**A Comparative Evaluation of Academic and Independent Digital Library Viola Resources**

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**Abstract**

 The viola has always attracted less attention then more popular instruments such as the violin or piano, and this discrepancy has remained through the development of digital music libraries. While many digital collections have been created for the distribution of sheet music, none are designed to cater specifically to violists. It is therefore necessary to identify wider scope digital libraries that include viola resources. This paper attempts to identify and evaluate valuable online resources for viola study. A set of evaluation criteria have been created and two examples each from two main types of digital music library have been assessed: academic libraries and independent libraries. Included here are detailed evaluations of each of the four digital libraries and a discussion of the evaluation results.

**Introduction**

 Digital libraries have emerged rapidly over the past decade, allowing access to previously inaccessible resources and spurring the creation of entirely new resources designed specifically to take advantage of digital formats. Sheet music is particularly well suited for distribution in digital format, as it is a resource that can be expensive and difficult to locate in physical form. Existing sheet music can easily be digitized through scanning, and several software programs are available to generate new arrangements directly in digital formats. Digital libraries of sheet music may also be linked to audio files, allowing users to sample music while browsing. Many digital libraries have been created for musicians, and this paper will focus specifically on digital resources currently available for violists.

 Digital libraries are still relatively new as information retrieval entities and the term lacks a universally accepted definition (Xie, 1346). The Association of Research Libraries (1995) defined several useful characteristics of digital libraries: the digital library is not a single entity; the digital library requires technology to link the resources of many; the linkages between the many digital libraries and information services are transparent to the end users; universal access to digital libraries and information services is a goal; and digital library collections are not limited to document surrogates. A slightly different definition was put forth by the DELOS Digital Library Reference Model (19): “An organization, which might be virtual, that comprehensively collects, manages and preserves for the long term rich digital content, and offers to its user communities specialized functionality on that content, of measurable quality and according to codified policies.” This is the definition that has been followed in this paper for selection of digital collections for assessment.

 Two main categories of digital libraries offer viola resources: academic collections that offer scanned copies of archived music, and web-based businesses that create digital arrangements of popular music and offer it as a free download or for sale. The first type of collection is funded and maintained mostly by university or public library systems (hence, “academic”) and the resources are based on previously existing sheet music that has been digitized and archived in specifically themed collections. The second type of collection deals primarily with resources that have been created using music software and are offered for download (hence, “independent”). These collections focus on popular classical music that copyright laws allow them to offer, and arrangements of commonly requested types of music such as pieces played at weddings or holiday celebrations. Many of the independent services will also supply personal arrangements on user request.

 The viola is an uncommon pastime and perhaps the least well known of the orchestral stringed instruments. As such, far less music is available for solo viola and physical music stores stock a less comprehensive selection than that kept for more popular instruments such as violin or piano. Most pieces may be found in academic music libraries, but this requires both physical proximity and access. Digital collections are thus particularly attractive in this situation as they preclude the trade-off between popularity and available storage space that faces physical collections. Despite this, no digital resources exist that dedicated to providing music to violists. However, several academic and independent services provide viola music as part of their collection, either for solo use or ensemble, (e.g., string quartet). This paper will examine examples of each type of digital library resource and evaluate their collections in order to assess potential user satisfaction.

# Selection of Digital Libraries for Evaluation

 Two examples of each digital library type have been selected for evaluation. All collections were identified through Internet searching and include collections of music for either solo viola or string ensemble. Digital libraries were omitted from consideration if they had a limited or non-existent viola section, or if they did not have a way of isolating viola music from the body of the collection. Some digital libraries were located using the listing provided by the *International Music Score Library Project* (IMSLP), a Wiki of online sheet music resources ([http://imslp.org/wiki/IMSLP:Other\_music\_score\_websites](http://imslp.org/wiki/IMSLP%3AOther_music_score_websites)).

 The academic collections that have been evaluated are: *The Classical String Quartet, 1770-1840* maintained under the Duke University Libraries Digital Collections, and the *Musical Scores* digital collection in the Sibley Library at the Eastman School of Music. These collections have both been created by university library systems and are composed of scanned copies of musical scores owned by those libraries.

 The independent collections that have been evaluated are websites *Virtual Sheet Music* ([www.virtualsheetmusic.com](http://www.virtualsheetmusic.com)) and *Music Scores* ([www.music-scores.com](http://www.music-scores.com)). Both of these are web-based libraries that offer downloadable sheet music. In both cases the music is divided between free downloads and downloads that are only available through individual purchase or purchase of a site subscription. The music offered by these libraries has not generally been scanned from previously existing scores, but created using music notation software.

# Evaluation Methods

 Digital libraries are becoming increasingly common, and users are more likely to have experience with them. It is therefore increasingly important to establish strong standards for digital library evaluation (Fuhr, 2007). A series of evaluation criteria were developed in order to compare digital collections and assess their potential value to users. The evaluation questions are designed to fit within several major topic headings: Basic Features and Navigation, Search/Browse/Help Functions, Collection, Resource Access and Format, and Unique Value to Users. These criteria are partially based on those used in a 2008 study on user perceptions of digital libraries (Xie, 2008). The table below enumerates the specific criteria assessed under each of these headings:

|  |  |
| --- | --- |
| **Basic Features and Navigation** | First impressions of the site:* Does it look professional?
* Are there ads?
* Is the site well organized or is it cluttered?
* Do all inner pages share the same visual theme?
* Does the site display compatibility with a variety of browsers? All sites have been tested using Chrome, Firefox, Internet Explorer 7 and 8, and Safari.

Navigation:* Is navigation prominently displayed on all pages?
* Is it easy to determine where you are within the site?
* Is it easy to return to previous sections or to the homepage?
* How easy is it to navigate to the viola sub-section?
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| Search/Browse/Help | Visibility of features:* Are search, browse, and help functions supported?
* Are these features easy to locate?

Search:* How does the primary search function work?
* Is there an advanced search option?
* Are there different searchable fields?
* Are search capabilities clearly conveyed to the user?
* Can you limit search results?

Browse:* Is browsing supported?
* What categories are available for browsing?
* Is it easy to access results while browsing?

Help:* Is the help function visible on every page?
* How is the help section formatted?
* Is the help section actually helpful?
 |
| Collection | Scope:* What is the intended scope of this collection?
* Is it easy to determine the focus and extent of the collection?

Selection of resources:* Are items in the collection well chosen?
* Is it clear how resource selection is accomplished?
* Who may add new resources to the collection?

Maintenance:* Do all site links work?
* When was the last site update?
* How frequently is the site updated?
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| **Resource Access and Format** | Format:* What formats are used for resource distribution?
* Are both audio and image files available?

Downloads:* Is a login required for downloads?
* Are download times reasonable?
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| Unique Value to Users | Unique value:* What does this digital library offer that sets it apart from other digital libraries?
* Why should a user choose this collection?

Issues:* Is there anything about this collection that is likely to frustrate users?
* What could be improved about this collection?
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 Each of the four digital libraries named above has been evaluated using these criteria. The next sections of this paper will describe the results of these evaluations, and identify major differences between academic and independent digital music libraries.

**Evaluation of Libraries: Academic**

## Musical Scores: Eastman School of Music

 [*Musical Scores*](https://urresearch.rochester.edu/viewInstitutionalCollection.action?collectionId=63) is a collection within the Sibley Music Library at the Eastman School of Music (the Eastman School is part of the University of Rochester in New York, and is one of the nation’s premiere music conservatories). This collection contains scanned images of public domain scores and books, many of which are unique to the Sibley Music Library. The collection currently contains over 9,000 items and had been updated with at least 5 new items within a day of evaluation.

 The *Musical Scores* interface is displayed using Google’s IR+ Institutional Repository software, a package designed to store and manage digital document collections (<http://code.google.com/p/irplus/>). The homepage of the collection therefore appears rather generic, containing boxes labeled: Browse/Search, About Collection, Subscribe/RSS Feeds, Pictures, Recent Submissions, and Statistics. There is a small navigation bar along the upper right margin of the page with links to a help function, information about the site (including contact information for administrators), and the library privacy policy. There are also clear links that will take the user to listings for other digital collections maintained by the University of Rochester. It is also possible to login or create an account on this page, although the benefits of creating an account are not immediately apparent. You do not need to be affiliated with the University to create an account. The sparse look of the site makes it easy to quickly grasp basic features, and the site displays properly in major web browsers. Entering “viola” into the search box isolates documents that contain “viola” as a keyword. There are no advanced search features visible on the collection homepage.

 A search for “viola” returns 540 results, initially ranked by relevance. The search results page includes a tabbed navigation bar that allows the user to browse publication, search, browse authors/contributors, or browse sponsors. Choosing any of these tabs resets the search results, taking the user back into the main collection. However, once a user has entered the search results page there is no easy way to return to the collection homepage. Search results are displayed in a list, with 25 results appearing on each page. Each result includes the resource title, a brief description of the original physical item, and the name of the composer or contributor. It is easy to open any of the results in a new tab or window, allowing the user to set aside results while continuing to browse the main list. There is no option to create a list of results. Any results that are generated may be easily browsed, but there is no specific browsing interface.

 Once a search has been entered then the results may be limited based on a number of criteria that appear in a box on the left margin of the page. Viola search results may be limited by composer, collection, format, subject, or language. Each limiter includes in parentheses the number of results that fit that category (i.e. “Wolfgang Amadeus Mozart (22)”). Boolean searching is also supported, though there is no dedicated “advanced search” function. Users must therefore be familiar with Boolean search conventions in order to take full advantage of the site capabilities.

 A collection specific help section would make the digital library features more comprehensible. A previous study on perceptions of digital libraries found that usability is the quality of greatest importance in evaluation; collection quality is irrelevant if the site interface and navigation are poor (Xie, 2008). The same study showed that help features are generally rated as being of comparatively low importance. Users prefer collections that are presented clearly. There is no visible guide to or description of specific site features in this collection; the information in the help section applies to the IR+ software and not to individual collections. This information is not presented in a user-friendly manner, forcing the user to download a 110 page PDF manual that they must then search for specific information.

The resources in this collection are scanned images of resources held by the Sibley Music Library. Since several items had been added within days of this evaluation it can be assumed that updates are relatively frequent. The intended scope of the collection is not explicitly stated. Each record contains download links to PDF image files of the sheet music, a complete cataloguing record, and copyright information. Materials are generally public domain, and so the collection excludes most of the well-known and popular repertoire. Files may be downloaded by clicking on the file link and can be opened using a PDF viewer such as Adobe Reader. Download speeds are close to 1 mb per second over a wireless network and no login is required. All collection links appear to be active.

 This digital library offers access to a large collection of sheet music for viola players. The site allows remote users to take advantage of unique resources held by the Sibley Music Library without being affiliated with or physically near the University of Rochester. Browsing is recommended since the collection is composed mostly of obscure works. The flaws in this digital library are mostly due to the use of the IR+ interface. It is unclear whether IR+ is not easily customized or whether Sibley has chosen not to take advantage of customization, but the lack of specific features make the collection extent and capabilities difficult to understand. Information about the collection and features is almost non-existent, and user frustration may ensue. Overall this is a useful but unfocused collection that could benefit from some custom digital library design.

## The Classical String Quartet, 1770-1840: Duke University

 [*The Classical String Quartet*](http://library.duke.edu/digitalcollections/quartets/) is a digital element of the Rare Book, Manuscript, and Special Collections Library at Duke University. The collection is composed of digital images of quartet scores from the classical period (1770-1840), most of them from composers whose works are rarely found in modern editions. The purpose of the collection is to make these pieces once again available for study and performance. All resources in this collection are relevant to viola players since the viola is a member of the traditional string quartet. Materials are offered freely for private use. For any uses beyond research, teaching, or study relevant copyright laws must be observed.

 This collection exists as a subsection of the Duke University Libraries Digital Collections, and may be accessed through the library website. The homepage of the collection offers information on background, copyright and citation issues, a link to enter the collection, and links back to other parts of the library system. These links remain on all subsequent pages, making it easy for the user to navigate back to the collection homepage or any other part of the library system. There is also a message along the top of the page soliciting feedback for a possible site redesign. The look of the page is clean and professional and the information presented gives the user a good feel for the intended purpose and scope of the collection. Clicking on a link labeled “explore” leads the user directly into the collection.

 There is no dedicated search function for the *Classical Quartet* collection, although resources can be located through the main library catalogue search. If the user is looking for something specific then they are better off using this method. Although the catalogue is enormous, the advanced search contains highly specific fields, allowing the user to limit by formats like “electronic resource.” This collection is small—44 different scores—and is designed for browsing. In fact, the focus of the collection combined with the obscurity of the included scores means that browsing is the best way to access these resources. The collection is designed to expand knowledge and use of music that has been largely unknown to this point. It is far less likely that a user will come to this collection looking for a particular piece of music, and since the collection is already limited to string quartet pieces then the user knows exactly what they are likely to find.

 The strength of this collection lies in its focus and its presentation of resources. The scope of the collection is specific, including only string quartet scores and those only from the classical period. These limits mean that a user already has a very clear idea of what they can expect to find before they actually enter the collection. Unlike the other collections considered in this paper, this has been designed as a complete collection; resources have been assembled from the body of scores owned by the library system and the collection is not being updated beyond the original scope. Careful selection of resources means that the items in this collection feel connected in a way lacking in many other digital libraries. A conscious decision has been made to link these resources, and that decision is based on more than the fact that they are all digital.

 Collection resources are presented in a table, with each row pertaining to a unique digital entity. Columns include a thumbnail image from the score, a download link to a PDF file (along with information on the size of the file), composer, title, publisher, and publication date. Clicking on a title in the main record returns a page with a complete cataloguing record, including links to the resource in both the Duke Library Catalog and WorldCat. Records for every item in the collection contain the same information.

 Scores in the collection are high quality scans of original resources, with all flaws and markings on the original score visible. There is no login required to view or download resources. The high quality of the images means that download times are a little bit slower, and users should probably have at least a cable Internet connection in order to use the collection without frustration.

 Small scope and a strong relationship between resources means that this collection is well designed for study and user satisfaction. The collection is clearly defined, and users therefore know exactly what they are likely to find within. Information that can be found about each resource is nicely standardized. There is a clear relationship between collection resources and a clear view of how this collection fits into the large library system. Users should see this collection as a unique opportunity to access rare resources for both study and performance.

# Evaluation of Libraries: Independent

*Music Scores*

 [*Music Scores*](http://www.music-scores.com/viola/composer.php)is an independently operated digital sheet music library and vendor. The site was begun in 1999 with the intention of offering a large body of free digital sheet music to users. A membership service was added at a later date (<http://www.music-scores.com/general/about.html>). Resources in this collection are mostly arrangements that have been created specifically for the collection using musical notation software. They are therefore entirely new digital objects, not scans of pre-existing material such as was seen in the academic collections. The site is updated 3 or 4 times per month and all site links are active. An RSS feed is also available to keep users apprised of recent additions. The frequent growth of the collection benefits users by allowing them access to an ever-growing collection of resources.

 This site is offered in French and Spanish as well as English, reaching out to a wider variety of web users. Site pages are uncluttered and have no displayed ads. The same visual theme is shared throughout all subsections of the main site. Each page features a primary navigation bar across the top margin, containing prominent links labeled: Composers, Instruments, Members, and Search. There is also a site log that offers a return to the library homepage. Links along the bottom of the page offer information on origin of the site, help function, FAQ, and contact information. The site displays properly on all major web browsers tested.

Clicking on “Instruments” allows the user to choose “viola”, which returns a listing of all of the pieces on the site that feature the viola, including both solo and ensemble repertoire. The Viola sheet music section has 272 files available for download. A box along the top of the page gives information on how to download files and how to listen to audio samples. Below this the viola resources are listed alphabetically by title. A box along the right margin of the page allows the user to limit results by performance difficulty level, with levels ranging from 1 to 9.

The search function for *Music Scores* is very simple, consisting of a single search box operated by Google. Basic Google search rules apply, meaning that the search is based on keywords with Boolean operations supported but there are no distinct searchable fields. The search results are displayed in standard Google format, meaning that a significant portion of the page is taken up by Google ads. These ads—while potentially relevant—generally distract from the actual search results. Results are displayed in a list where each record consists of the item title, a brief summary, and URL information. Clicking on the title leads to that resource page. There is no advanced search option and no way to further limit search results. This site is generally far more suited to browsing then searching. Several resource categories are available for browsing: Christmas, Traditional, Wedding, Beginners, and Theory. The user can also browse by composer, although it is impossible to limit by both composer and instrument. The only way to limit results within the viola section is by difficulty level.

A link to the Help function is visible on every page, granting easy access to users. The Help section includes a link to a site tutorial, as well as tips on how to use various site features. There is also an FAQ and a Discussion Forum in case the user requires further assistance.

Resources are available as downloadable PDF files. Each record includes a sample image from the sheet music PDF and information about the item title, composer, instrumentation, skill level, genre, and any other relevant notes. There are also links to the PDF download and to a MIDI audio sample generated from the sheet music. Download times are fast and the sheet music is clear and easy to read.

The most obvious difference between academic and independent digital libraries is the presence of a subscription service. While some of the resources at *Music Scores* are free, more of them are available only to site subscribers. Membership costs $29.95 per year and grants the user full access to site resources. Membership also conveys additional benefits, such as the ability to download MIDI files and access to special transposition and arrangement services (<http://www.music-scores.com/general/membership.html>). Users may also purchase resources individually if they choose to forgo full membership.

The unique value in this site lies in the ability to request particular arrangements and therefore customize sheet music for personal use. A viola player could, for example, request that a particular violin sonata be transposed for the viola. Any user may request new music additions, although priority is given to requests from members. Additionally, all music has been newly typeset to modern standards, removing any of the flaws that might appear in scanned or photocopied music. While this would be less attractive for music scholars, it is a nice benefit for teachers and performers. Overall, this site is a good resource for viola players but would benefit from greater development of search resources.

*Virtual Sheet Music*

 [*Virtual Sheet Music*](http://www.virtualsheetmusic.com/) is an independent web-based digital music library. Like *Music Scores* they offer newly typeset arrangements of music for download or purchase. The site appears to be updated frequently, with several updates occurring within the week prior to this assessment. The purpose of the collection is to provide wide access to as much sheet music as possible. Some sheet music is available for free, but more is available for purchase either individually or through site membership. There are no ads on the site except for those specifically designed by *Virtual Sheet Music* and the site displays properly on all major browsers.

 The library homepage appears professional, with many core features easily accessible. The primary navigation bar displays links for: Composers, Instruments, Ensembles, Skill Levels, Piano, Violin, Specials, Top Sellers, Free Stuff, and Browse. Users may navigate to the Viola section using the Instrument drop down list. At the top of the viola dedicated page is a box giving the user basic information about file formats and membership options. This is followed by a list of top viola sheet music downloads, which include a few of the most widely known pieces in viola repertoire (such as the Bach Cello Suites and Pachelbel’s Canon in D), as well as several books of seasonal music. After this listing comes the complete viola catalogue, containing 330 items and initially sorted alphabetically by title. All site pages share a common visual theme and it is easy to navigate from one part of the site to another.

 A keyword search box appears directly above the main navigation bar on every site page. Pages also include links to an advanced search function, including searchable fields: Composer, Title, Instrument, Skill Level, Price, Rating, and Publication Date. A user may specify as many or as few of these fields as desired. Below the advanced search box is a brief list of “search tips”, including the fact that “Publication Date” refers to the date that the resource was added to the online catalogue, not the origin date of the music itself. Search results may be displayed in either a list or a table depending on user preference and each record includes information on the item composer, title, instrumentation, skill level, user rating, and cost. Results may be sorted by any of these fields but may not be saved to a list.

 Browsing options in *Virtual Sheet Music* are present and plentiful. The main list of viola resources may be sorted according to any of the search fields listed above and it is easy to access any of the results from the list. Unfortunately, re-sorting the list refreshes the site and returns the user to the top of the web page, forcing them to scroll down in order to see the new browse list. This can be mildly frustrating if a user goes through several different browse permutations. Users are also given the choice to browse music by broad categories such as: Christmas Sheet Music, Accompaniments, Latest Additions, and Free Sheet Music.

 There is a help function for this digital library and it is accessible from every page. The Help page lists a number of common support topics and also allows the user to draft their own question. There is also a “Contact Us” link that allows users to communicate directly with site administrators. The questions already listed under support topics provide a good range of information about site methods and operations.

 *Virtual Sheet Music* is designed to provide quick user access to sheet music and audio files. Items in the collection are almost exclusively classical music, excluding composers who are under some form of protected copyright (<http://www.virtualsheetmusic.com/AboutUs.html>). The collection includes mostly popular and well known items, but is lacking in upper level repertoire—composers such as Bartok and Hindemith—which is likely protected by copyright. Every download includes a PDF image file and MIDI and Mp3 audio files. Some also include Mp3 accompaniment files. Previews of the audio files and the first page of the score are available for trial before download. Most of the pieces have been specifically typeset for or by *Virtual Sheet Music*. Users should therefore check sheet music to determine the extent of performance notations available before purchasing or downloading since these things are applied somewhat inconsistently (i.e. things like bowing directions and dynamics).

 The majority of sheet music on this site is not available for free download. Users have the option to either pay for each piece individually, or purchase a one year membership for $37.75. Membership renewals are less expensive then initial membership. Members are allowed unlimited free downloads and highest priority for assistance and new music requests. *Virtual Sheet Music* is certified by many online payment services including VeriSign and PayPal.

 One of the unique features of this site is the availability of accompaniment files for solo sheet music in the form of Mp3 piano files. These accompaniments are created specifically for *Virtual Sheet Music* and are available both with and without metronome markings. Users can also take advantage of audio files created at a slower tempo for practice purposes. Additionally, *Visual Sheet Music* offers free apps for the iPhone and iPad that allow users to access the site and view downloaded items from their mobile devices. The site also offers exclusive compositions, transcriptions, and arrangements, frequently based on user requests.

**Conclusions**

The evaluation process shows some clear distinctions between academic and independent digital sheet music libraries, as well as some distinct similarities. The most obvious difference is the origin of the resources offered: academic library collections are based on scans of original scores, whereas independent collections are composed of newly typeset scores. This is due partially to copyright issues and partially to a basic difference in philosophy between the two types of libraries. Academic libraries are more concerned with issues of preservation and research: they want to preserve the original score as much as possible. They are also more likely to be in possession of actual scores that can be digitized if desired. Independent libraries are more concerned with offering as much music as possible, and are not generally in possession of physical library collections. Their sheet music must therefore be created for the site in order to avoid interfering with copyright laws. Independent libraries are also more focused on providing music for performance and education (i.e. music for school teachers) and less of music that can be used for academic research.

One commonality between academic and independent libraries is that they tend to contain mostly lesser known works. None of the libraries evaluated contains any of the top level solo repertoire pieces for viola (such as the Bartok Viola Concerto, or Hindemith’s *Der Schwanendreher* Concerto). These pieces are more likely to fall under explicit copyright. It is also more likely that performers looking for such high level pieces will have access to physical music libraries. Also lacking from these libraries is any section pertaining to viola orchestral excerpts that are commonly required for auditions. It appears that independent libraries are better resources for beginner players and those looking for performance repertoire for occasions such as weddings or holidays. Academic collections are focused less on popular choices and more on rare collections.

 Another difference between the academic and independent digital libraries assessed is the presence of audio files to accompany sheet music downloads. This option is frequently featured in independent libraries and is extremely useful both as a practice aid and a way of helping the user decide which music best suits their needs. Both independent libraries evaluated use MIDI as an audio encoding method, with *Virtual Sheet Music* offering Mp3 as well. While many Internet users consider MIDI an outdated audio format, it is still particularly well suited for musicians. Most music schools have MIDI facilities, and many performers and composers—both professional and amateur—use MIDI as a recording tool. The fact that the format has been around for so long means that high quality tools and software are not prohibitively expensive (Montalvo, 2003). It makes sense that independent libraries would be more likely to include these audio files, since they are focused on providing music intended for practice and performance.

 There is at this point no comprehensive digital library devoted to providing viola resources. Despite this, many existing libraries offer useful viola sub-sections or collections of ensemble music that include the viola (such as the *Classical String Quartet*). The collections assessed in this paper provide a wide variety of resources and all have unique value for viola performers and scholars.

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