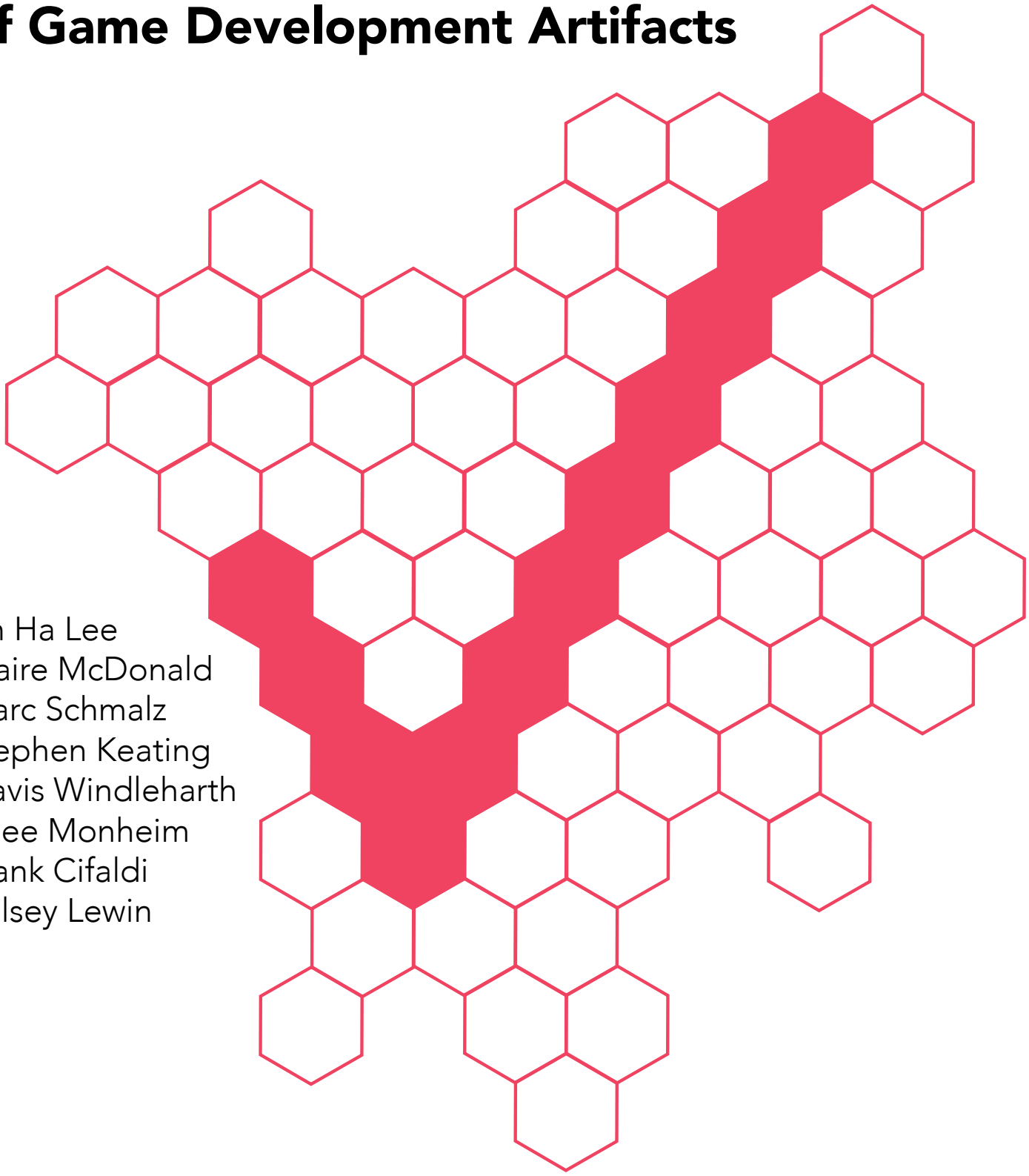
Best Practices

for Organizing and Maintaining Collections of Game Development Artifacts



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Contents

Video games have undoubtedly become a major fixture in contemporary culture, and are present in millions of homes across the world; however, these cultural heritage objects have only just begun to be recognized and collected by academic institutions and other cultural heritage organizations. While enabling long-term access to published games is certainly important, consideration must also be given to related information and artifacts, such as early drafts, design documents, prototypes, and research notes, which are crucial for understanding a game's creation processes and creative intent. Our research seeks to advance our understanding of how to organize and represent archival collections of artifacts related to the development of video games.

We examined multiple collections of video game artifacts and created a taxonomy of video game artifacts, which is accessible at the University of Washington GAMER Group's website (https://gamer.ischool.uw.edu/releases/). In addition, we interviewed 29 game creators, information professionals, and researchers. As a result, we were able to develop an understanding of how these stakeholder groups approach game development artifact collections and the obstacles that they face when engaging with these materials according to their currently established practices. Each group plays a crucial role in providing and maintaining access to these cultural heritage materials in the near and distant future, and their common goals provide a strong foundation upon which we can develop, manage, and improve these collections.

Based upon the statements collected during our interviews, we have identified nine practical components of long-term preservation of game development artifact collections for our best practices framework. For each of these, we have written a broad definition of the practice and how it relates to the development and maintenance of game development artifact collections. We then provide suggestions for how each stakeholder group may best implement the practice in their work. Rather than merely providing best practices for each stakeholder group, we have provided *minimum* practices, *intermediate* practices, and *best* practices. Requirements are additive: the higher level requirements include those listed in the lower levels.

Culture

During the interviews, many participants in the game industry shared that their organizational culture often does not promote and reward documentation practices, prioritizing creation of game artifacts over documenting the process of creation. While this is not surprising given the rapid pace of game development, it is important for game companies to develop a culture that encourages and rewards documentation to ensure the future accessibility of game development artifacts. This is not only helpful internally within the organization for improved searchability of the materials, but it also will have impact outside of the organization when cultural heritage institutions inherit their collection in the future. ***See also:*** Naming conventions; working with metadata; inter-organizational collaboration.

Creators

Minimum

- ✓ Follow basic documentation guidelines when creating, labeling, and storing the game development artifacts and promote these behaviors to co-workers. This includes simple but important practices like following naming conventions, using a similar directory structure for organizing the files, and putting digital files into the correct folder. ***See also:*** Naming conventions.
- ✓ If you are a supervisor, maintain standards for documentation for your direct reports to follow.
- ✓ Be an advocate for archiving and donating materials to cultural heritage organizations. ***See also:*** Inter-organizational collaboration.
- ✓ Consider adding cultural heritage organizations with collections of video games and game development materials to the list of eligible organizations if your company offers a matching gift program. ***See also:*** Inter-organizational collaboration.

Intermediate

- ✓ Establish an in-house documentation cycle related to digital records management and long-term preservation. For instance, consider allocating time after the project (or a phase of the project) is finished to organize and document the key information related to the creation of the materials. ***See also:*** Working with metadata.
- ✓ Consider designating a central location for file storage and instruct people to save and archive all the materials in this location. ***See also:*** Maintaining digital objects.
- ✓ Engage with information professionals and researchers who reach out about accessing or acquiring collections of game development materials. ***See also:*** Inter-organizational collaboration.

Best

- ✓ Have one or more dedicated employees manage the physical and digital game development materials in your organization to improve the management and accessibility of these materials. The designated employee(s) can coordinate with multiple creators to establish and maintain the documentation cycle and coordinate with repositories about transferring development materials.
- ✓ Donate time to cultural heritage organizations to help process collections of game development artifacts. ***See also:*** Inter-organizational collaboration.

Information Professionals

Minimum

- ✓ Treat collections of video game development artifacts with the same level of care and attention as collections in other subject areas.
- ✓ Ensure that collection descriptions accurately depict the company's culture and organizational structure, as conveyed by the materials within the collection. For instance, the differences between the company cultures of AAA games and indie games are substantial in terms of the size of the teams and the roles individual creators may take on, and it is important to ensure that patrons are able to understand these company culture-related distinctions between collections. ***See also:*** Using descriptive standards.
- ✓ Reach out to game companies for collection survey and development. Explain the benefits of preserving these collections and discuss the donation of development materials. ***See also:*** Inter-organizational collaboration.

Intermediate

- ✓ Actively bring in the collections of game development artifacts; catalog them and make them accessible to patrons.
- ✓ Design exhibits which include these materials and actively promote their sociocultural importance. ***See also:*** Outreach and publicity.
- ✓ Educate users about how to access these collections and what to expect when using them for research.
- ✓ Offer to teach classes or workshops to individuals in the game development industry about documentation practices and the purposes they serve. ***See also:*** Inter-organizational collaborations.

Best

- ✓ Implement participatory archival practices with game development industry partners, utilizing their subject expertise and lived experiences for organizing and representing their materials. ***See also:*** Inter-organizational collaboration.
- ✓ Work with partners in the industry to foster these practices in game companies.
- ✓ Have an active ongoing collaboration for living games and documents.
- ✓ Prepare researchers for organizational cultures where the materials are not typically well described or organized, and work with researchers to find appropriate strategies to use with these collections.

Researchers

Minimum

- ✓ Advocate for game development artifact collections and access to these collections, and emphasize their importance for research in game studies and other domains such as business and communications.
- ✓ Use these artifacts in research to illustrate their significance. ***See also:*** Outreach and publicity of collections.
- ✓ Recognize that these collections may not be well described or organized and come up with appropriate strategies to efficiently work with them.

Intermediate

- ✓ Communicate with people at your local institutions and game companies about the importance of maintaining and preserving collections of game development artifacts. ***See also:*** Inter-organizational collaboration.
- ✓ Attend conferences, conventions, and other events where you can communicate about the importance of these materials.
- ✓ Participate in outreach activities to the creators of video games. ***See also:*** Outreach and publicity of collections.

Best

- ✓ Use game development artifacts in classroom instruction and encourage your students to pursue research that uses these materials.
- ✓ Volunteer time to archives and repositories that have game development artifacts and consider using your domain expertise to help describe the collections. ***See also:*** Inter-organizational collaboration.

Naming Conventions

A naming convention is a consistent heuristic method for determining the labels applied to objects. While this concern is usually expressed regarding digital objects, it also arises for the naming of physical items in catalogs and other records, or the labeling of physical media.

For digital objects, a naming convention usually refers to a file naming convention (FNC), which also includes the naming of folders in a file system. An FNC "is a framework for naming your files in a way that describes what they contain and how they relate to other files." While some file types and operating systems include important metadata (creator, date created, etc.), including metadata in the name of a file can dramatically improve searchability and help everyone locate resources more quickly.

> Developing an FNC is done through identifying the key elements of the project, the important differences and commonalities between your files. These elements could include things like the date of creation, author's name, project name, name of a section or a sub-section of the project, the version of the file, etc. An advantage to using unique and standardized filenames is the ability to follow path names and link to other systems that require unique filenames.
> — Purdue Libraries' Data Management for Undergraduate Researchers: File Naming Conventions (https://guides.lib.purdue.edu/c.php?g=353013&p=2378293)

Even when file types and operating systems include important metadata, files are often shared outside of these structures and systems, so repeating the most important metadata in a file name is usually warranted.

Creators

Minimum

- ✓ Establish and maintain an internally consistent naming convention for your own use, or follow the one provided by your organization.
- ✓ Develop a naming convention that will facilitate retrieval and continued use of materials; include information which you and your peers most often use to identify materials for your work so that your naming convention is copacetic with and supportive of your existing creative practices. ***See also:*** Culture.
- ✓ Include metadata that helps others in the group understand what the file contains. ***See also:*** Working with metadata.
- ✓ Keep a record of the elements of file names and what they indicate.
- ✓ Apply your naming convention to digital and analog materials alike. ***See also:*** Maintaining physical objects, maintaining digital objects.
- ✓ Hold others accountable for consistent use of the established naming convention. ***See also:*** Culture.

Intermediate

- ✓ Work with those in your group, production company, etc., to establish a naming convention that can be used by all members; in large groups involving members with distinct roles in game creation, ensure interoperability in naming conventions across roles. ***See also:*** Culture.
- ✓ Document the naming convention in a central location where others can reference it; when changes are made to the naming convention, include these in the central location.

Best

- ✓ Consider sharing information about your own naming conventions used within your orga-

nizations so other organizations can potentially adopt it and benefit from using it.
- ✓ Work within professional industry groups to establish and promote common naming conventions informed by the needs of both the game development industry and cultural heritage institutions. ***See also:*** Inter-organizational collaboration.

Information Professionals

Minimum

- ✓ Include the creators' naming conventions and organizational structures in game development artifact collections' finding aids.
- ✓ Refrain from using "digital files" and other overly broad terms in collection descriptions; instead, utilize creator-imposed naming conventions to understand and more accurately describe the material types present in the collection. The Taxonomy of Game Development Artifacts (https://gamer.ischool.uw.edu/releases/) may also be used to identify and express material types present in game development artifact collections. ***See also:*** Using descriptive standards.
- ✓ Where one exists, include the naming convention framework in a collection as an object of study.

Intermediate

- ✓ Consistently include creator-maintained language in archival descriptions of collections, and where necessary, include public-facing explanatory notes that clarify creators' naming conventions, filing structures, and so on.

Best

- ✓ Communicate with people in the game industry and help them establish a naming convention if they are interested in establishing one to be used within their organization. ***See also:*** Culture; inter-organizational collaboration.
- ✓ Contribute to building a naming convention standard that may be used to identify and name video game development artifacts and other relevant born-digital media across institution(s).

Researchers

Minimum

- ✓ Understand that many creators do not have well-named objects while others have consistently implemented detailed naming conventions; be prepared for collections that are anywhere on this continuum with regards to naming convention maintenance.
- ✓ Establish an internally consistent naming convention for your own research, or follow the one provided by your organization.
- ✓ Make sure that the names are reliably interpreted and that they contain the information most important to you about the objects. ***See also:*** Maintaining physical objects; maintaining digital objects.
- ✓ Keep a personal record of the elements of your file names and what they indicate.
- ✓ Properly cite materials from the game development artifact collections used in your research.

Intermediate

- ✓ Work with those in your research group to establish naming conventions that can be used by all members. ***See also:*** Culture.
- ✓ Document your naming conventions in a central location.
- ✓ Ensure that your naming conventions include metadata that helps others in the group understand what the file contains. ***See also:*** Working with metadata.
- ✓ Hold others accountable for maintenance of the naming conventions. ***See also:*** Culture.

Best

- ✓ Conduct research related to organization of game development artifacts that shows the importance of naming conventions practice.

Working with Metadata

Metadata is "structured information that describes, explains, locates, or otherwise makes it easier to retrieve, use, or manage an information resource" (NISO, p.1). Metadata is essential for effectively managing and accessing collections of video game development artifacts, as it provides the contextual information necessary for better understanding the materials and also helps improve the searchability of the objects in the collection. A good way to easily and automatically generate some basic information about the objects is for creators of the game development artifacts to embed metadata into the digital files. Embedded metadata can facilitate retrieval of these digital artifacts while they are being actively used by creators; information professionals can also use embedded metadata to generate human-readable and machine-readable descriptions of these artifacts. Further, this metadata can also potentially help with the authentication process when there is a need to track down the original creators.

Creators

Minimum

- ✓ When possible, set up the creation software so that some basic metadata can be automatically attached to the file that is created. For example, when installing software that

asks for your name and company, fill out the fields accurately. ***See also:*** Working with metadata.
- ✓ Describe and preserve some basic information about the context of the materials, such as the source and approximate creation date of materials. This could be as simple as labeling the physical and digital materials using names or headers that are meaningful rather than using random or automatically generated file names.
- ✓ Ensure that your practices for managing metadata are copacetic with your naming conventions. ***See also:*** Naming conventions.

Intermediate

- ✓ When possible, set up the creation software so that more detailed and representative metadata is automatically embedded to the files being created.
- ✓ When working with digital files, transfer them in a way that maintains their descriptive and administrative metadata. ***See also:*** Maintaining digital objects.
- ✓ Establish an internal taxonomy or adopt existing taxonomies (for example, the Taxonomy of Game Development Artifacts created by UW GAMER Group and VGHF) to consistently describe the objects; use these taxonomies consistently, in written and spoken communication alike. ***See also:*** Naming conventions.

Best

- ✓ Maintain the metadata following a standard (***see*** Appendix); metadata standards are interoperable ways of expressing the metadata of a digital object, and can be used to provide structure for documentation practices. ***See also:*** Maintaining digital objects.
- ✓ Consider having designated personnel to create archive packages of the files (***see*** Appendix) and prepare materials for donation to cultural heritage organizations.
- ✓ Promote the importance of organizing and preserving these development materials via social media, conventions, and conferences. ***See also:*** Outreach and publicity.
- ✓ Be aware of and consider potential crosswalks between different metadata schemas when labeling artifacts.
- ✓ Ensure that your descriptive and administrative metadata are version controlled, and that changes to an object's metadata are documented in a usable way. ***See also:*** Maintaining digital objects.

Information Professionals

Minimum

- ✓ Understand the connections between metadata practices and other representative practices, so as to maximize the usefulness of creator-imposed metadata in your work. ***See also:*** Using descriptive standards.
- ✓ Check for embedded metadata when processing the physical objects or digital files, and use this metadata to inform collection processing.
- ✓ Create a manual that documents metadata-related practices in your organization to maintain consistency in how the collection is processed, especially when there is a change in personnel. ***See also:*** Culture.
- ✓ Consider adopting taxonomies related to games and game-related development materials to describe items in your collections. ***See also:*** Naming conventions; using descriptive standards.

Intermediate

- ✓ Reach out to game developers and ask if they are interested in learning more about documentation practices relating to metadata usage. ***See also:*** Inter-organizational collaboration.
- ✓ Establish a way to authenticate the materials received during the evaluation process. ***See also:*** Maintaining digital objects.

Best

- ✓ Provide instructions to game companies to help them establish best practices in their organizations for managing and accessing these materials with regards to metadata. ***See also:*** Inter-organizational collaboration.

Researchers

Minimum

- ✓ Check metadata attached to physical objects or embedded in digital files and become familiar with working with metadata. ***See also:*** Maintaining physical objects; maintaining digital objects.
- ✓ Publish research using and/or investigating game development artifacts.
- ✓ Properly cite materials in research so other interested people can locate and access the materials as well. ***See also:*** Outreach and publicity.

Intermediate

- ✓ Communicate with information professionals when you encounter potentially inaccurate metadata during the research process in order to review and correct this information.
- ✓ As you find more information about the collection that could potentially be useful for describing the materials in the catalog, consider informing the librarians or curators to add that metadata into human-readable and machine-readable descriptions alike. ***See also:*** Inter-organizational collaboration; connecting collections.

Best

- ✓ Contribute to building the metadata for collections of video game development artifacts by sharing your domain expertise.
- ✓ Participate in collaborative efforts to create metadata standards or adapt and modify existing metadata standards to better describe collections of video game artifacts. ***See also:*** Inter-organizational collaboration.

Maintaining Physical Objects

Digital artifacts may have a physical basis; these include floppy disks, flash drives, and other physical storage devices that require specialized attention during processing, particularly with regards to long-term preservation actions meant to manage digital decay and technological obsolescence. Some are physical objects such as artwork, notes, clay models, or dioramas that never had digital counterparts. These may need to be digitized in order to ensure future access. In some cases, physical objects may be the only real vestiges of an unreleased product's existence; these particularly rare historical instances elucidate both the company's history and the game development process. It is important to understand the expected lifespan of a given piece of hardware and whether or not the artifact has value as a physical object in the collection. Eventually, all hardware will be too degraded to see active use, and as such, for purposes of representation, simulacra must be made available to emulate the hardware context in which the original material existed.

Creators

Minimum

- ✓ Save physical and printed game development artifacts; collect them in one central location, and ensure that they are adequately labeled and safe for long-term archival. ***See also:*** Culture.
- ✓ Ensure that your naming conventions and other documentation practices are applied to physical objects in addition to digital objects. Connect the objects where necessary. ***See also:*** Naming conventions; working with metadata.
- ✓ Move particularly sensitive data away from at-risk hardware, particularly CDs, DVDs, and other older materials subject to disc or hardware rot. LOCKSS (Lots of Copies Keeps Stuff Safe) is an important practice, particularly for hardware that is prone to failure. ***See also:*** Maintaining digital objects.

Intermediate

- ✓ Label the packages/boxes containing the physical objects, in addition to the physical objects themselves.
- ✓ Digitize physical objects wherever possible; maintain the original analog materials after digitizing them. ***See also:*** Maintaining digital objects.
- ✓ Attempt to house physical hardware in spaces that will prolong its life, and if advisable, potentially start hardware to prolong life. Power cycling, while time intensive for old hardware, can potentially prolong the functional life of the hardware considerably.

Best

- ✓ When the project is completed and inactive, consider offering collections of video game development artifacts to cultural heritage organizations that manage such collections; include physical materials in your donation.
- ✓ Establish an ongoing relationship with these institutions to provide materials over time, rather than all at once, as this makes them easier to process. ***See also:*** Inter-organizational collaboration.
- ✓ Retain the date of creation, or the point at which the object was first used and in what context it served its purpose. If not possible, retain the representative connection so that it is easy to associate with other related materials.
- ✓ For any unreleased hardware, describe the intent behind its use or creation (e.g., if it was used as a new type of bumper in a pinball machine, or an add-on for a controller) when donating it to a cultural heritage institution.

Information Professionals

Minimum

- ✓ Maintain consistent standards for organizing and describing physical objects within game development artifact collections, and ensure that these objects' physical medium is conveyed in collection descriptions. ***See also:*** Using descriptive standards.
- ✓ When processing game development artifact collections with both analog and digital objects, ensure that both physical instantiations are treated equitably.
- ✓ Conduct a careful assessment of hardware at accession to ensure that you are able to provide adequate access to physical objects within a game development artifact collection.
- ✓ Provide access to physical artifacts as they were originally created and used to the best of your institution's abilities (e.g., VHS players if you have VHS Tapes for viewing, CRTs for play experiences on systems before LEDs were common).

Intermediate

- ✓ Be aware that a lot of physical materials—in particular, obsolete physical storage devices—degrade rapidly; prioritize processing these components so as not to compromise continued access to these materials.
- ✓ When processing materials, note that particular care must be given to CDs, DVDs, and other discs, as they are an extremely volatile format. Additionally, be wary of plugging these pieces of hardware directly into a computer until a bit-accurate hardware copy has been made of the drive, as this may compromise the content of these physical objects.
- ✓ Attempt to establish lines of contact with hardware manufacturers when managing damaged or compromised physical objects, as they may be able to provide parts for damaged hardware and guidance on whether or not newer materials will make for potential surrogates for older hardware. ***See also:*** Inter-organizational collaboration.

Best

- ✓ Develop strategies for maximizing access to physical objects in game development artifact

collections, and enable patrons' use of original physical objects in ways that will not compromise their integrity.
- ✓ Provide emulation where possible for old or decaying hardware, and provide replicas of available physical materials necessary for game interactions.
- ✓ Become familiar with the physical components of video games, as this foundation of knowledge will enable you to better describe and facilitate access to these materials.
- ✓ Provide information in a collection's scope/content note about associated companies, including hardware and software manufacturers. ***See also:*** Using descriptive standards.
- ✓ Digitize physical materials wherever necessary; ensure that relevant metadata is transferred during the digitization process. ***See also:*** Working with metadata; maintaining digital objects.
- ✓ Stay in close contact with studios that have donated materials and ask for their assistance with physical objects while processing the collection. ***See also:*** Inter-organizational collaboration.

Researchers

Minimum

- ✓ Request to see physical components of game development artifact collections when they are available.
- ✓ Be aware that some physical materials may no longer be available for researchers' access; visual images and other tertiary products may be the only ways to engage with these materials.
- ✓ When you are given access to physical objects, handle the materials with utmost care; follow any and all guidelines provided by the holding institution.
- ✓ Recognize that institutions will provide different levels of access to their collections; this information should be conveyed in a collection's finding aid under "access restrictions." ***See also:*** Using descriptive standards.
- ✓ Familiarize yourself with the variety of physical material types that you could potentially use for your research on game development artifacts; the Taxonomy of Game Development Artifacts may be consulted for this purpose.

Intermediate

- ✓ Ask if there are specific media or formats available that are more representative of the materials in the historical timespace in which they were created, particularly regarding controllers and additional or associated input devices.
- ✓ Maximize catalog functionality when browsing game development artifact collections' finding aids; if finding aids do not convey physical aspects of relevant collections (e.g., no indication of a collection's physical instantiation), contact the archivist, curator, or reference specialist. ***See also:*** Connecting collections.

Best

- ✓ Actively engage in community archival practices and work with information professionals

to provide useful contextual information for describing and organizing physical materials, particularly when a collection includes both physical and digital materials. ***See also:*** Using descriptive standards; inter-organizational collaboration.
- ✓ Use multiple media points of access, including hardware distributors, software development studios, and associated tools from creators to gain information surrounding the topic of research.
- ✓ Establish working relationships with game developers and other creators of game development artifacts, and consult them with questions relating to context of creation and physical instantiations of materials. ***See also:*** Inter-organizational collaboration.
- ✓ Finally, be inclusive to as many paths to information as possible and be open to working with a wide variety of stakeholders. Creativity is at the heart of these objects, and solutions often come from highly unexpected places. ***See also:*** Culture.

Maintaining Digital Objects

While many published games and game development artifacts may have a physical basis, it is undeniable that video games are generally understood according to their digital instantiations. Digital objects' relative instability complicates the short- and long-term maintenance of these objects. While related to the temporal aspects of artifact preservation, digital object maintenance also engages with issues related to (re)use and retrieval of these materials by users in all three stakeholder groups. Depending on the goal of the organization, the desired level of accessibility will differ (for instance, emulating the original game builds will be an essential component in certain game museums whereas it might be aspirational for other organizations that have game development artifacts as part of the larger collection). In general, we recommend that organizations investigate the needs of their users to decide which level of actions make sense, from migrating the data to newer formats to a full emulation of the builds; decisions regarding emulation or migration should be made with the intentions of how best to facilitate users' access to these materials.

Creators

Minimum

- ✓ Implement workflows that support and encourage documentation practices and facilitate the retrieval of artifacts.
- ✓ Consider creating or modifying an overarching structure for documentation, artifact organization, etc.; integrate these structures into working practices "from now on," prioritizing its implementation with in-use and future artifacts. ***See also:*** Working with metadata.
- ✓ When creating or modifying these structures, consider using existing standards, including

metadata standards used by cultural heritage institutions as a basis for your internal system, and adapt these standards to your internal needs where necessary. ***See also:*** Working with metadata.
- ✓ Maintain a widely accessible instruction manual for these structures' use among developers.
- ✓ Ensure that documentation practices are consistently applied to digital materials and physical materials, especially when a project uses both kinds of materials. ***See also:*** Naming conventions; working with metadata; maintaining physical objects.

Intermediate

- ✓ Maintain central repositories for in-use artifacts and documentation relating to particular games or projects that integrates documentation practices into its functional structure; additionally, archive these central repositories after a game or project is finished and/or canceled. ***See also:*** Culture.
- ✓ Create and/or maintain a standardized structure for documentation and artifact organization for in-use and future artifacts; where necessary, consider integrating older artifacts that are frequently used into these structures.
- ✓ When considering a cloud-based storage system, consider potential platforms' terms and conditions with regards to ownership of content; interoperability across operating systems and devices; and access restrictions and security.

Best

- ✓ Adapt workflows so that they require documentation and embedded descriptive and administrative metadata during and after game creation. ***See also:*** Working with metadata.
- ✓ Maintain central repositories for in-use artifacts and documentation, finished projects, and unfinished/canceled projects. ***See also:*** Culture.
- ✓ Donate materials to cultural heritage organizations on an established records retention schedule, requiring access restrictions to maintain privacy for your materials until you are ready for broader availability.
- ✓ Integrate older artifacts that are designated as "important" to current development practice into these structures; during this process, record any changes made to these older artifacts' human-readable or machine-readable descriptions. ***See also:*** Maintaining physical objects.

Information Professionals

Minimum

- ✓ When transferring materials from a donor to an institution, ensure that the transfer does not compromise the materials' timestamp, filing structure, or other creator-imposed metadata. ***See also:*** Working with metadata.
- ✓ Maintain the creators' filing structure and imposed naming conventions during collection processing, as these are comparable to notions of "original order" in analog materials, and use these components of the materials to inform the collection's finding aid, institutional catalog record, and other descriptions. ***See also:*** Naming conventions; using descriptive standards.
- ✓ When managing collections with digital and analog components, ensure that patrons are able to access the digital materials as well as the analog materials.
- ✓ Access restrictions for legal, technical, or any other reasons must all be expressed in a collection's public-facing finding aid; collections that include any amount of digital artifacts must have a technical access note. ***See also:*** Using descriptive standards.
- ✓ Restrict public access to original digital artifacts; instead, facilitate researchers' access to game development artifacts through authenticated copies, of which the institution should maintain multiples in distinct digital and spatial locations.
- ✓ When considering how these materials will be instantiated to patrons, it is wise to consider the benefits and drawbacks of emulation and migration—particularly if the institution will be implementing long-term preservation measures—and make decisions that prioritize patrons' access to these materials.

Intermediate

- ✓ Add human-readable and machine-readable descriptions of the transfer process to the Archival Information Package after accessioning the collection.
- ✓ Record any and all subsequent processing and preservation-related actions taken on behalf of the collection in the Archival Information Package. ***See also:*** Working with metadata.

Best

- ✓ Enable patrons' engagement with these materials in Dissemination Information Packages, which should include the artifacts themselves, along with relevant descriptive and administrative metadata from the creator and the institution. ***See also:*** Working with metadata.

Researchers

Minimum

- ✓ When browsing institutions' finding aids of game development artifact collections, consult the access restrictions and technical access notes for information about how you will be able to interact with the materials; if the contents of these notes is unclear, contact the institution's archivist, curator, or reference specialist for clarification. ***See also:*** Using descriptive standards.
- ✓ Expect to interact with authenticated copies of the digital materials in these collections rather than the original digital files, since digital materials are more easily compromised than their analog predecessors.
- ✓ When surveying materials for your research, include any creator-imposed descriptive or administrative metadata that accompanies the materials in your study. ***See also:*** Working with metadata.
- ✓ Familiarize yourself with the variety of digital material types that you could potentially use for your research on game development artifacts; the Taxonomy of Game Development Artifacts may be consulted for this purpose.

Intermediate

- ✓ Use other game researchers' published papers about game development artifact collections as a way of finding more potential collections to use for your own research.
- ✓ Make connections with other game researchers so as to share useful information about existing game development artifact collections and facilitate collaborative research efforts. ***See also:*** Connecting collections.

Best

- ✓ Participate in research with other game researchers, particularly in interdisciplinary research endeavors; when possible, include game creators in research that uses these materials.
- ✓ Reach out to archivists, librarians, curators, and other information professionals who manage these collections in their institutions; establishing and maintaining communication can enable your access to and understanding of these materials in your research. ***See also:*** Connecting collections, inter-organizational collaboration.

Using Descriptive Standards

The Society for American Archivists defines descriptive standard as: "A collection of rules, practices, and guidelines that codify the kinds and structure of information used to represent materials in a finding aid, catalog, or bibliography."

Descriptive standards are broadly intended to give consistent structure to descriptions of an institution's collected holdings. These standards are constructed with the intention of providing users with a clear, informative, and easily understood representation of the intellectual contents of the materials being described.

See also: Culture; naming conventions; working with metadata; maintaining physical objects; maintaining digital objects; connecting collections; outreach and publicity.

Creators

Minimum

- ✓ Use consistent language in written and spoken communication about the game development process, particularly with regards to the type of artifacts that are being created and used over the course of game development. ***See also:*** Naming conventions.
- ✓ Familiarize yourself with existing descriptive standards (***see*** Appendix), as these frameworks may be valuable during efforts to create and/or modify existing documentation

structures for developers' use with living documents.

Intermediate

- ✓ When donating your collected artifacts to a cultural heritage repository, include contextual information about the intellectual/creative content of the materials; this will result in a finding aid which more accurately represents your work. ***See also:*** Maintaining physical objects, maintaining digital objects.

Best

- ✓ Establish and maintain in-house documentation practices according to a widely-accepted descriptive standard; adapt the chosen standard(s) where necessary, and document these adaptations. ***See also:*** Working with metadata.
- ✓ Volunteer your time to process and describe your own collection; engage in participatory archiving practices with receptive archivists, librarians, and curators.
- ✓ Educate other creators on the uses of descriptive standards in documentation of game development artifacts.

Information professionals

Minimum

- ✓ Maintain standard human-readable and machine-readable descriptive practices when processing archival collections of game development artifacts, including the use of descriptive standards as a framework for consistent representation of these collections.
- ✓ Use the collection as the primary source of information for the archival description and finding aid; the Taxonomy of Game Development Artifacts may also be relied upon for terminology regarding game development artifacts.
- ✓ Describe material types according to their documentary content as well as their physical medium. ***See also:*** Naming conventions; maintaining physical objects; maintaining digital objects.
- ✓ In public-facing collection descriptions, include information about technical access requirements and/or restrictions.
- ✓ Make collection-level descriptions of game development artifact collections available to users as soon as possible. ***See also:*** Outreach and publicity.
- ✓ Ensure accurate representation of game development artifact collections' extrinsic documentary elements in their respective finding aids.
- ✓ For collections with analog and digital components, ensure that the collections' finding aids represent their hybrid nature. ***See also:*** Maintaining physical objects; maintaining digital objects.

Intermediate

- ✓ Maintain documentation of any and all actions taken upon the collection after accessioning; include this information in the collection's description. ***See also:*** Maintaining physical objects; maintaining digital objects.

- ✓ To maximize keyword search capabilities, use consistent terminology across all descriptions of game development artifact collections; this implies not only the implementation of the Taxonomy of Game Development Artifacts, but also consistency in broader terms such as "video games,""creator," etc.
- ✓ When possible, create links between game development artifact collections' finding aids and published games' catalog records to ensure representation of these connections to users. ***See also:*** Connecting collections.
- ✓ Encourage donors to contribute additional content to the scope/content note or other parts of their collection's finding aid.

Best

- ✓ Re-describe game development artifact collections that have already been processed and made publicly accessible, with a focus on consistently using descriptive standards and appropriately-representative terminology.
- ✓ Familiarize yourself with participatory archiving practices, and suggest collaborative collection processing with the donors of these materials. ***See also:*** Inter-organizational collaboration.

Researchers

Minimum

- ✓ Familiarize yourself with archival descriptive standards and how these standards represent archival collections' contents.
- ✓ Reach out to archivists, librarians, and curators about collections of game development artifacts when you have questions about collections' finding aids, as well as questions about their institutional holdings related to game development. ***See also:*** Inter-organizational collaboration.
- ✓ When citing materials from game development artifact collections in your research, include information about the repository where the materials are held; include a direct link to the collection's description, if possible. ***See also:*** Connecting collections; outreach and publicity.

Intermediate

- ✓ Maintain a relationship with archivists, librarians, and curators who closely work with game development artifacts; these relationships will be conducive to your research with these materials, and potentially the holding institution's ability to maintain these materials for current and future researchers. ***See also:*** Inter-organizational collaboration.
- ✓ Suggest corrections and/or additions to game development artifact collections' finding aids when you recognize the need for them over the course of your research.

Best

- ✓ Contribute to forthcoming editions of descriptive standards, using your experiences with the finding aids of game development artifact collections to inform improvements to these standardized frameworks. ***See also:*** Inter-organizational collaboration.
- ✓ Volunteer your time to process game development artifact collections; rewrite existing finding aids for game development artifact collections; and facilitate networking between creators, collecting repositories, and researchers.

Connecting Collections

The relationships among objects are often not always clear or specified. It can be difficult to establish relationships between collections and objects, particularly when there is no context provided, or when documents are separated from the larger collection. This can make the research process more difficult for end users, as identified by the interviewees in our research. While there is no way to completely avoid this issue, there are some things that stakeholders can do to help ease the process.

Creators:

Minimum

- ✓ Donate game development artifact collections to cultural heritage institutions which are willing and able to manage and facilitate access to them. ***See also:*** Inter-organizational collaboration.
- ✓ Provide basic information about the context of materials when transferring the material to cultural heritage institutions, such as how the collection and the materials within it are related to each other. ***See also:*** Culture.

Intermediate

- ✓ Create and maintain a documentation structure for records that reflects the relationship between items. ***See also:*** Working with metadata.
- ✓ Ensure that this documentation is passed onto cultural heritage institutions when the material is transferred.
- ✓ Respond affirmatively to requests for collaboration/participation from researchers. ***See also:*** Inter-organizational collaboration.

Best

- ✓ Engage in participatory curation practices and participatory archiving practices with information professionals and researchers.
- ✓ Share your knowledge of game development with information professionals and researchers as it relates to their work. ***See also:*** Outreach and publicity.

Information Professionals

Minimum

- ✓ Process game development artifact collections relatively soon after accessioning them, including the publication of public-facing finding aids.
- ✓ Provide information in finding aids about other, related archival collections; link to these collections' finding aids if possible. ***See also:*** Using descriptive standards.
- ✓ Use consistent terminology across finding aids, as this will facilitate retrieval of materials during keyword searches of online catalogs. ***See also:*** Naming conventions.

Intermediate

- ✓ Provide information in the finding aid about other, related archival collections. ***See also:*** Using descriptive standards.
- ✓ Write a research guide that highlights game development artifact collections in some capacity. ***See also:*** Outreach and publicity.
- ✓ Link the finding aid to other, related catalog records of finished games and other relevant published works, if possible.

Best

- ✓ Actively work to create relationships with creators and researchers to understand how to best describe the connections among different collections, and engage in collaborative practices wherever possible. ***See also:*** Culture; inter-organizational collaboration.
- ✓ Connect with other librarians or curators who manage similar kinds of collections to come up with strategies for better connecting the collections across distinct institutions. ***See also:*** Inter-organizational collaboration.

Researchers

Minimum

- ✓ Be aware that these connections may not be documented. This is particularly true for older collections, as information professionals may not have the time or resources to go back and edit the finding aids and catalog records with this information. ***See also:*** Culture.
- ✓ Become familiar with repositories' existing practices for representing connections among and across materials, and approach information professionals with any questions you may have about the materials in their collections. ***See also:*** Using descriptive standards.

Intermediate

- ✓ Publish research that draws attention to connections within and across collections of game development artifacts.
- ✓ Inform information professionals of connections that you find in your research. Additionally, researching and publishing about the connections among connections helps to establish them and make them known to broader audiences. ***See also:*** Inter-organizational collaboration.
- ✓ Be ready to provide instructions to fellow researchers about effectively using the finding aids.

Best

- ✓ Engage in participatory curation practices, such as working with information professionals to process collections as you go through them for your own research or rewriting published finding aids. ***See also:*** Inter-organizational collaboration.

Inter-organizational Collaboration

Without collaboration between stakeholders, the preservation of ephemeral video game material will remain in isolated bubbles. Creators will never learn best practices, libraries and archives will double up efforts that could be avoided, and researchers will be unable to locate materials needed for their work.

Creators

Minimum

- ✓ Encourage internal archiving practices among your peers, especially those outside of your team. ***See also:*** Culture.
- ✓ Share knowledge and solutions, and become an advocate within the game industry for engaging in collaborations with other game industry professionals, information professionals, and researchers. ***See also:*** Outreach and publicity.

Intermediate

- ✓ Enable public access to your archiving practices.
- ✓ Speak at conferences, write blog posts, and contribute to the public conversation about video games as cultural objects, digital archiving, and other related topics. ***See also:*** Outreach and publicity.
- ✓ Resurface old or abandoned works and share them on social media. ***See also:*** Maintaining physical objects; maintaining digital objects.
- ✓ Collaborate with other creators for joint archival projects. Engage information professionals and researchers in these efforts.

Best

- ✓ Establish firm rules for donating material to a cultural heritage organization. For example,

establish a clear set of guidelines for when a project is concluded and deemed inactive, and work with institutions to determine a delivery method.
- ✓ When you donate your collected materials and ephemera to a cultural heritage institution, publicize this donation and encourage patrons to seek it out. ***See also:*** Outreach and publicity.
- ✓ Consider volunteering time to work with information professionals and assist in the cataloging and archival processing of your materials.
- ✓ Make your contact information available and searchable online in professional networking services and consider including information about the games with which you previously worked. ***See also:*** Culture.

Information Professionals

Minimum

- ✓ Catalog and facilitate access to your collections; when cataloging collections, ensure that the subject headings applied to records are reflective of contemporary language surrounding video games. ***See also:*** Using descriptive standards.
- ✓ Make a point to get to know other institutions working with video game materials, even if just following them on social media.
- ✓ Promote your collections online, even if not fully cataloged: take photographs, post interesting finds. ***See also:*** Outreach and publicity.

Intermediate

- ✓ Share your archiving practices with other institutions, or collaborate with them in efforts to make interoperable adaptations to existing practices. ***See also:*** Working with metadata; maintaining physical objects; maintaining digital objects.
- ✓ Write research guides or other promotional materials which showcase your collections of game development artifacts; ensure that these materials are accessible by members of all three stakeholder groups. ***See also:*** Connecting collections; outreach and publicity.

Best

- ✓ Work with other institutions toward establishing a "master catalog" of video game material located in archives around the world. ***See also:*** Connecting collections.
- ✓ Attend conferences in game studies, archival studies, and other related fields so as to share your knowledge with a wider audience.
- ✓ Facilitate collaborations across stakeholder groups.

Researchers

Minimum

- ✓ Publish research that utilizes video game development artifact collections.
- ✓ Familiarize yourself with cultural heritage institutions and establish a knowledge base of their specialities and "who has what." ***See also:*** Connecting collections.
- ✓ Become an advocate for utilizing these institutions, and for creators donating materials to them. ***See also:*** Outreach and publicity.

Intermediate

- ✓ Visit cultural heritage institutions and familiarize yourself with their individual practices and needs. ***See also:*** Culture.
- ✓ Provide feedback where appropriate and inform them with regard to which kinds of materials institutions can acquire that would be of use to your research.
- ✓ Reach out to creators and other researchers for research collaboration, and inform/educate them about available institutions and practices with regard to these materials.

Best

- ✓ Donate materials you may have acquired in your research.
- ✓ Include multiple stakeholder groups in research relating to game development artifacts wherever possible. ***See also:*** Culture.
- ✓ Consider volunteering time to work with information professionals and provide assistance for cataloging the collection.

Outreach and Publicity

Performing outreach is a key step in building a collection and ensuring that it is used. This is especially true of collections related to video games and game development artifacts. Lack of awareness of their cultural significance and their research value are common issues, which means the material is often not transferred to a cultural heritage organization and not preserved for posterity—and when it is, the collections may not be actively used. This lack of awareness can be rectified by active outreach and publicity.

Creators

Minimum

- ✓ Be aware of local cultural heritage organizations, particularly those that already have collections of video games and related materials.
- ✓ Use collections as ideas for future work, and cite them when used.
- ✓ Consider initiating contact with a special collections library, archives, museum, or other cultural heritage institution to donate your collection to. ***See also:*** Inter-organizational collaboration.

Intermediate

- ✓ Establish and maintain a working relationship with cultural heritage organizations to create and advertise the collections through social media, exhibits, and other outreach activities. ***See also:*** Inter-organizational collaboration.

Best

- ✓ Advertise on your own website that your archive is held at a particular institution, and what the terms of access are.
- ✓ Be a docent or other volunteer at a cultural heritage organization.

Information Professionals

Minimum

- ✓ Process collections of video game development artifacts, publish finding aids and research guides to assist users' access to these collections. ***See also:*** Using descriptive standards.
- ✓ Be aware of local game companies and private collectors, as well as of other institutions that collect video game material.
- ✓ Be aware of game research projects and other relevant resources, and point researchers to them. ***See also:*** Connecting collections.
- ✓ If you are approached with a potential collection but are not equipped to administer the collection, provide the prospective donor with the names and contact information of other institutions who collect in the area. ***See also:*** Inter-organizational collaboration.

Intermediate

- ✓ Start reaching out to local companies and private collectors and discuss what would be needed to begin accepting material.
- ✓ Discuss the possibility of transferring material.
- ✓ Actively perform outreach to video games and private companies. This can take the form of direct contact, mailers, and presentations at conferences. ***See also:*** Inter-organizational collaboration.

Best

- ✓ Include the collections of video game development artifacts in standard outreach, such as social media posts and exhibits.
- ✓ Include the collections in relevant instruction sessions.

Researchers

Minimum

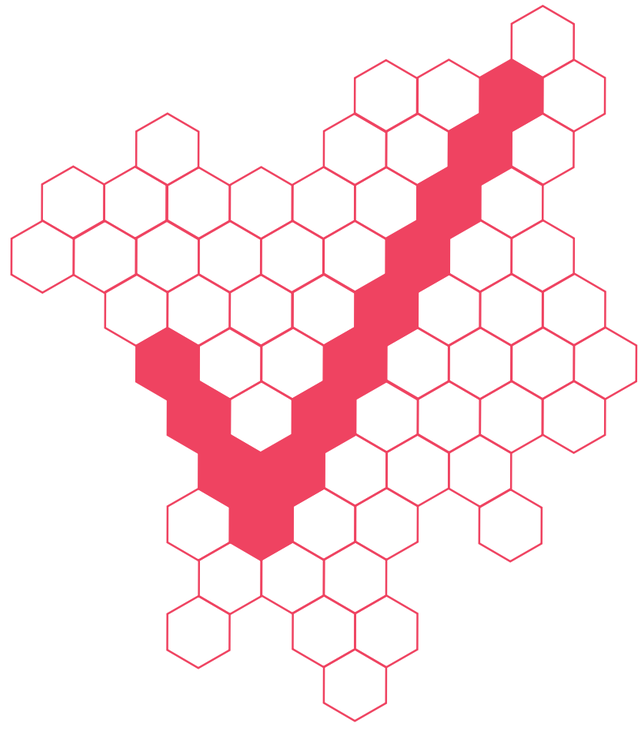
- ✓ Engage with the outreach material (such as social media posts and exhibits) related to collections of video games and game development artifacts.
- ✓ Use and cite collections in research to increase the awareness of the existence of such collections and potential use of them. ***See also:*** Connecting collections.

Intermediate

- ✓ Attend game studies conferences, workshops, and other events and present your research in these venues.
- ✓ Share your expertise with librarians, archivists, and curators as they work to facilitate access to these materials by making yourself available as a resource to information professionals as they create exhibits and outreach materials for fact checking or providing additional contextual information.

Best

- ✓ Actively work toward building a network of people who support collection, organization, and preservation of games and game related materials which will allow stakeholders to find each other more easily.
- ✓ Be a docent or other volunteer at a cultural heritage organization.
- ✓ Volunteer to work as guest curator, who will help create the whole exhibit and be involved in the whole process, for game-related exhibits when needed. ***See also:*** Inter-organizational collaboration.



Appendix: Metadata Standards

This appendix highlights key metadata standards for potential use when establishing naming conventions, preparing archival packages, and otherwise engaging in digital and physical preservation of game development artifacts. The metadata assigned to game development artifacts should be drawn from an existing standard if practical, and organizations and developers should be consistent in use of metadata standards and controlled vocabularies (***see*** Working with metadata).

Every metadata standard can be understood in four fundamental ways: by domain, by community, by function, and by purpose. For instance, the CCO metadata standard (Cataloging Cultural Artifacts) is used within the domain of cultural artifacts. Its purpose is to structure descriptive metadata about objects for search and retrieval, and its function is a content standard—it provides rules for creating content in specific data fields. It is also used most frequently by the museum community to catalog items in museum collections.

Video games are complex multimedia objects in and of themselves, and the artifacts used in their creation are complex as well. When possible, game archivists should use existing metadata standards and vocabularies to increase interoperability with other information systems. It is possible game archivists may use multiple standards and vocabularies to account for many types of objects. For instance, an organization may wish to utilize part of the MEI (Music Encoding Initiative) standard for music scores, CCO (Cataloging Cultural Objects) for physical materials, and VGMS (Video Game Metadata Schema) for whole games.

The following standards are highlighted as the most likely to be useful to game archivists. Development of this list was aided in part by Jenn Riley's *Glossary of Metadata Standards.* Riley has also published a useful visualization of many widely used metadata standards, organized by domain, community, function, and purpose, available here: http://jennriley.com/metadatamap/

AACR2: Anglo-American Cataloging Rules, 2nd Edition, Revised. http://www.aacr2.org/
This is the main content standard used in English-speaking libraries in Australia, Canada, United Kingdom, and United States. It covers a wide range of descriptive metadata.

AAT: Art & Architecture Thesaurus.
http://www.getty.edu/research/conducting_research/vocabularies/aat/
This is a set of controlled vocabularies used by the Getty Institute to describe works of art and architecture. Some of the controlled vocabularies may be useful for describing graphic images and other visual art assets.

CCO: Cataloging Cultural Artifacts. http://www.vrafoundation.org/ccoweb/
This is a content standard widely used in museums, for art, architecture, and other material culture. It is useful for works of art, as well as physical artifacts such as game carriers and packaging.

CDWA: Categories for Descriptions of Works of Art.
http://www.getty.edu/research/conducting_research/standards/cdwa/
This is another metadata standard used in museums to describe material culture and works of art. It is very extensive, with 532 categories and subcategories available to describe items. It is widely used in museum collections management software.

CDWA Lite: Categories for Descriptions of Works of Art Lite.
http://www.getty.edu/research/conducting_research/standards/cdwa/cdwalite.html
This is an XML representation of some elements of CDWA, used to support interoperability with the OAI-PMH protocol (see: OAI-PMH). In essence, it is a format for sharing some CDWA metadata elements with other systems via XML.

CIDOC/CRM: International Council of Museums (ICOM) International Committee for Documentation (CIDOC) Conceptual Reference Model.
http://cidoc.ics.forth.gr/
This standard focuses on cultural heritage materials, and defines concepts and relationships. The framework expresses modelling components as well, providing structure to describe events affecting objects through time and space. The ISO standard 21127:2014 defines CIDOC/CRM.

DACS: Describing Archives: A content Standard.
http://www.archivists.org/governance/standards/dacs.asp
This standard establishes a multi-level descriptive metadata standard for documents, such as personal papers and institutional records. It is maintained by the Society of American Archivists. This standard may be particularly useful for describing and organizing collections of development documentation such as design notes, letters, and memos.

DC: Dublin Core Metadata Element Set (also DC-MES).
http://www.dublincore.org/documents/dces/
This set of elements (also called "Simple Dublin Core," is a 15-element set that represents the core elements to describe resources, across format types. Documentation on some elements also contains guidance on creating content and controlled vocabularies.

DCAM: Dublin Core Metadata Initiative Abstract Model.
http://dublincore.org/documents/abstract-model/
This provides structure for object classification, and provides a robust system for describing the relationships between resources. As a modeling standard, it is more complex than Simple Dublin Core, and is widely used in the cultural heritage community.

DIG35: Digital Imaging Group 35. http://www.i3a.org/technologies/metadata/
This is a metadata format for still images, developed by the International Imaging Industry

Association (I3A). It is interoperable with ISO 19115/TC211 metadata standard for geospatial data, to associate photos or images with a physical location. This standard may be useful for game concept art, and other game ephemera that are still images.

EAD: Encoded Archival Description. https://www.loc.gov/ead/
An XML standard for encoding archival descriptions and finding aids. Maintained by the Society of American Archivists in partnership with the Library of Congress, this standard maps to other human-readable descriptive standards for archival collections.

FRAD: Functional Requirements for Authority Data.
http://www.ifla.org/publications/ifla-series-on-bibliographic-control-34
FRAD expands the FRBR (***see*** FRBR). It adds authority control access points to the FRBR model, along with associated user tasks such as "find," "identify," "contextualize," and "justify."

FRBR: Functional Requirements for Bibliographic Records.
https://www.ifla.org/publications/functional-requirements-for-bibliographic-records
FRBR is a conceptual model first published in 1998. Its core feature is the designation of groups of entities that categorize intellectual works. In FRBR, Group 1 entities describe the object or intellectual product (such as a song). Group 2 describes responsibility data, such as the creator or corporate body. Group 3 describes subjects of the work such as event, place, or concept. Group 1 is also divided to describe particular entity types—FRBR defines i) a work is a distinct artistic creation, ii) an expression is the realization of a work, iii) a manifestation is the physical embodiment of the work, iv) an item is one example of the manifestation.

FRSAD: Functional Requirements for Subject Authority Data.
http://www.ifla.org/node/1297
This framework provides a more robust format for FRBR Group 3 entities. It presents a different model for the FRBR Group 3 entities focusing on themes.

ID3. http://www.id3.org/
ID3 format describes tags in MP3 files, with predefined fields for Album, composer, recording date, etc. This metadata is useful for game companies preserving scores in the MP3 format.

ISAAR(CPF): International Standard Archival Authority Record for Corporate Bodies, Persons, and Families.
http://www.icacds.org.uk/eng/isaar2ndedn-e_3_1.pdf
This is a model for descriptive metadata in archives, modeling corporate bodies, persons, and families, and describing relationships between them. It may be useful to modeling complex relations among developers, artists, and corporate bodies related to game assets and ephemera.

ISAD(G): International Standard Archival Description (General).
http://www.ica.org/en/node/30000
This statement provides a set of principles for archival description, and describes 26 elements useful for all types of formats.

LCC: Library of Congress Classification. http://www.loc.gov/catdir/cpso/lcc.html

This is a classification system widely used by academic libraries, with materials divided into 21 subject-based classes.

LCSH: Library of Congress Subject Headings. http://authorities.loc.gov
This is a controlled vocabulary operated by the Library of Congress, and covers subjects, topics, and genres.

MADS: Metadata Authority Description Schema. http://www.loc.gov/standards/mads
MADS encodes authority data in the Metadata Object Description Schema (MODS), providing descriptive metadata for bibliographic records.

MARC: Machine Readable Cataloging. http://www.loc.gov/marc
MARC was the first format for machine-readable bibliographic records, and for the time being remains the most widely used. Many cataloging systems and software packages are designed to read and import records in the MARC format. This format is defined by ISO standard ISO2709. There are five formats in MARC21, the most used current version, with Bibliographic and Authority formats seeing the most use. Many libraries catalog video games in this format. The Video Game Metadata Schema (VGMS) has mapped metadata elements to specific MARC fields to establish equivalent relationships.

MARCXML: MARC in XML. http://www.loc.gov/standards/marcxml/
This format expresses MARC in XML syntax, and is fully interoperable with MARC 21.

MEI: Music Encoding Initiative. http://www2.lib.virginia.edu/innovation/mei
This standard describes a markup format for Western musical notation. It also provides for several bibliographic elements to describe works. This may be a useful format for archiving game scores in a standard format.

METS: Metadata Encoding and Transmission Standard.
http://www.loc.gov/standards/mets/
This is an XML-based metadata standard for complex objects. It provides a structure for representing files and relationships between them, and can interact and operate with other metadata schemas and their structures and rules for descriptive, rights, technical, and other types of metadata.

METS Rights: METS Rights Declaration Schema.
http://www.loc.gov/standards/mets/news080503.html
This is a simple rights metadata standard for locally owned objects.

MIX: NISO Metadata for Images in XML Schema. http://www.loc.gov/standards/mix/
This is an XML representation of Data Dictionary—Technical Metadata for Digital Still Images (ANSI/NISO Z39.87-2006). They are both used for digital image objects.

MO: Music Ontology. http://musicontology.com/
This standard describes musical materials for the semantic web. There are three levels that address basic descriptive information (level 1), creation (level 2), complex events such as rela-

tionships and performances (level 3). It adopts some FRBR principles to differentiate between works and their manifestations.

MODS: Metadata Object Description Schema. http://www.loc.gov/standards/mods/
This is a descriptive metadata structure using language-based element names and expressed in XML, and is MARC compatible.

MPEG21 DIDL: MPEG 21 Digital Item Description Language.
http://www.iso.org/iso/iso_catalogue/catalogue_tc/catalogue_detail.htm?csnumber=41112
This is part of the MPEG-21 standard (ISO/IEC 21000-2:2005). It represents the content of files and associated metadata.

MPEG-7: MPEG Multimedia Content Description Database.
http://www.chiariglione.org/mpeg/standards/mpeg-7/mpeg-7.htmMPEG-7.
This is a standard used to describe the content of multimedia files, including technical, rights, and creation metadata, as well as other features such as lighting and sound.

MuseumDat: Dublin Core Metadata Element Set.
http://www.museumdat.org/index.php?ln=en
This is a metadata structure standard based on CDWA (see: CDWA) As such, it focuses on material culture and works of art. It is also useful for natural history museums.

MusicXML: Music XML. http://www.recordare.com/xml.html
This is a standard for encoding (primarily) Western musical notation. It is used by many music notation software packages, and may be a useful format in which to store, retrieve, and play game scores.

MXF: Material Exchange Format. http://mxf.info/
This is The Society of Motion Picture and Television Engineers maintains this format for digital audio and video. It is primarily used to carry over digital object metadata between software packages that use the files, such as editor notes.

OAI-PMH: Open Archives Initiative Protocol for Metadata Harvesting.
https://www.openarchives.org/pmh/
This protocol allows data providers who use it to provide metadata in a structured way. Service providers can then make requests to harvest metadata structured using this protocol.

Open Metadata Registry: Open Metadata Registry. http://metadataregistry.org/
This is a registry featuring many types of metadata and controlled vocabularies, which are searchable and retrievable in the associated database. It is a useful resource for identifying pre-existing schema and vocabularies before a novel one is re-invented.

OMR: Ontology for Media Resource.
http://www.w3.org/TR/2009/WD-mediaont-10-20090618/
This is a metadata standard for media resources, with particular focus on those on the web. It focuses on a small number of elements, including descriptive and technical information.

PREMIS: Preservation Data Implementation Strategies. http://www.loc.gov/standards/premis/
This is an XML schema used in digital preservation. It is operated by the Library of Congress. It is useful in the preservation process of all manner of digital assets.

RAD: Rules for Archival Description. http://www.cdncouncilarchives.ca/archdesrules.html
This is a content standard used primarily in Canada, structured in a similar manner to AACR2.

RDA: Resource Description and Access. http://rdaonline.org/
This is a planned alternative to AACR2, used widely in the library community. It focuses on descriptive metadata, but also includes affordances for rights, technical, and other metadata.

SKOS: Simple Knowledge Organization System. http://www.w3.org/2004/02/skos/
This is a standard for encoding structured vocabularies in RDF, for the semantic web. It is most widely used in the cultural heritage community.

SPECTRUM. https://collectionstrust.org.uk/spectrum/
This is the UK standard for Museum Documentation. It is designed for cultural heritage objects such as museum objects, and it also covers descriptive information for acquisitions and loans, and focuses significantly on museum management.

Taxonomy of Video Game Development Artifacts. https://gamer.ischool.uw.edu/releases/
This taxonomy of material types, also authored by the University of Washington,Äôs GAMER Group, is intended to complement existing descriptive standards and provide clarification for terminology used to name video game development artifacts.

TGM I: Thesaurus for Graphic Materials I: Subject Terms. http://www.loc.gov/rr/print/tgm1/
This controlled vocabulary covers visual works. It is used in conjunction with TGMII.

TGM II: Thesaurus for Graphic Materials II: Genre & Physical Characteristic Terms.
http://www.loc.gov/rr/print/tgm2/
This controlled vocabulary describes genres for visual works, and addresses image forms as well. TGM I and TGM II are unified and are used together.

ULAN: Union List of Artist Names.
http://www.getty.edu/research/conducting_research/vocabularies/ulan/
This is a controlled vocabulary of names of artists, and is maintained by the Getty Research Institute.

VGMS: Video Game Metadata Schema. https://gamer.ischool.uw.edu/releases/
This is a metadata schema and associated set of controlled vocabularies developed by the GAMER Group at the University of Washington. It provides elements for rich description of whole video game works.

VRA Core: Visual Resources Association Core Categories.
http://www.vraweb.org/projects/vracore4/
VRA Core uses Dublin Core elements, and is a metadata standard for managing visual resources.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Special Collections


GAMER
GAME RESEARCH GROUP


THE VIDEO GAME
HISTORY FOUNDATION