**From TEI to Drupal:**

**Creating a Custom Metadata Schema for**

**The George Washington Financial Papers Project**

***Introduction***

As the first President of the United States, George Washington is an outsized figure in American history whose name is invoked in contemporary politics to this very day. Scholars know more about Washington than virtually any of the other founders, owing to the thousands of extant letters he wrote during his lifetime. He left posterity thousands of financial documents where he recorded every transaction, from money lost at cards, to food and textile expenses at his Mount Vernon home. Washington was a savvy entrepreneur and successful businessman whose methodical and meticulous recordkeeping allows 21st century researchers a broad understanding of America’s economy in the 18th century. The Washington financial papers offer insights spanning economics, material culture, manufacturing, and agriculture.

The George Washington Financial Papers Project (GWFPP) was a 3-year project (2013-2017) to transcribe and digitize the first President’s financial documents and make them accessible to the public. <http://financial.gwpapers.org/>. The collection’s core documents are contained within three general ledgers covering a nearly 50-year period from 1750-1799.[[1]](#footnote-1) It contains basic business accounts where Washington recorded everything from the purchase of farm and household products to the sale of slaves. In addition to the ledgers, there are associated financial journals, account books, cash books, pocketbooks, receipts, invoices, and business correspondence.

The GWFPP grew out of the earlier Papers of George Washington Digital Edition (PGWDE) project. <https://rotunda.upress.virginia.edu/founders/GEWN.html>. The PGWDE was a highly successful 2004 effort to digitize the original Papers of George Washington ([PGW](https://washingtonpapers.org/)) project, a decades old hardcopy publishing effort of the University of Virginia. Since the first printed volume was released in 1985, PGW has published an astounding 77 of its anticipated 92 volumes. It remains on schedule to finish the complete Papers in about 2026, making this one of the longest continuous research efforts in the humanities, and one that spans the transition from print to digital.[[2]](#footnote-2)

First launched in 1968, the PGW is a collection of every known letter written AND received by George Washington. It contains approximately 135,000 documents. The financial papers contain an additional 30,000+ digital items. Both collections are available online and allow access to the XML information for each record. The PGWDE collection uses the Text Encoding Initiative (TEI), but when confronted with complex financial metadata, the GWFPP creators realized that TEI would be inadequate to the digital task and project goals, thus necessitating the development of a custom schema. I will show how the unique complexities of financial data required a more nuanced metadata schema and why the TEI schema that was so successfully employed on the inaugural digitization project, was insufficient.[[3]](#footnote-3)

***TEI History***

Prior to the creation of TEI, humanities scholars had no common standard for encoding electronic texts in a manner that would serve their academic goals.[[4]](#footnote-4) In 1987, a group of scholars representing fields in humanities, linguistics, and computing convened at Vassar College to put forth a set of guidelines known as the “Poughkeepsie Principles”. These guidelines directed the development of the first TEI standard, "P1".[[5]](#footnote-5) The most recent TEI standard is P5, established in November 2007, with maintenance and updates released at least twice a year since that time.[[6]](#footnote-6) The current edition of P5 is 4.8 (2024).

***Community***

Because it is focused on the humanities and social sciences, TEI is, “the encoding scheme of choice for the production of critical and scholarly editions of literary texts, for scholarly reference works and large linguistic corpora, and for the management and production of detailed metadata associated with electronic text and cultural heritage collections of many types.”[[7]](#footnote-7) The University of Virginia was a founding member of the TEI Consortium in 1999, so it is logical that the PGWDE would utilize the TEI schema.

***Structure***

TEI uses the XML schema language of the World Wide Web Consortium (W3C), which originated in May 2001 and is currently in its fifth edition (2008). TEI has approximately 15 top level (core) elements that contain hundreds of sub-elements. Sample elements are listed below: [[8]](#footnote-8)

|  |  |
| --- | --- |
| **Element** | **Description** |
| <TEI> | The root element that contains the entire TEI document. |
| <teiHeader> | Contains the metadata of the text, including title, author, and other bibliographic details. |
| <fileDesc> | Describes the file, such as title, publication details, and other bibliographic metadata. |
| <text> | Contains the main body of the text being encoded. |
| <body> | Contains the main content of the document, typically nested inside <text>. |
| <front> | Contains front matter such as title pages, prefaces, or introductions. |
| <back> | Contains back matter such as appendices, bibliographies, or indexes. |
| <div> | Used for logical divisions within the text, such as chapters or sections. |
| <p> | Represents paragraphs in the text. |
| <head> | Contains headings, such as chapter or section titles. |
| <note> | Used for annotations, footnotes, or other supplementary information. |
| <list> | Represents a list of items, such as bibliographies or inventories. |
| <item> | Represents an item within a list. |
| <date> | Used for encoding dates, either in the content or in metadata. |
| <title> | Represents the title of a section, document, or part of the text. |
| <name> | Used for encoding names of persons, places, organizations, etc. |

***Implemented projects and collections***

There are now hundreds of projects, both completed and in progress, that utilize TEI and almost all are associated with one or more universities and typically relate to heavy text-based collections such as diaries, books, letters, etc.[[9]](#footnote-9) Following the success of the PGWDE, in 2009, the creators decided that the financial papers should be a digital-only edition.

***Issues surrounding an initial XML-based approach***

While the creators initially planned to simply add them to PGWDE, challenges rapidly became apparent. The PGWDE was the first publication in Rotunda’s (University of Virginia Press digital division) American Founding Era Collection to move from print to digital. The schema (using the TEI P5 with some customizations) used in this XML-based publication was informed by the print structure to define the visual presentation and organization. It was important to not only mirror the letterpress edition, but also exploit the search and display capabilities of the digital medium. TEI remains an excellent solution for moving legacy publications from letterpress to digital.

In the context of documents related to the America’s founding generation, the XML-based solution was ideal because the papers were mostly narrative documents. Moreover, letters (which make up the majority of the document types) can easily be arranged hierarchically. Financial documents, however, are tabular in structure, span decades-long periods of time, and are not typically useful when read from beginning to end. They are also uniquely dependent on other documents to provide context.

The question of which financial papers constitute a single "document" is also problematic. For instance, the three ledger books, each of which could be considered an individual document, total around 850 folios in length (about 1,700 pages). Under the TEI schema, users who navigated to the document would have to scroll through hundreds of pages. Treating individual folios as documents is also problematic because one ledger folio can contain entries from multiple accounts. These accounts were frequently carried forward to other folios and ledgers. Furthermore, a folio page with multiple accounts contains transaction dates that are chronological only within each individual account, not the folio.

**Document Types**

How can the database be used to define and organize different types of financial documents such as ledgers, journals, waste books, and receipts?

Metadata and templates were structured on the different types of financial documents. Washington followed the common accounting practices of his time, so most documents can be categorized according to type.

* Ledger
* cash memoranda
* journal of accounts

Transactions were quickly recorded in a waste book (also known as a daybook, blotter or memorandum), then moved to a journal where a bit more information was added, and finally recorded in the ledger; so a single transaction is recorded in several places. This set of relationships is managed in the database using links.[[10]](#footnote-10)

With these challenges and realizations in mind, the creators sought to balance two desired outcomes: a searchable transcription and calculable data. To make these records not just available, but truly accessible, they needed a solution to capture the financial content in a way that users could run calculations, connect related records, and thus, understand the data in context.[[11]](#footnote-11)

After partnering with DocTracker, a content management system for the editing and publishing of digital documentary editions, a database solution was implemented. The project goal remained to not only broaden the potential audience, but also to facilitate search options, data mining, and analysis. [[12]](#footnote-12)

**The Database Migration: From DocTracker2 to Drupal**

DocTracker (DT2) was a content management database for documentary editions built in FileMaker Pro. DocTracker centralized the editorial process: document search and collection, document cataloguing, transcription and markup, source-image storage, editorial workflow management, gathering of metadata, annotation, and XML output. However, as a publication platform, it was limited because of its use of XML. Accordingly, the creators migrated to Drupal, a highly configurable open-source content management system.

Stertzer reasoned the following:

1. Drupal content can be mapped to fields, allowing for robust displays and search capabilities.
2. Drupal is accessible, low-cost and easy-to-use for a large, international user community.
3. Backend (content/data) and frontend (website interface) are managed within the system.
4. Drupal is open-source, and its core and add-on (module) code are actively maintained.

The use of Drupal allowed the project to confront four challenges inherent in the financial documents:

1. Different types of financial documents are formatted in distinct, though standardized ways, and the formatting of financial documents carries implied meanings.
2. Transactions are full of dittos, abbreviations, and shorthand.
3. The documents present issues of currency, valuation, and barter.
4. A hierarchy of documents exists: the same transaction may be recorded in multiple formats (daybook and ledger, etc.) generating repeated instances of the same transaction.

Archaic financial data is not easily accessible by search techniques. Those same challenges made it impossible for the GWFPP team to simply transcribe it, put it online, and expect it to be searched and understood. The solution involved a combination of transcription and corresponding data fields, node references associating various content types, and references connecting taxonomies. Drupal provided a place to develop and manage taxonomy lists for specific financial content types, group and sort content, and to identify relationships between content types.[[13]](#footnote-13)

**Docs vs. Data Approach**

The database negotiated the challenges of financial documents, such as managing and interpreting multiple currencies, fluctuating valuations, and the system of barter, as well as handling complex document relationships. But the most critical question was:

**What is the best way to present a document both as an object that has been accurately transcribed while also allowing scholars to analyze the financial content?**

**Answer: Preserve the text & create data.**

To provide accurate transcriptions of the documents and for the text to be fully searchable from the beginning, required a solution to address the “incomplete data”. Financial documents use little actual text, preferring instead to use dittos, abbreviations, limited dates/amounts, and partial headings, which can be difficult to understand and create data gaps.

The solution to these gaps is something the creators termed: "docs v. data." Two different versions of a document exist in the database: literal transcription (document) and expanded transcription (data). On the data side, dittos, abbreviations, and shorthand have been expanded. This includes everything from abbreviations for tobacco and locations, to shorthand for people mentioned in the transactions. Other editorial additions were designed to clarify archaic practices for the modern reader: when possible, dates are added to most transactions, as it was an accepted accounting practice to list a date once and not again until a date change occurred.

***Controlled Vocabularies***

|  |  |
| --- | --- |
| Government | Attorney General, Delegate, Inspector of Tobacco, Sheriff, Auditor, Deputy Sheriff, Justice, Tax Collector, Burgess, Flour Inspector, Mayor, Tax Commissioner, Clerk, Governor, Secretary, Trustee, Commissioner |
| Health and Medicine | Apothecary, Doctor, Negro Doctor, Surgeon, Dentist, Midwife, Nurse |
| Horses and Livestock | Farrier, Hostler, Saddler, Stabler, Horse Breeder |
| Hospitality and Entertainment | Fiddler, Hostler, Stabler, Tavern Keeper |
| Legal | Attorney General, Executor, Lawyer |
| Management | Estate Manager, Overseer / Farm Manager, Supercargo |
| Masonry | Bricklayer, Brickmaker, Mason |
| Mercantile and Business | Bookseller, Jeweler, Milliner, Storekeeper, Firm, Merchant, Printer / Publisher, Treasurer, Hatter |
| Metalwork | Blacksmith, Goldsmith, Iron Manufacturer, Silversmith |
| Military and Supporting Services | Adjutant, Colonel, General, Militia Officer, Adjutant General, Commissary, Lieutenant, Paymaster, Batman, Courier, Lieutenant Colonel, Sergeant, Brigadier General, Drummer, Major, Soldier, Cadet, Ensign, Major General, Sutler, Captain |
| Publishing | Bookseller, Printer / Publisher |
| Real Estate and Land-Related | Chain-man, Guide, Surveyor, Tenant, Explorer, Proprietor |
| Religion | Clergyman, Nun, Vestryman, Vicar |
| Servants, Slaves, and Personal Services | Batman, Housekeeper, Man Servant, Slave, Butler, Indentured Servant, Secretary, Steward, Cryer, Maid, Servant, Translator, Groom |
| Teaching and Education | Dance Instructor, Headmaster, Teacher, Tutor, Fencing Instructor, Music Teacher |
| Textile, Leather, Clothing | Currier, Jeweler, Seamstress, Tanner, Fuller, Leather Worker, Shoemaker, Watchmaker, Hatter, Mantuamaker/Dressmaker, Tailor, Weaver |
| Trades | Barber, Builder, Millwright, Plasterer, Boat Builder, Glass Cutter, Painter, Trunk Maker |
| Transportation | Boatman, Coachman, Postilion, Ship Captain, Coachmaker, Ferryman, Sailor, Waggoner |
| Woodworking | Cabinetmaker, Chair Maker, Joiner, Sawyer, Carpenter, Cooper (Cowper) |

Taxonomies structure information hierarchically, like a traditional index. Each term can include a description, citation, and links to related book pages. Both types of annotation—content types and taxonomies—are displayed on the page overview.

***Metadata Quality***

Metadata quality is the most important part of any digital collection. Accordingly, I conducted a metadata quality evaluation. Before randomly pulling records, I searched for local metadata creation guides and/or information about each depository’s metadata schema. In the absence of a local guide, I confirmed that PGWDE uses a TEI schema through a poster presentation.[[14]](#footnote-14) Conversely, the GWFPP included a local guide that is well-written and designed.[[15]](#footnote-15)

Actual Retrieved Metadata Item Records (12)

* 1. PGWDE (6)
     1. <https://rotunda.upress.virginia.edu/founders/GEWN-05-05-02-0193>
     2. <https://rotunda.upress.virginia.edu/founders/GEWN-01-01-02-0005-0002-0011>
     3. <https://rotunda.upress.virginia.edu/founders/GEWN-03-23-02-0442>
     4. <https://rotunda.upress.virginia.edu/founders/GEWN-03-23-02-0485>
     5. <https://rotunda.upress.virginia.edu/founders/GEWN-03-27-02-0503>
     6. <https://rotunda.upress.virginia.edu/founders/GEWN-01-06-02-0001-0003-0015>
  2. GWFPP (6)
     1. <http://financial.gwpapers.org/?q=content/ledger-1750-1772-pg1>
     2. <http://financial.gwpapers.org/?q=content/ledger-1750-1772-pg2>
     3. <http://financial.gwpapers.org/?q=content/ledger-1750-1772-pg3>
     4. <http://financial.gwpapers.org/?q=content/ledger-1750-1772-pg4>
     5. <http://financial.gwpapers.org/?q=content/ledger-1750-1772-pg5>
     6. <http://financial.gwpapers.org/?q=content/ledger-1750-1772-pg6>

Discussion Based on Triple Criteria Discuss and any problems with semantic interoperability using two (2) records.

|  |  |
| --- | --- |
| RECORD | <http://financial.gwpapers.org/?q=content/ledger-1750-1772-pg6> |
| 1. COMPLETENESS | The local guide specified mandatory data elements that are included in the record. Account name, people, place and services are listed. The listing also includes controlled vocabulary lists for services and place types. While there are several other fields available (i.e. “ship”,”occupation”, “food & beverage”, they are appropriately not listed as they do not appear on the original document. As these are financial records, the most frequently occurring element was “account name”. |
| 1. ACCURACY | Data is accurate, as the original document and transcription is viewable against the entry fields and reflects high-quality editing. |
| 1. CONSISTENTCY | Data values and inputs are consistent and coherent throughout and make use of a hierarchical taxonomy (controlled vocabulary). |

|  |  |
| --- | --- |
| RECORD | <https://rotunda.upress.virginia.edu/founders/GEWN-05-05-02-0193> |
| 1. COMPLETENESS | Without a local guide, I compared against P5 TEI-XML metadata schema as the poster presentation confirmed that was the schema used along “with minor schema customization”. The Project used a vendor for initial digitization and basic tagging. “Author” was the most frequently used data element. |
| 1. ACCURACY | The poster referenced a conversion vendor who performed primary transcription via double-rekeying to 99.995% which was considered by the client to be “excellent”. Vendor successfully tagged the main structural features of the 52 volume (30,000 page) print edition first published in 1985, with few errors. Schematron and XQuery (along with spot checks) were used by the client to conduct mark-ups and correct errors. [Carlson et. al., 2007, Outsourcing Complex Digitization: Lessons Learned [Poster presentation](https://rotunda.upress.virginia.edu/docs/research/TEI2007Poster.pdf)]) |
| 1. CONSISTENTCY | Data values and inputs are consistent and coherent throughout using controlled vocabulary. |

1. Examine the *completeness* of data elements.
2. Examine the *accuracy* of data value and input (content).
3. Examine the *consistency* of data value and input. ***(a.k.a. comparability/coherence)***

While the digital repositories I examined scored well among the three core metadata quality criteria, they did not begin in such a state. In fact, the PGWDE project team admitted to high vendor error rates for “tasks involving interpretation”. As a result, they simplified their tagging demands on the vendor; moved much of the interpretive work in-house; and automated as many procedures as possible. Quality improvement efforts continued throughout the project and “lessons learned” were incorporated into the Papers of Thomas Jefferson (PTJ) Project.

By making use of “second-level tagging”: the PGWDE used TEI markup that goes beyond capturing basic structure to include various types of metadata and linking: bibliographic data, document cross-references, expansions of abbreviations and short titles, etc. The project also required both letter-for-letter accuracy in document re-keying, and close adherence to XML tagging guidelines.[[16]](#footnote-16)

Through this process of analysis and improvement, the final product resulted in good metadata that supported interoperability. High *consistency and accuracy* led to high semantic *interoperability* not only across databases in adjacent projects such as the Washington family papers, but also in the multitude of Presidential Papers digital repositories that were extensively linked.

Using standard controlled vocabularies and taxonomy to reflect the what, where, when and who of the content contributed extensively to their deservedly high rating for consistency. The quality of this metadata makes these two digital repositories an excellent resource to understand Washington’s voluminous correspondence within the context of the 18th century world he inhabited.

The GWFPP ensures metadata quality through detailed line-by-line transcription, paired with structured metadata for every entry. Each transaction is broken down into its fundamental components—such as date, amount, account holder, and service description—using controlled vocabularies to standardize terminology. The taxonomies ensure consistency and accuracy which fit under the broader content types for people, places, and ships. The transcription process includes regularizing shorthand, abbreviations, and other inconsistencies found in the original records, ensuring accuracy while preserving historical context.

**Platform Design**

Second in importance only to quality, is utility or ease-of-use. Searchability and browsability are key to *accessibility*, which was the primary goal of the GWFPP. Taxonomies and content types provide access points to the document’s content, but document structure within the platform is equally important.

The initial focus was on three ledger books of accounts, which were chosen because they are the top-level records, where all financial transactions were finalized. These three texts form the top-level navigation and display. Each ledger consists of several hundred folios—two pages, with debits on the left and credits on the right. Every page consists of several transactions, and every transaction consists of a date, an entry, and totals. All data can be viewed at its most granular level to allow it to be reassembled for display, searching, and browsing.[[17]](#footnote-17)

**Interoperability**

The GWFPP’s metadata schema and Drupal-based platform emphasize interoperability, ensuring compatibility with other digital archives and projects. The use of open-source technologies allows for long-term sustainability and adaptability as new tools and methodologies emerge among a large cohort of international developers. While TEI offers robust interoperability in the digital humanities, the GWFPP’s hybrid metadata schema achieves similar goals by structuring financial data for integration with other research networks. This approach enhances the visibility and usability of Washington’s financial records within broader economic research context.

**Conclusions**

While taking the best lessons-learned from a previous TEI-based project, the leaders of the GWFPP realized that TEI couldn’t meet their goal to make the financial documents of George Washington not onlyaccessible, but also useful to researchers. Their creative development of a hybrid database metadata schema and later upgrading to Drupal, allowed content mining, textual analysis, currency valuations, tracking of purchased and sold goods, and examinations of relationships, both business and personal.

From these records, we know the amounts Washington spent each year, with whom he had financial dealings, how the price of certain commodities fluctuated over time, the types and quantities of goods he purchased, and how various currencies (such as Maryland and Virginia) were valued. Indeed, since the project concluded, researchers have begun to creatively visualize the data from the highest levels to draw remarkable conclusions. For example, a series of graphs plot mentions of various crops in the financial papers against the calendar to help visualize planting and harvest seasons over the colonial period and spot agricultural trends.[[18]](#footnote-18)

The digitization of Washington’s business records now links every aspect of Washington’s business records with all the other George Washington papers. This helps to correct an once fashionable, but abominable, archival practice of separating out separate business records from the rest of a collection. The reintegration of George Washington’s business records with all the rest of his papers is central to our understanding of both sets of materials and restores the integrity of the entire collection of George Washington papers.[[19]](#footnote-19) By adopting a robust platform, users may explore and analyze these free, on-line documents that have been carefully optimized for searchability to include annotation, glossaries, indexes, and linking.[[20]](#footnote-20)

The GWFPP schema provides an innovative solution for the transcription, annotation, and publication of complex historical financial documents. By employing a custom metadata schema tailored to financial records, the project enables users to uncover patterns and insights about early American economic history and offers a sustainable and scalable model for future preservation and exploration of historic financial data.

**Bibliography**

1. Carlson, John. et al. (2007). *Outsourcing Complex Digitization: Lessons Learned.* Poster presentation at the TEI Conference.
2. Koyada, Prajeeth. (2017). "[T]he Life of a Husbandman": Visualizing Agricultural Data from George Washington’s Financial Papers. Retrieved from <http://financial.gwpapers.org/?q=content/%E2%80%9C-life-husbandman%E2%80%9D1-visualizing-agricultural-data-george-washington%E2%80%99s-financial-papers>.
3. McCusker, John. (2017). *To "Arrange My Accounts" — Fulfilling the Last Wishes of George Washington.* Retrieved from <http://financial.gwpapers.org/sites/financial.gwpapers.org/files/To%20Arrange%20My%20Accounts.pdf>.
4. Stertzer, Jennifer. (2014). "Working with the Financial Records of George Washington: Document vs. Data." *Digital Studies / Le Champ Numérique.* DOI: <http://doi.org/10.16995/dscn.57>.
5. Stertzer, Jennifer. (2016). "Making George Washington's Financial Documents Accessible: Transcription, Data, and the Drupal Solution." Poster presentation at DH2016 Digital Humanities Conference, Krakow, Poland.
6. Stertzer, Jennifer, & Cavanaugh, Erica. (2016). "The George Washington Financial Papers Project: Building Content-Specific Taxonomies and System Specifications." Blog post. Retrieved from <https://uva.theopenscholar.com/jennifer-stertzer/blog/george-washington-financial-papers-project-building-content-specific>.
7. The George Washington Financial Papers Project. Edited by Jennifer E. Stertzer et al. (2017). Charlottesville: Washington Papers. Retrieved from <http://financial.gwpapers.org/>.
8. GWFPP Team. (2024). *Instructional Guide: Using the George Washington Financial Papers Site.* Retrieved from <http://financial.gwpapers.org/sites/financial.gwpapers.org/files/GWFPP%20Manual.pdf>.
9. Text Encoding Initiative. (2024). "History of the TEI." *Text Encoding Initiative (TEI).* Accessed December 5, 2024. Retrieved from <https://tei-c.org/about/history/>.
10. Library of Congress Digital Collection. George Washington Papers. (2024). Retrieved from <https://www.loc.gov/collections/george-washington-papers/articles-and-essays/series-notes/series-5-financial-papers/>
11. World Wide Web Consortium. (2024) *XML Schema Language.* Retrieved from <http://www.w3.org/XML/Schema>.

1. Library of Congress Series 5, Financial Papers, 1750 to 1796. Accessed 2024. https://www.loc.gov/collections/george-washington-papers/articles-and-essays/series-notes/series-5-financial-papers/ [↑](#footnote-ref-1)
2. George Washington’s Mount Vernon. "Washington Papers." *Mount Vernon Library*, 1968. Accessed December 5, 2024. <https://www.mountvernon.org/library/research-library/washington-papers#:~:text=Since%20its%20inception%20in%201968,various%20stages%20of%20Washington's%20life>. [↑](#footnote-ref-2)
3. Stertzer, J. (2014). Working with the Financial Records of George Washington: Document vs. Data. *Digital Studies/le Champ Numérique*, *3*(3). DOI: [http://doi.org/10.1 6995/dscn.57](http://doi.org/10.1%206995/dscn.57) [↑](#footnote-ref-3)
4. Hockey, Susan. (1993) Hockey, Susan. "Electronic Texts in the Humanities: A Coming of Age". Forthcoming in Proceedings of Annual Clinic on Data Processing in Libraries 1994, Graduate School of Library and Information Science, University of Illinois at Urbana-Champaign. [↑](#footnote-ref-4)
5. Ahronheim, J.R. (1998). "Descriptive metadata: Emerging standards". *Journal of Academic Librarianship*. **24** (5): 395–403. [doi](https://en.wikipedia.org/wiki/Doi_(identifier)):[10.1016/S0099-1333(98)90079-9](https://doi.org/10.1016%2FS0099-1333%2898%2990079-9). [↑](#footnote-ref-5)
6. Cantara, L. (2005). "The text-encoding initiative: Part 1". *OCLC Systems & Services*. **21** (1): 36–39. [doi](https://en.wikipedia.org/wiki/Doi_(identifier)):[10.1108/10650750510578136](https://doi.org/10.1108%2F10650750510578136). [↑](#footnote-ref-6)
7. Text Encoding Initiative. "History of the TEI." *Text Encoding Initiative (TEI)*. Accessed December 5, 2024. <https://tei-c.org/about/history/>. [↑](#footnote-ref-7)
8. Tienne, Andre d. (2024) “A TEI RESOURCES NAVIGATION APP USER GUIDE” https://peirce.indianapolis.iu.edu/TEI/TEI-XML-Components-User-Guide.pdf [↑](#footnote-ref-8)
9. TEI Consortium. (n.d.). *TEI projects*. TEI Consortium. <https://tei-c.org/activities/projects/> [↑](#footnote-ref-9)
10. *The George Washington Financial Papers Project*, ed. Jennifer E. Stertzer, et al, Charlottesville: Washington Papers, 2017 [↑](#footnote-ref-10)
11. *The George Washington Financial Papers Project*, ed. Jennifer E. Stertzer, et al, Charlottesville: Washington Papers, 2017 [↑](#footnote-ref-11)
12. Stertzer, Jennifer (2014). Working with the Financial Records of George Washington: Document vs. Data. Digital Studies / Le Champ Numérique. DOI: http://doi.org/10.16995/dscn.57 [↑](#footnote-ref-12)
13. Sterzer, Jennifer, 2016 Making George Washington's Financial Documents Accessible: Transcription, Data, And the Drupal Solution. Poster Presentation. [↑](#footnote-ref-13)
14. Carlson et. al., 2007, Outsourcing Complex Digitization: Lessons Learned. Poster presentation. TEI Conference [↑](#footnote-ref-14)
15. Instructional Guide: Using the George Washington Financial Papers Site <http://financial.gwpapers.org/sites/financial.gwpapers.org/files/GWFPP%20Manual.pdf> [↑](#footnote-ref-15)
16. Carlson, John, et al. (2007). *Outsourcing Complex Digitization: Lessons Learned.* Poster presentation TEI Conference. [↑](#footnote-ref-16)
17. The George Washington Financial Papers Project. (2021). *Editorial methodology*. The George Washington Financial Papers Project. <http://financial.gwpapers.org/?q=content/editorial-methodology> [↑](#footnote-ref-17)
18. Kumar, Prajeeth, *“[T]he life of a Husbandman”1: Visualizing Agricultural Data from George Washington’s Financial Papers, n.d.* [**http://financial.gwpapers.org/**](http://financial.gwpapers.org/). [↑](#footnote-ref-18)
19. McCusker, John. To “arrange my accounts” — Fulfilling the Last Wishes of George Washington [↑](#footnote-ref-19)
20. Sterzer, Jennifer, 2016 Making George Washington's Financial Documents Accessible: Transcription, Data, And the Drupal Solution. Poster Presentation. [↑](#footnote-ref-20)