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Visualization Praxis: Data Visualizations with an Interdisciplinary Advantage

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A look at using Viewshare as a data visualization resource for teaching lessons, completing assignments, or complementing research in any discipline.

Introduction

Digital scholarship is changing the way we communicate, access, connect, learn, and create information (Rumsey, 2013; UCLA, n.d.; Johnson et al., 2013). Increasingly, scholars, journalists, authors, scientists, humanists, and others want to include specific technologies such as data visualizations and interactive models to communicate their work. This is being done through class assignments, project websites, code on Github, newsfeeds, social media, and other digital channels, using visualization tools such as Google Fusion Tables, StoryMaps, Viewshare, Tableau Public, and D3, among others. These technologies have changed what we can do with data. Among scholars, they are catalyzing discussions on the importance of hyperlinking and interoperability and what it means for data to be linkable, mined, curated, analyzed, visualized and so forth. Just a few years ago, we could not absorb and disseminate knowledge and information in the ways we now can. Therefore, in the digital age of the 21st century, many higher education institutions are considering how to better support scholarship in a wide variety of disciplines on their campuses (Lippincott et al., 2014). One response is implementing digital tools into the curriculum.

This article emphasizes how data visualization tools can be used by both faculty and students across different disciplines. Specifically, the article addresses Viewshare (<http://viewshare.org>) and includes procedural steps for uploading data and building data visualizations.

In my teaching, I use Viewshare to demonstrate the relevancy and impact of hyperlinking and interoperability across disciplines. The data visualization lesson described in this article was extremely useful to the interdisciplinary community I instruct, which includes both faculty and students, as they didn't know how to start adding digital tools to their research or teaching. Data visualizations can show polling results in elections for journalism courses, show cholera outbreaks across locations for biology and chemistry courses, and reveal how historical events helped shape a society over time in history courses. These are just a few examples of ways the same data visualization tool can be used in different disciplines.

Viewshare: An Overview

Viewshare is a free platform for generating and customizing views or visualizations such as interactive

maps, timelines, facets, and tag clouds (Viewshare, 2016). This tool allows a user to import data from a variety of sources and manipulate and share that data. The Viewshare product is available by requesting a free account and is provided by the National Digital Information Infrastructure and Preservation Program (NDIIPP) at the Library of Congress.



Figure 1: Image of the Viewshare homepage

Once the data has been gathered, preferably in a spreadsheet or XML MODS file, simply upload and then augment the data to correctly identify field types and other format specifications. The structure of the file being uploaded is important. It should include data as a rectangular spreadsheet (divided by columns and rows) or as an XML MODS file with valid XML (per the Metadata Object Description Schema). There are three other ways to import data (via OAI, CONTENTdm or JSON) but for interdisciplinary teaching it is best to focus on spreadsheets and XML files. To learn more about the other methods, visit the [Viewshare FAQ page](#). Once the data is uploaded, choose layout preferences, and create views to show different representations of that data like a gallery, list, pie charts, timelines and maps.

Creating Visualizations with Viewshare

1. Request a free account by filling out the form at <http://viewshare.org/registration/register/> and log in into Viewshare.
2. Upload your data. Click “Create view” and select a file to import “From a file on your computer” to locate the spreadsheet data you already compiled for your course assignment or research project.
3. After clicking “Upload,” you will see a preview window that allows you to edit field names and field types and select what data to include in your visualizations.
4. Augment your data. Next, you augment the data by selecting the proper “type” for each element signaling how the software should treat each element (as a link, text, image, etc.). It is important to consider how the data is being used and to determine in which field that data is located. For example, there are differences between a date and date ranges or links to websites and links to image URLs. Placing the wrong data in the wrong field can misrepresent the project. This step is important, as students have encountered problems due

to incorrectly formatted data. When you click “Save,” you can review the dataset.

5. Click “Build” and choose the column layout you prefer for your web page (typically one, two, or three columns).
6. Click on the “Add a View” tab and select from tags, maps, scatter plot, table, timeline, pie chart, and gallery to add visualizations of your data. Use the “Lens” setting to decide what data from your spreadsheet should appear in a pop-up text block when clicked on in the “View” you selected. There may be information in the uploaded spreadsheet that is helpful to the creator of the visualization but not necessarily helpful to others. It is important to critically think about what is being communicated with that visualization and not to overpopulate it with too much or unimportant content.
7. Click “Save” once you have added the views and settings desired.
8. To embed the visualization in a website, ePortfolio, assignment wiki, or other digital channel, click “Inspect” in the “My Views” menu. Copy the embed code for HTML publishing within a content management system or copy the shareable link for use in resumes or emails.

This process is summarized in the image below for steps 1 to 6 and may take some time, depending on how well you prepared your data in advance.

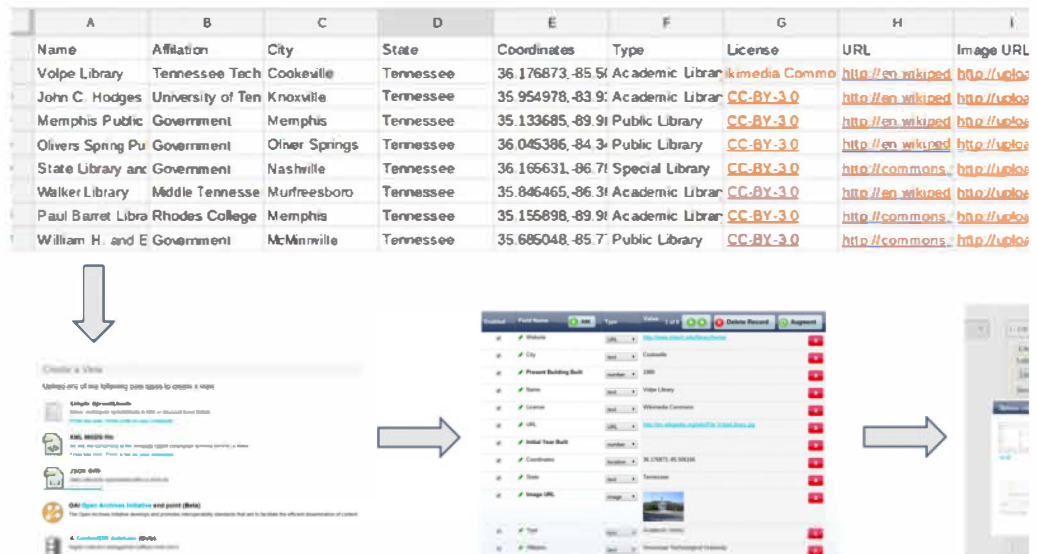


Figure 2: Process of uploading spreadsheet, augmenting data, and building a visualization

List View Settings

Label

Free text title of view

Sort By

Lens Settings

Title

Link

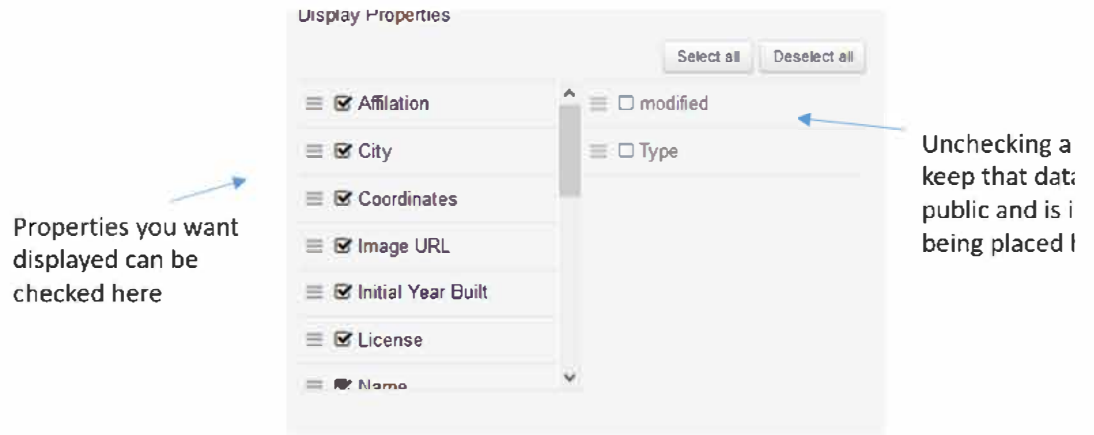


Figure 3: Example of settings where you can decide which properties of the data you want displayed

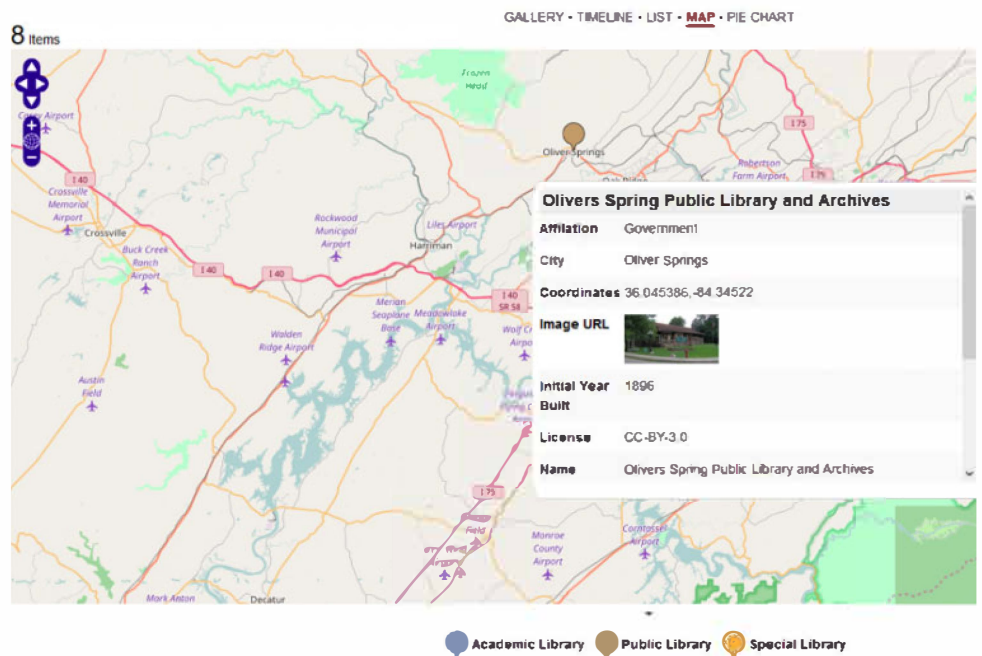


Figure 4: Image of map with pop-up text

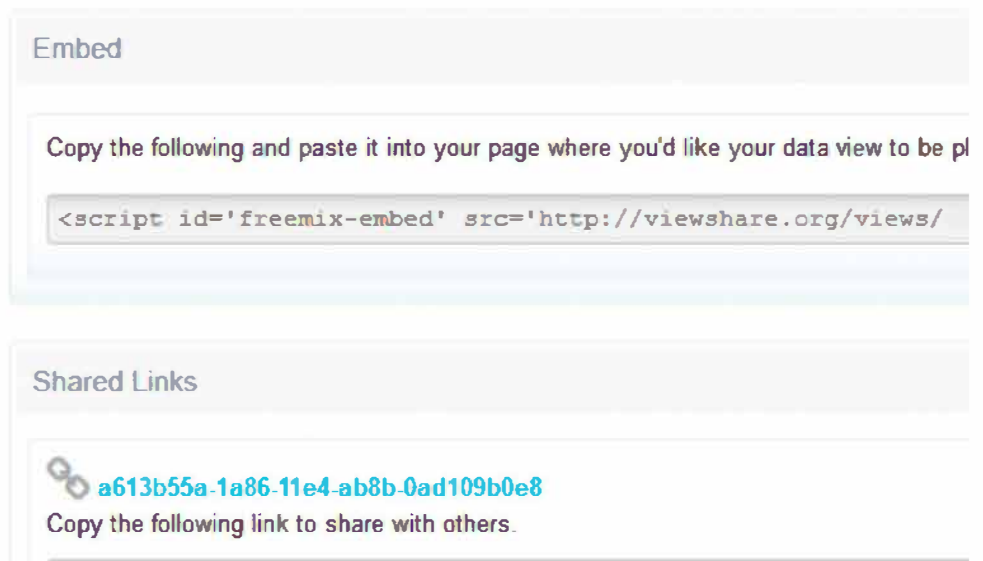


Figure 5: Publishing options for embedding project into another html compatible website or sharing links to V

Teaching Visualization with Viewshare

I have used these steps to present Viewshare on several occasions including live webcasts, pre-recorded online lecture modules, and in-person workshops that were open to a variety of disciplines at two different institutions. Particularly in the workshop, the interaction among participants from different disciplines was instrumental in showing Viewshare's interdisciplinary applicability. Building a view together, with feedback from the audience, helped the concepts sink in further. Students and faculty in the audience were stimulated and already thinking of ways to implement Viewshare in their own coursework and pending projects.

After introducing Viewshare at interdisciplinary workshops, I typically receive feedback from attendees. One faculty member mentioned using it to show the impact of their own research within their field, including the number of dissertations advised during their tenure. A graduate student decided to use Viewshare to show the development of certain laws around unions and migrant workers of the Chavez era. The student actually used it to collaborate as well, where multiple students were logging into the same account to edit the views.

When presenting a lesson on Viewshare, have images pre-selected and easily accessible and the spreadsheet already complete with data. Start by showing the complete project and then back track to the creation process. It is important to stress how the entire set of visualizations was created from one spreadsheet to avoid unintentionally provoking anxiety among non-programmers in the audience. There is no code involved but all the data can make it seem complex.

Examples to show an audience should include, at minimum, the completed project website homepage and different views of that homepage as depicted in the images below.

The screenshot shows a Viewshare project page for "Libraries in Tennessee". Annotations with blue arrows point to various features:

- Project title:** "Libraries in Tennessee"
- Introduction to project:** A text block starting with "WELCOME to the Digital Scholarship Workshop on Data Visualizations..."
- Ability to search contents of project:** A search bar with the word "Search" above it.
- Present Building Built:** A timeline slider showing the years 1932 and 2005.
- Type:** A list of categories: Academic Library, Public Library, and Special Library.
- Number of items in this project:** "8 items"
- The type in this showii:** Navigation links for "GALLERY", "TIMELINE", "LIST", "MAP", and "PIE CHART".
- sorted by:** "Name, then by" and "grouped as sorted"

The main content area displays a grid of eight library images with their names: John C. Hodges Library, Memphis Public Library, Olivers Spring Public Library and Archives, Paul Barret Library, Stele Library and Archives, Volpe Library, Walker Library, and William H. and Edgar Magness Community House and Library.

"Facets" are used to search and limit results within the project.

The type and number of facets used is up to the author of the project. Here the example shows you can filter by the year a library was built or the type of library.

Figure 6: Example of a completed project, “Libraries in Tennessee,” with gallery view in Viewshare

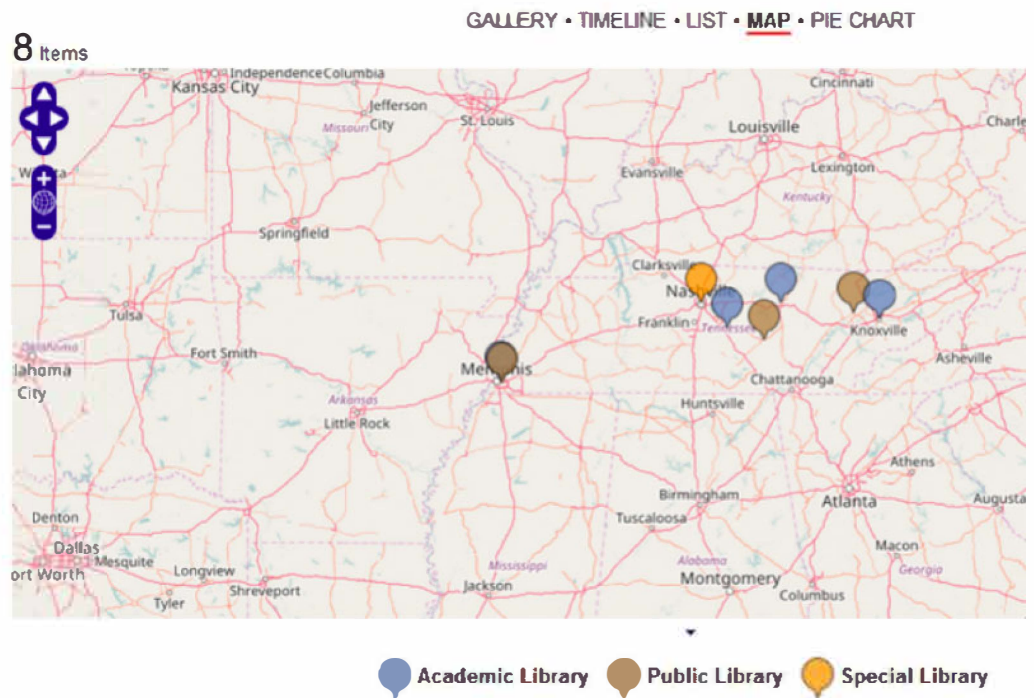



Figure 7: Map view of the homepage “Libraries in Tennessee”

1 Item filtered from 8 originally ([Reset All Filters](#))

sorted by: [Name; then by...](#) • [grouped as sorted](#)

John C. Hodges Library ([link](#))

Affiliation	University of Tennessee
City	Knoxville
Coordinates	35.954978,-83.930293
Image URL	
Initial Year Built	1969
License	CC-BY-3.0
Name	John C. Hodges Library
Present Building Built	1987
State	Tennessee

Type	Academic Library
URL	http://en.wikipedia.org/wiki/File:UT-Hodges_Southeast.jpg
Website	http://www.lib.utk.edu/
Year	Wed, Dec 31, 1986, 07:00 pm



Figure 8: Search results using the word cloud to filter for key terms with the list view in Viewshare

Conclusion

Incorporating data visualizations into research and teaching is one way scholars, journalists, authors, scientists, humanists, and others can communicate their work. Viewshare and the lesson described in this article can be used in classes, assignments, or workshops for multiple disciplines including English, history, geography, anthropology, business, journalism, and biology.

Libraries, digital scholarship centers, and other centralized locations on university campuses can help scholars across disciplines incorporate technologies like Viewshare into their teaching and research. By fostering this type of interdisciplinary teaching and campus collaboration, visualization praxis can help to improve the digital and data pedagogies that inform our 21st century culture.

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