to equip students not only with an understanding of patents as historical objects, but also with relevant search skills to explore patent databases. Garnai and Gauder also developed workshop activities that would allow participants to visualize the information they collected by collaboratively creating a timeline or map. Along with the opportunity to present these co-curricular learning experiences, the librarians saw a chance to share Dayton's history as a hub for innovation at the turn of the twentieth century and to introduce patents as a primary source.

UD's institutional identity also made these workshops especially pertinent. The University promotes entrepreneurship within its Business and Engineering schools. Both academic units have "idea incubators," where innovation is encouraged and promoted. The School of Engineering's Leonardo Enterprises and the L. William Crotty Center for Entrepreneurial Leadership support student start-ups and patents and a competition for new venture creation.

Garnai and Gauder built upon multiple inspirations, including a patent searching guide created by a former engineering librarian. For these workshops, Garnai and Gauder adapted the librarian's generalist approach, understanding that not all students are familiar with the technical language of patents and

¹ Kelly, Katy and Heidi Gauder, "Taking Flight as a Campus Partner: Library Programs Support a Residential Curriculum," in *Learning beyond the Classroom: Engaging Students in Information Literacy through Co-Curricular Activities*, eds. Silvia Vong and Manda Vrklja (Chicago: Association of College & Research Libraries, 2020), 21–41.

patent searching. The patent mini lecture was inspired by Dave Schmitt, engineering librarian at UC San Diego Library, and his patents workshop slide deck.² The “Dayton Patented” mapping activity was inspired by a DataLiteracy lesson, Demonstrating the Distribution of Innovation and Entrepreneurship Using Patent Data and a Mapping Tool: GeoFRED Marks the Spot.³ Given the co-curricular nature of the workshops and the widespread use of Google products on campus, the librarians adapted this activity using Google My Maps.

Narrative

Garnai and Gauder worked together to design and teach both patent workshops. The first session, “Patent Pending: Innovation in Society,” was offered twice. The second session, “Dayton Patented,” was offered once. Each session included a short lecture and hands-on activities resulting in crowdsourced digital products that illustrated the data collected by participants. “Patent Pending” introduced patent history, concepts, and searching to participants, who then had the opportunity to search for and read patents and share the information they collected. “Dayton Patented” introduced participants to the history of innovation in Dayton, Ohio, and suggested that patents can serve as records of this innovation. Participants in the “Dayton Patented” workshop also searched for and read patents and shared the information they found.

In preparation for the “Patent Pending” sessions, Garnai and Gauder compiled a list of patents including the patent number, the year it was issued, the name(s) of the inventor(s), and the subject and title of each invention—a patent bank, of sorts. The librarians consulted lists of important and influential patents,⁴ winnowing these down to patents that they thought would be especially interesting and relevant to the daily lives of college students. From this short list, the librarians created individual paper slips with a patent number, a link to the United States Patent and Trademark Office (USPTO) patent database, and a link to the Google Form where they would record the information they discovered through their search. This Google Form, set up before the sessions, included spots for participants to report the patent number they searched for, the invention title, inventor name(s), and the year that the patent was issued.

In the mini lecture, Gauder introduced participants to a brief history of the USPTO and highlighted the provision for patents in the US Constitution. The discussion also covered the definition of a patent, the different types of patents, what can be patented, and the patent application process. Next, Gauder related patents to the work of undergraduate students, contextualizing the role that universities play in basic research and development. A look at university-sponsored patents led to a discussion about connections between campus work and research and the potential needs for patents (Objective 1.B.). The mini lecture concluded with a patent number search in the USPTO database to introduce the hands-on search activity that would follow.

For the active learning activity, each participant received a slip of paper with a patent number. The directions asked them to perform a number search in the USPTO database, open the full text of the patent document, and record information about the patent in a Google Form (Objective 2A). Participants were asked to identify the invention, the inventor(s) name(s), and the year the patent was issued (Objectives 3.A. and 3.B.). At the same time, the librarians circulated around the classroom to

² Schmitt, Dave, “Patents: Slides from Patent Workshop,” accessed April 23, 2020, <https://ucsd.libguides.com/patents>.

³ “Demonstrating the Distribution of Innovation and Entrepreneurship Using Patent Data and a Mapping Tool: GeoFRED® Marks the Spot,” accessed April 23, 2020, <https://www.stlouisfed.org/education/distribution-of-innovation>.

⁴ United States Patent Office, *Revolutionary Ideas: Patents and Progress in America* (Washington, DC: U.S. G.P.O., 1976).

answer questions about searching and identifying the correct information in the patent documents. After each participant had submitted a Google Form response, Garnai exported the Google Form results to Google Sheets to create a timeline chart (Figure 1). In the Google Sheet, the data was sorted chronologically by the year each invention was patented and another column was added to the sheet with a repeated number pattern to space out the patents vertically in the chart. Next, a bubble chart was created with “Year Issued” as the horizontal axis and the vertical placement column as the vertical axis of the chart. Formatting was applied to make the bubble chart appear more like a timeline (see Appendix A for directions on replicating this timeline). These charts visualized the patents by displaying the name of each patent in chronological order. The finished timeline was viewed on the classroom screens and the librarians asked participants to share details about the patents they researched, which were often well-known patents (Objective 3.B.).

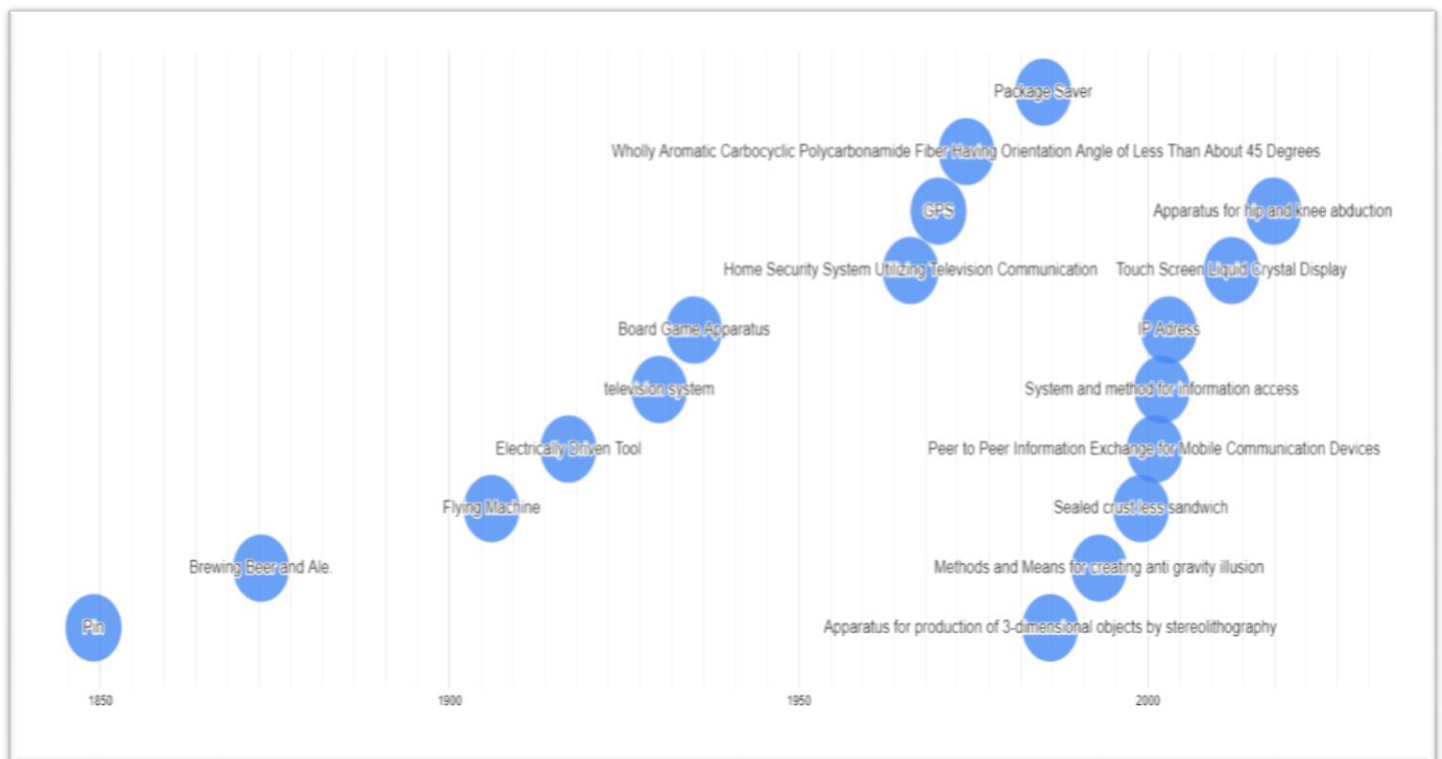


Figure 1. Timeline created for “Patent Pending” workshop. Data input by workshop participants.

While the timeline was being formatted, Gauder led the participants in a short “Guess that Patent” activity. Participants were shown a slide with a cropped image from a patent illustration and the corresponding patent title (Figures 2 and 3). Students were invited to guess a more well-known name for that patent. Examples included “pneumatic carpet-renovator,” also known as a motor-driven vacuum cleaner, and an “ice resurfacing machine,” better known as a Zamboni (Objective 3.A.).

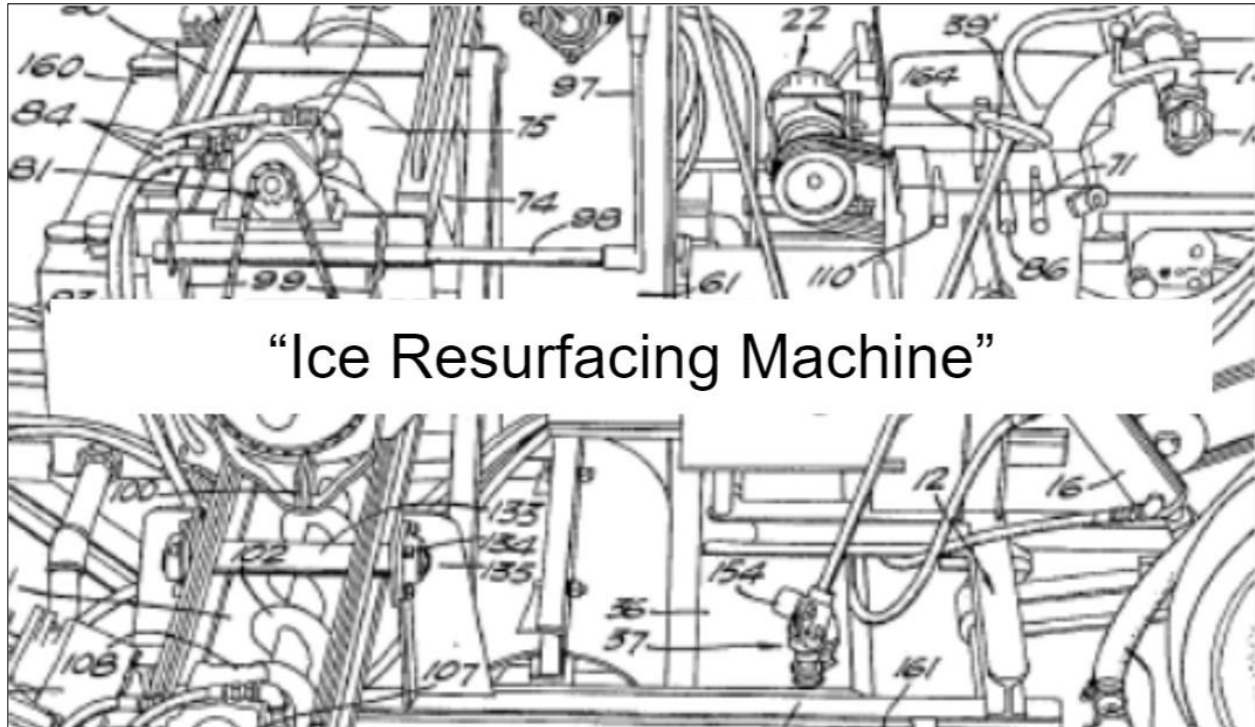


Figure 2. “Guess that Patent” slide with cropped image of patent illustration and patent title.

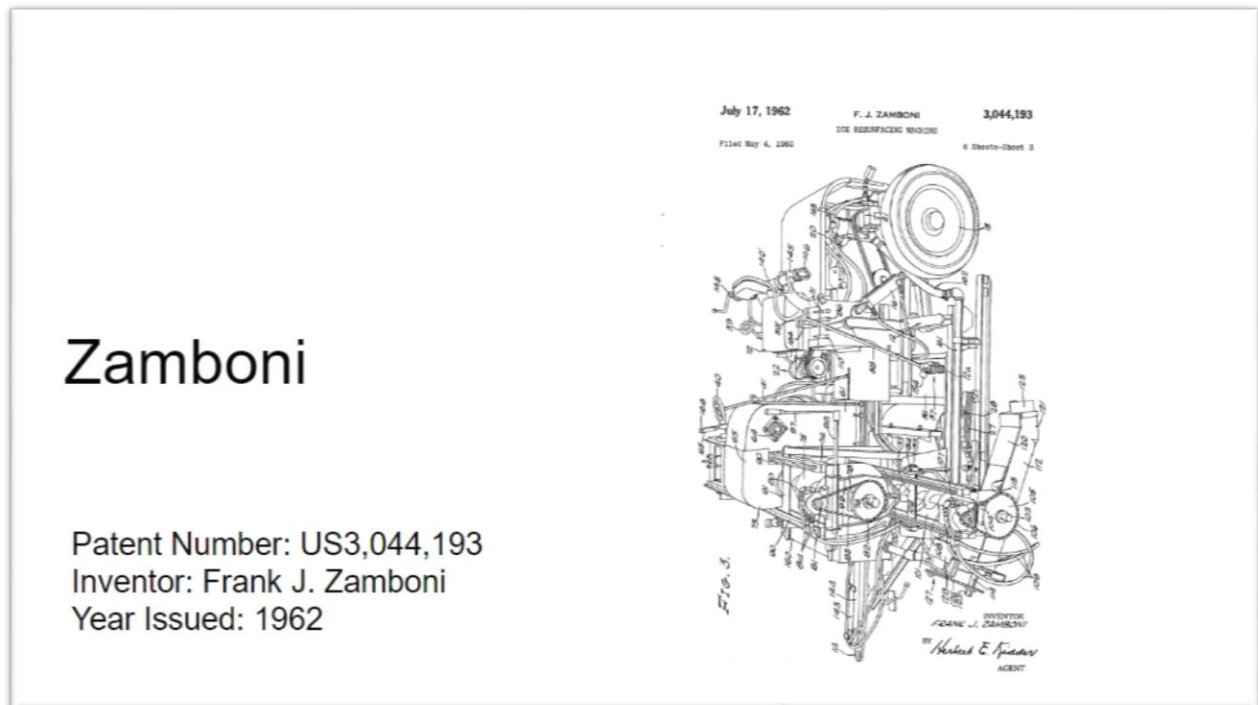


Figure 3. “Guess that Patent” slide with entire patent illustration, better-known name of patent, patent number, inventor name, and year that the patent was issued.

The “Dayton Patented” session built upon the introduction to patents and patent searching from the first workshop, as the librarians did not expect participants to have attended the “Patent Pending” sessions. In “Dayton Patented,” participants learned about Dayton’s innovation history and dropped pins in a Google map, another digital humanities approach that was employed to visualize the data collected through patent searching.

In preparation for “Dayton Patented,” Garnai and Gauder compiled another patent bank for Dayton inventions. In addition to the patent number, name, year issued, and inventor name(s), they also recorded the applicant/assignee, address of the inventor and/or assignee, and the source of any context about the patent. To identify relevant patents, the librarians read literature on the history of Dayton innovation and invention, including Curt Dalton’s *Dayton Inventions: Fact and Fiction*.⁵ They found the addresses of inventors and assignees through searches in city directories and census records when they were not included in patent documents. When deciding which patents to include in the session, Garnai and Gauder prioritized patents with associated addresses that still had buildings visible in the street view on Google Maps. For the session, envelopes were prepared for each patent that included a relevant address for the inventor or assignee and copies of contextual information about the invention. Garnai created a Google My Map and shared it with participants using a shortened URL.

Like the “Patent Pending” sessions, “Dayton Patented” began with a mini lecture, which was followed by a two-part, hands-on digital humanities activity. The mini lecture introduced participants to the history of innovation in Dayton, beginning in the late nineteenth century, as well as the people, transportation routes, and capital that contributed to Dayton’s role as a hub for invention and industry. A discussion of the area’s current innovation highlighted the University of Dayton Research Institute and Wright-Patterson Air Force Base. Review material from the “Patent Pending” session included the definition of a patent, types of patents, and what can be patented, all of which helped participants connect Dayton history to patents. The mini lecture concluded with a patent number search on the USPTO website.

After the mini lecture, participants were given a slip of paper with a patent number and four pieces of information to identify in their research, including the patent name, year issued, inventor(s) name(s), and assignee(s) name(s). For the first activity, participants conducted their own patent number search in the USPTO patent database and recorded the information on the paper slip (Objectives 3.A. and 3.B.). Next, participants reported their inventor’s names to the librarians, who gave an envelope to each student with a relevant address for each inventor and copies of any contextual information that would help participants understand the patent documents they had located. This address information, along with the patent information, formed the basis for the second activity. Participants added a pin to the Google Map referencing the patent number, year issued, inventor(s) name(s), and assignee(s) name(s) in the pin description (Figures 4 and 5). Together, the group viewed the map on the classroom screens and the librarians led a discussion, tying the completed map into points from the mini lecture, including settlement in Dayton, historic transportation routes, and changing neighborhoods.

⁵ Montgomery County Historical Society, 2003.

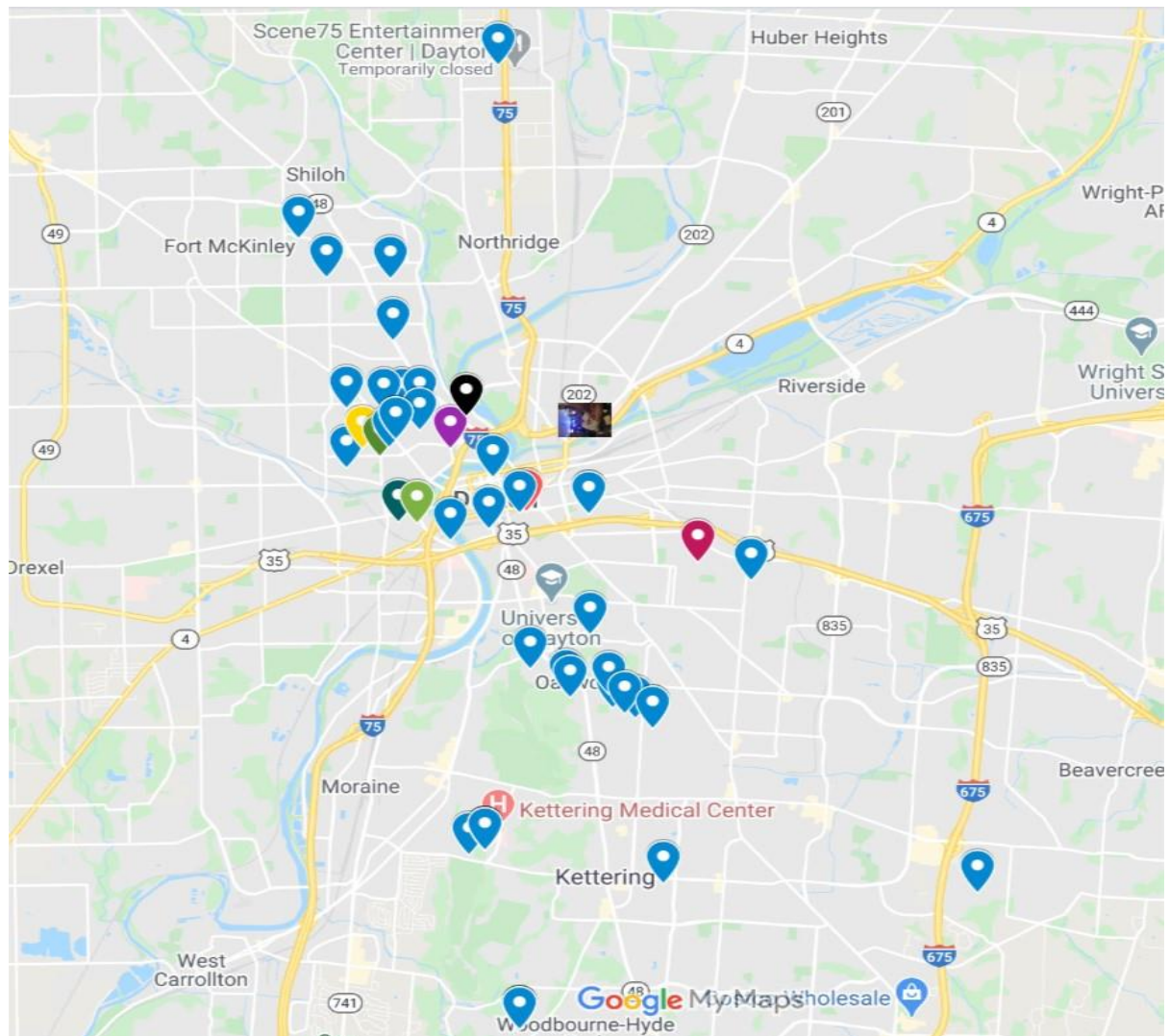


Figure 4. Google My Map with pin drops from the “Dayton Patented” session. Pins added by workshop participants.

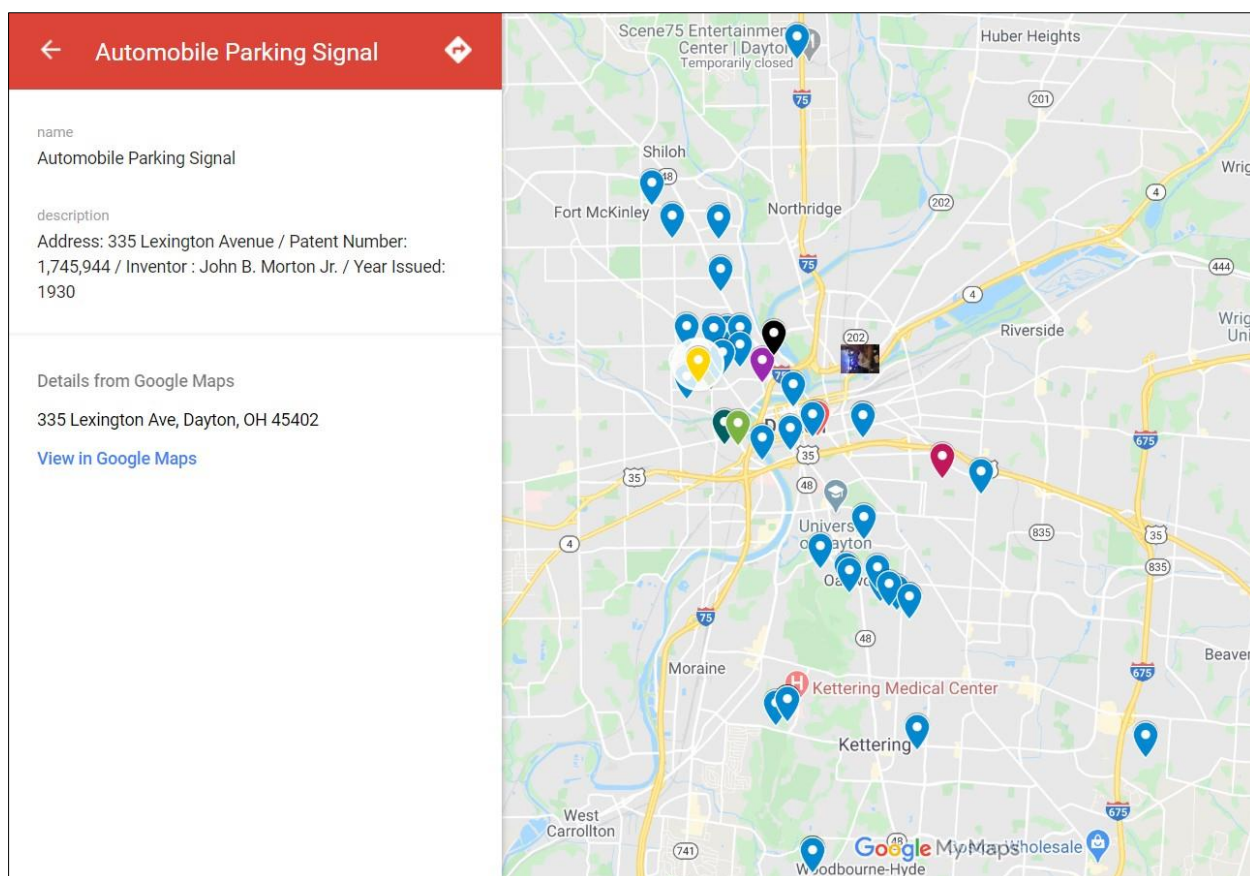


Figure 5. Google My Map with individual location metadata from the “Dayton Patented” session.

Results

Based on attendance numbers, the librarians were pleased with the results: two of the three sessions were filled to capacity (the room holds 48 people) and the third had nearly three dozen students present. These sessions were entirely voluntary and the fact that they were nearly full each time speaks to the level of interest. Given that the workshops were co-curricular and students were motivated to attend for housing points, the assessment approaches were tied to the AVIATE program learning outcomes—in this case, community living—and not with any course-specific learning outcomes. In hindsight, however, even though there was great attendance, the librarians realized that they missed a prime opportunity to gather student feedback, particularly in terms of session content and perceptions of patents as primary sources.

In order to evaluate instruction effectiveness, the librarians determined that success would be measured in terms of whether students could navigate to the USPTO database, search for a particular patent, and identify specific components of a patent (Objectives 2.A., 3.A., and 3.B.). The librarians knew that the library’s instruction program did not address patent searching on a comprehensive scale and that

previous patent research was likely done, if at all, within individual research consultations. As such, success was mostly measured in their ability to locate the USPTO website, identify certain patent components, and describe the patent itself. Librarians could immediately identify when students had failed one of these steps, because the patents were fairly well-known for the “Patent Pending” session, while the “Dayton Patented” activities relied on either famous names or local addresses.

The measures worked well for a patent introduction, given the large number of participants, the session activities, and the time constraints. Now that the librarians have taught a round of workshops, more consideration could be used for assessing learning. Both librarians felt the sessions were successfully planned and executed and would be improved in the future by conducting more assessment as to whether participants understand the value and need for patents. Although both workshops examined how students might utilize patents and patent searching within their own academic disciplines (Objective 1.B.), there could be additional opportunity for students to articulate how patents fit within their work and studies.

The librarians also discussed adding an activity that asked students to identify what they liked, learned, and would suggest for future iterations of the workshop; a slightly different assessment of learning might be to ask students to identify one new thing that they learned as well as what they would like to know more about. These questions could easily be integrated into the hands-on portion of the workshop, whether they are added to the patent paper slips or the Google forms that students are asked to fill out.

Lessons Learned

Librarian passion and interest in local history sustained a lot of the preparation that went into hosting the workshops, as it took time to locate patents that would make sense to students. The patent bank for “Dayton Patented,” which focused on local inventors, probably took more time than the first one; although the city is rich in inventions, the librarians sought to create a diverse pool of inventors, patent types, and eras. It was a labor of love, to some extent, as both librarians learned more about the significance of patents to the city’s history.

For the “Patent Pending” workshop, the librarians searched for patents that were easily understandable as well as for patents taken out by women and minorities, which took additional searching. Others inspired to do a general patents workshop would do well to look at the patent prints market on Etsy, where many easily identifiable patent images are for sale. Websites like the National Inventors Hall of Fame (<https://www.invent.org/>) and Famous Women Inventors (<http://www.women-inventors.com/>) were also useful sources of information, especially when seeking minority and female inventors.

When preparing the “Dayton Patented” workshop, the search for such inventors was difficult to the point where the session included discussion about the lack of women and minorities in the local story.

At the turn of the century, this town's most well-known innovations were developed by white men. Dayton local history contains gaps about women, African Americans, and other minorities who might have been actively engaged in creating inventions and filing for patents. This gap is potentially exacerbated by the fact that the U.S. Patent and Trademark Office collects very limited demographic information on patent applications.⁶ Because this session was introductory, the librarians focused on inventions and inventors that were more easily understood, and where houses or business locations could be more easily found on a Google map. If this workshop is repeated, it would be good to include more women and minorities in the patent bank. We used several books and websites to gather local patent information, but the Miami Valley Inventor Historical Database (<https://libraries.wright.edu/research/patents>) from the Wright State Libraries will be an additional resource for future iterations of this workshop.

As a result of these workshops, librarians were able to strengthen ties to University centers that do not necessarily make direct use of library instruction. The workshop leaders reached out to the directors of both the School of Business Administration and the School of Engineering entrepreneur centers, advertising the workshops and sharing workshop dates. Both directors responded positively to our requests. The "Patent Pending" workshop could easily be offered as a teaching component to either entrepreneur center at the University, whether it would be for students in the School of Business Flyer Pitch competition or those seeking funding from the School of Engineering Leonardo Enterprises. Students from both areas have gone on to patent their inventions, and as such, the librarians can envision offering a session to students in either center as they work on developing their products.

The librarians also saw that the hands-on nature of the workshops offered the potential of working with other groups. For example, an offer was extended to a nearby parochial school and the middle school science teacher scheduled two visits to the library. Even though these events were cancelled due to school closures, the librarians prepared to lead these sessions by adjusting the general patent workshop to include a U.S. Patent and Trademark Office learning activity,⁷ and the patent bank for this was adapted to include more toy patents and more recent patents that middle school children would recognize. An assessment activity for this age group could easily be incorporated with a question or two related to the mini lecture on the same Google Form that asks them to record patent information. Additionally, the librarians had plans to host the "Dayton Patented" workshop with the library staff as a professional development opportunity. One of the lessons learned from this experience was that these workshops could be adapted to different groups and constituents.

In considering what might be done differently the next time in order to improve teaching the primary source-related learning objectives, another possible hands-on activity could ask students to identify a

⁶ Office of the Chief Economist at the U.S. Patent and Trademark Office, "Progress and Potential: A Profile of Women Inventors on U.S. Patent," p. 13, accessed April 23, 2020, <https://www.uspto.gov/sites/default/files/documents/Progress-and-Potential.pdf>.

⁷ U.S. Patent and Trademark Office, "Inventor and Pioneer," accessed April 23, 2020, <https://www.uspto.gov/kids/TrashCanLiner.pdf>.

relevant patent descriptor, so that students better understand the Patent Cooperative Classification system, “a system for organizing all U.S. patent document and other technical documents into specific technology groups based on common subject matter.”⁸ Students responded well to the “guess this patent” activity during the general patents workshop, and a similar activity for the classification syntax could be developed easily (Objective 3.A.).

By leveraging their interest in patent history and creating engaging hands-on activities, the librarians hosted three successful co-curricular workshops on two separate topics that introduced students to a new kind of primary source—and one that has the potential to be used in multiple academic disciplines. The librarians also recognized the adaptability of these workshops so that other groups could appreciate these primary sources in a meaningful way. With this framework, librarians are now poised to host additional workshops and share the value of these less-understood primary sources.

⁸ U.S. Patent and Trademark Office, “Patent Classification,” accessed April 23, 2020, <https://www.uspto.gov/patents-application-process/patent-search/classification-standards-and-development>.

Appendix A

Directions for Creating a Timeline in Google Sheets

1. Create spreadsheet from Google Forms responses.
2. Sort range A -> Z by Year Issued column.
3. Create Vertical Placement column, repeating sequence of numbers (1, 3, 5, 2, 4, 6 or similar sequence).
4. Insert chart.
5. Chart editor -> Setup -> Chart type -> Bubble chart
 - a. Data range: (ex.) A1:F27
 - b. ID: Title of Invention
 - c. X-Axis: Year Issued
 - d. Y-Axis: Vertical Placement
 - e. Check box: Use row 1 as headers
6. Chart editor -> Customize -> Horizontal axis -> Min: 1790, Max: 2050
 - a. Vertical axis -> Min: 0, Max: 7 (max should be one number larger than largest number in Vertical Placement sequence)
 - b. Gridlines -> Vertical axis -> Major gridline count: None
 - c. Gridlines -> Horizontal axis -> Minor gridline count: 10
7. Adjust length and height.