Notes on Operations Enhancing the Discovery of Tabletop Games

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Collections of three-dimensional materials may not be discoverable to library users if they lack adequate metadata. Discovery of these collections may be enhanced through the application of relevant cataloging standards and controlled vocabularies. This paper outlines how librarians at the University of North Texas Libraries used these strategies to increase access to a large collection of tabletop games.

Books are for use," declares Ranganathan's first law of Library Science.[1] However, many unique library collections, particularly those containing three-dimensional materials, violate this belief because they are not readily accessible. Catalogers often perceive these items as overly complex and are reluctant to catalog them. Without detailed metadata, discovery interfaces cannot filter them from the thousands or millions of other items within a local system. Therefore, users cannot discover or access them.

Even large academic libraries have issues with these types of collections. The University of North Texas is the largest public university in the Dallas-Fort Worth area, with over thirty-five thousand students. The University Libraries' cataloged holdings include seven million print and digital items housed in six facilities. The university's Media Library houses a game collection that includes games in all formats. This paper focuses on the library's collection of over six hundred tabletop games, including board games, dice games, collectible card games, and role playing games.[2]

The authors began exploring the aforementioned issues surrounding discovery and access of three-dimensional materials within the context of this tabletop game collection: what concrete steps could they take to help users more easily discover and use these items? Ensuring that the items were cataloged appropriately was only the first step. Because the collection is so small relative to other collections within the library, the authors feared that finding the items would pose a challenge. Therefore, they enhanced the records with locally-developed, tabletop-game-specific genre terms plus metadata to allow filtering based on tabletop-game-specific dimensions. Their goal was to enable users searching for games to find the collection more easily through keywords and to narrow their search results to find specific games to meet their specific needs.

Local record enhancements alone were not sufficient to accomplish these goals. The discovery layer was locally customized to provide appropriate end-user-facing features based on the new data that the records would provide. The

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Libraries were in the process of exploring Blacklight, a customizable, open-source discovery layer, working on top of Apache Solr, an open-source enterprise search index, to replace their ILS's more traditional online catalog.[3] To help with local development and to serve as a template for similar collections, the authors implemented the tabletop game record enhancements as custom Blacklight facets. Although that system was still under development at the time of writing, the Libraries' programmers built and deployed the described enhancements in a working, prerelease version.

Through their efforts, the authors learned that improving access to collections via discovery interfaces requires close collaboration between catalogers, technologists, and systems librarians. Catalogers who wish to learn what metadata will provide the best return on their efforts cannot insulate themselves from technological concerns. Likewise, technologists and systems librarians cannot assume that library metadata will support the features they want to build; they must seek catalogers' guidance to interpret the metadata appropriately and address practicalities of what catalogers can easily record and maintain. This paper documents the collective effort required at the authors' institution to enhance access to their tabletop game collection.

Literature Review

This review explains why the appropriate type of cataloging is necessary to ensure access to library collections. It covers two strategies used to enhance access to collections, namely assigning genre terms to catalog records and implementing faceted searching. Finally, the review explores literature on cataloging tabletop games within the context of non-book resources and discusses enhancements beyond descriptive cataloging.

Cataloging

Jones provides several cogent answers regarding why it is important to catalog collections.[4] First, uncataloged collections are hidden from users. Access to these collections is uneven because it depends on the institutional memory of the staff on duty at a given time. Additionally, uncataloged collections are more vulnerable to loss and theft. If items are lost or stolen, the lack of documentation may make them impossible to recover. Furthermore, collection development of an uncataloged collection is problematic and may result in the purchase of duplicate items. Even when an item is represented by a full bibliographic record, it may still not be easily found in the catalog. As previously stated, the use of genre/form terms and facets can enhance discovery.

Genre/Form Terms

The Library of Congress (LC) defines genres as "categories of works that are characterized by similar plots, themes, settings, situations, and characters" and form as "a characteristic of works with a particular format and/or purpose."[5] A genre/form term identifies the nature of an item, while a subject heading describes what the item is about. Examples of genre/form terms include "Encyclopedias" and "Topographic maps." A genre/form term is tagged as a 655 field in MARC bibliographic records. The American Library Association (ALA)'s Machine-Readable Bibliographic Information Committee (MARBI) defined this field in 1979.[6] However, the associated authority record fields for genre/form terms were not defined until 1995.[7]

The form of a work may also be designated in the $v subfield of an LC subject heading. The USMARC Advisory Group approved the definition of subfield $v for form subdivisions in 1995, and LC began using this subfield in 1999.[8] Examples of form subdivisions include "Biography" and "Indexes."

Specialized thesauri of genre terms have been used for many years. One of the best-known is the *Art and Architecture Thesaurus* (*AAT*), published by the Getty Research Institute.[9] *Genre Terms: A Thesaurus for Use in Rare Book and Special Collections Cataloguing*, published by the Rare Book and Manuscript Section of the Association of College and Research Libraries (ACRL) in 1991, is another.[10] Other examples include *Thesaurus for Graphic Materials, The Moving Image Genre-Form Guide*, and *Radio Form/Genre Terms Guide*, all published by LC.[11]

LC began developing its *Genre/Form Terms for Library and Archival Materials* in 2007.[12] This thesaurus is "intended to fulfill the need for a unified, cohesive, multidisciplinary list of genre/form terms that provide for enhanced resource discovery."[13] The developers are taking a project-based approach in building the thesaurus by addressing one discipline at a time. As of February 2018, LC completed projects for cartographic materials, general materials, law materials, literature, moving images, music, non-musical sound recordings, religious materials, and artistic and visual works.[14] The projects for moving images, non-musical sound recordings, and cartographic materials stemmed from collaboration within LC.[15] Other projects involved partnerships with external groups, including the American Association of Law Libraries, the American Theological Library Association, and the Music Library Association.[16]

Ongoing communication between LC and the library community is necessary to make progress in developing genre/form terms. Some of this communication has been fostered by the Subcommittee on Genre/Form

Implementation, a unit of the Association for Library Collections and Technical Services's (ALCTS) Subject Analysis Committee. The Subcommittee on Genre/Form Implementation was charged with facilitating communication between the LC Cataloging Policy and Support Office and the cataloging communities concerned with genre/form headings.[17]

In some cases, librarians have developed their own lists of genre terms when existing thesauri did not meet their needs. For example, librarians at Virginia Commonwealth University developed a book art genre terms index.[18] Librarians at the University of Florida developed genre terms for chemistry and engineering property data.[19] Participants in a special topics course at the University of Washington Information School developed video game genre terms for the Seattle Interactive Media Museum.[20]

Facets

Faceted navigation is another strategy used to enhance online catalog searching. The *ALA Glossary of Library and Information Science* defines a facet as "a distinct metadata element that can be used to describe one characteristic."[21] Examples used in online catalogs include publication date, language of publication, availability, media type, geographic area, topical subject, and genre. By applying various facets, users can incrementally refine search results to obtain a narrowly defined set of items. Many users are already familiar with faceted navigation because of its widespread implementation in e-commerce websites.

Faceted applications are a current concern of the library community, as evidenced by the work of two groups in the ALCTS Cataloging and Metadata Management Section (CaMMS). The CaMMS Faceted Subject Access Interest Group is charged with discussing "theory and applications related to subject terminology intended for faceted application, including FAST (faceted application of subject terminology), AAT (Art and Architecture Thesaurus), LCGFT (Library of Congress genre/from terms), and others."[22] The Subject Analysis Committee Subcommittee on Genre/Form Implementation includes a Working Group on Full Implementation of Library of Congress Faceted Vocabularies that recently published a white paper entitled *A Brave New (Faceted) World: Towards Full Implementation of Library of Congress Faceted Vocabularies*.[23]

Faceted navigation in online catalogs has been implemented through a variety of discovery layers. Endeca was originally developed as a navigation system for e-commerce websites, and later used as a search engine in library online catalogs.[24] Two examples of open-source discovery layers include Blacklight, developed at the University of Virginia, and VuFind, created at Villanova University.[25] Discovery layers developed by online catalog vendors include Encore from Innovative Interfaces, Inc. and Ex Libris' Primo.[26]

Many studies have been conducted to evaluate the effect of faceted navigation on online catalog searching. Fagan published a literature review in 2010, examining studies of faceted searching in library catalogs and in interfaces created by information science researchers.[27] Experimental studies in the information science literature indicated that faceted navigation enhanced user searching. Users reported that faceted navigation helped them find relevant results quickly and efficiently. However, studies of faceted navigation in library catalogs provided inconclusive results. Fagan found it difficult to summarize the results of the library studies because results varied according to how faceting was implemented in various online catalogs.

In more recent studies, researchers have indicated that faceted navigation is helpful to users.[28] However, users have identified issues that have interfered with their searching in faceted systems. The most frequently cited problem was understanding the terminology used for certain facets.[29] Other issues varied widely, stemming from how faceting was implemented in individual catalogs. In one study, users recommended a decrease in the number of facets because the length of the list caused some facets to be hidden.[30] Users also expressed concern that some facets—such as "Collection" and "Resource type"—were too similar.[31] In another study, users expressed frustration that they were not able to limit searches to the DVD format.[32]

Cataloging Tabletop Games

For optimal discovery, tabletop games should receive full bibliographic records enhanced with genre terms and facets. Unfortunately, many tabletop game collections are simply not cataloged. Slobuski, Robson, and Bentley conducted a survey of public, academic, school, and special libraries with tabletop games collections in 2015.[33] Only 31 percent of the respondents reported that they always cataloged their tabletop games, and 18 percent reported cataloging these materials "sometimes." The authors identified "perceived complexity of cataloguing with a dearth of standards" as barriers to full cataloging.[34]

In an earlier study, Bierbaum investigated the cataloging of nonbook resources in public libraries, and also found a variance in cataloging practices.[35] Of 379 respondents, 218 collected audiovisual resources and three-dimensional objects. Toys and games constituted the largest subcategory of three-dimensional objects. Of the 218 libraries collecting three-dimensional objects, only 39 percent cataloged their collections. The author suggested that the low incidence of cataloging was related to a lack of guidance in earlier cataloging codes. Indeed, cataloging codes did not address

three-dimensional materials until the publication of *Anglo-American Cataloging Rules: North American Text, Chapter 12 Revised: Audiovisual Media and Special Instructional Materials* in 1975.[36]

Various authors have published guides to help catalogers interpret cataloging instructions for three-dimensional materials. Olson is one of the best known, with the publication of five editions of *Cataloging of Audiovisual Materials and Other Special Materials*, complete with clear instructions, helpful commentaries and well-chosen examples.[37] She included tabletop games in her discussions of cataloging three-dimensional materials with AACR2, and emphasized the importance of adding notes to catalog records for games to specify the number of players, the recommended age of players, and the purpose of the game.[38] More recently, McGrath and Moore provided information on tabletop games in their presentations on cataloging three-dimensional objects with RDA.[39] Both presentations offered step-by-step guidance for descriptive cataloging in RDA, illustrated with examples, and information about how RDA differs from AACR2.

A common theme in the literature about non-book cataloging is enhancing bibliographic records to meet user needs. Catalogers are using a variety of strategies to improve record retrieval and provide information to help users determine if the resources described will meet their needs. Some of these strategies are local practices, created in response to needs that have not been met by existing cataloging standards. As De Groat noted in her discussion of video games and non-book resources, "cataloging rules and practices have struggled to keep up and to find adequate ways of representing these materials."[40]

Some libraries have developed local vocabularies to facilitate the discovery of non-book resources. Over half of the respondents to a recent survey on tabletop game cataloging reported that they created local subject or genre term access points.[41] An example of a list of genre terms for tabletop games is the Langsdale Game Genre Headings.[42] Lyons and Tappeiner wrote that they were incorporating user-developed tags into a local thesaurus for video games and web resources at Hostos Community College Library.[43] Staff at Westchester County Public Library System created subject headings and general material designations to enhance catalog records for their collection of audiovisual materials.[44] Lee et al. developed a video game metadata schema for the Seattle Interactive Media Museum and included the elements of "genre/gameplay, style, plot/narrative, theme, setting, and mood/affect."[45] In another paper on the same project Welhouse, Lee, and Bancroft explained how they used domain analysis to develop a controlled vocabulary for video game plot metadata.[46]

Another way to enhance bibliographic records for non-book materials is to provide access to images of the items described. Moore illustrated this practice in a bibliographic record for an anatomical model.[47] At the University of Wyoming Libraries, bibliographic records for curriculum materials center resources include photographic previews.[48] Ferris State University Library also displays photographic previews in its bibliographic records for various collections of three-dimensional materials, including tabletop games.[49]

From the sources cited in this literature review, it is apparent that the use of full-level cataloging, genre/form terms, and faceted navigation can facilitate discovery in an online catalog. However, none of these sources focused on using these strategies together to enhance the discovery of tabletop game collections in libraries.

Cataloging Considerations for Tabletop Games

The UNT Media Library began cataloging games in 2010, but the authors' interest in enhancing these records occurred in 2015 when UNT's User Interfaces Unit began discussing a more dynamic discovery layer. The collection's size and use had grown, and discoverability beyond a brief or minimal record was needed to support research. The following cataloging overview covers the creation of an RDA core record with a few local practices used to enhance discoverability.

As noted in the literature review, providing at least a minimal bibliographic record is the best way to increase discoverability and use. These minimal records and their attached item records help with not only circulation, but also collection management and growth. A minimal record with a title, summary, and access point provide enough information to guide the user to the item in a small collection. An example of a basic or minimal record is provided below:

245 _ _ Archer : $b once you go blackmail… a love letter game.
246 3 _ Love letter
655 _ 7 Tabletop games. $2 gttg

Larger collections, particularly those used for research, will benefit from a fuller bibliographic record, such as an RDA core record. An RDA core record includes more information and access points to allow for more granular searching and sorting. Local user and collection needs should guide each library's cataloging practices. RDA core records include title proper, statement of responsibility, edition, date of production, publication statement, series statement, identifier, carrier type, extent, and access points

related to the entities and subject relationships (RDA 0.6).[50] Additional information and instances of core fields can be added to further increase discovery.

While tabletop games are composed of many parts, the game itself is cataloged as one whole (RDA 2.15.1).[51] This type of resource description is comprehensive according to RDA 2.1.2.[52] The preferred source of information for a tabletop game, according to RDA 2.2.2.1, can include the container.[53] If there is no container, another source of information, such as part of the accompanying material or other published descriptions of the manifestation, should be used (RDA 2.2.4).[54]

Identifiers

Identifiers are character strings such as the International Standard Book Number (ISBN) or Universal Product Code (UPC) that help identify each manifestation.[55] These numbers help when contacting publishers to replace lost games, parts, and pieces. Some tabletop games include an ISBN, but typically they include other standard numbers, such as a UPC. The following identifiers may appear on the preferred source:

The ISBN is a ten or thirteen digit number. It is recorded in the MARC 020 field.

020 _ _ 0786935405
020 _ _ 9780786935406

The UPC number is a twelve-digit number. This number is recorded in the Other Standard Identifier field, MARC 024. The first indicator for this identifier is 1.

024 1 _ 713757910521

The International Article Number (EAN) is a thirteen-digit number. This number is also recorded in the Other Standard Identifier field, MARC 024. The first indicator is 3 for an EAN.

024 3 _ 4260184330188

Unspecified numbers use the first indicator 8 in the MARC 024 field.

Publisher numbers are recorded in the Publisher or Distributor number field, MARC 028. The first indicator is 5 for other Publisher number or 6 for Distributor number. The second indicator is either 1 or 2, depending on a library's local practices regarding note generation for this field.

028 5 1 AYG 5375 $b Academy Games

Access points

RDA core requirements for a manifestation include the appropriate authorized access point(s) for the game's creator(s) and artist(s). If the preferred source, the container, includes the name of the designer(s), this name is an authorized access point for the creator. The game designer of a tabletop game is generally a person.

100 1 _ Coveyou, John J., $e designer.

This entry also includes a relationship designator. A relationship designator is additional information that specifies a relationship between a creator and a work, expression, manifestation, or item and is recorded in a $e.[56] This information is helpful when differentiating among works by a single creator. An example is a game designer who is also an artist for another designer's works. The level of specificity for this field can be determined by each library's user needs.

Title

RDA 2.3.1 provides basic instructions for recording titles. The container is typically the preferred source of information. However, if a container is lacking, RDA 2.17 requires that the source of title is noted.[57] This note appears in a MARC 500 field and can simply state the source of the title.

500 _ _ Title from publisher's website.

The statement of responsibility related to the title is taken from the same source as the title and appears exactly as shown on the source. RDA 2.4.1 lists the scope of the information to include, which consists of the "agents responsible for the creation of, or contributing to the realization of, the intellectual or artistic content of the resource."[58] Any edition statements on the preferred source are recorded in a MARC 250 as specified in RDA 2.5.1.4.[59] Examples of a title, statement of responsibility, and edition statement are provided below:

Information on game box lid (preferred source): *Betrayal at House on the Hill A Strategy Game* by Bruce Glassco -- 2nd Edition.

100 1 _ Glassco, Bruce, $e game designer.
245 1 0 Betrayal at house on the hill : $b a strategy game / $c by Bruce Glassco.
250 _ _ 2nd Edition.

Information from top card in deck (preferred

source): Behrooz *Bez* Shahriari, *Yogi*, Free demo version.

100 1 _ Shahriari, Behrooz, $e game designer.
245 1 0 Yogi / $c Behrooz Shahriari.
250 _ _ Free demo version.
500 _ _ Title from top deck card.

Production, Publication, Distribution, Manufacture, Copyright

RDA includes separate elements for recording the production, publication, distribution, manufacture, and copyright information of a manifestation. RDA 2.7.1 includes information on the place of production.[60] The production statement relates to the fabrication or construction of an unpublished item. This could be used for locally created but not formally published games. RDA 2.8.1 details recording a publication statement, including information about the place of publication, release, or issuance of the manifestation.[61] RDA 2.9 includes basic instructions on recording the place of distribution, including a statement on the distributor of a published manifestation.[62] RDA 2.10 includes basic instructions on the recording of the manufacture statement, which relates to the printing, duplicating, casting, or other manufacturing information.[63] Cataloger's judgment is necessary to determine which corporate entity applies to what element.

The corporate entity listed most prominently on the preferred source is likely the publisher and is recorded in the MARC 264, Production, Publication, Distribution, Manufacture, and Copyright Notice, with a second indicator 1 for publication. Local practices can guide additional access points related to the distribution or manufacture of the game, but only one statement is required for a core RDA record. Some additional access points to consider are the artist and game designer.

Place of publication is recorded in the MARC 264, and follows the same requirements as all other materials. RDA 2.7.2.3 requires the inclusion of the local place name and the name of the larger jurisdiction if present on the source of information.[64] If the place is not identified or may not be ascertained, the cataloger may supply it in brackets (RDA 2.7.2.6.1) or include the phrase *Place of publication not identified* in brackets (RDA 2.7.2.6.5).[65] Most games include a copyright notice date on the preferred source or rule book. This date is recorded in the MARC 264 with a second indicator 4 for copyright notice date.

The date of publication statement (RDA 2.8.1) relates to the publication, release, or issuance of a manifestation.[66] It is recorded as it appears on the preferred source. If the date of publication is inferred from the copyright date it is enclosed in brackets as noted in RDA 2.8.6.6.[67]

The tabletop game *Betrayal at House on the Hill* 2nd edition includes the following publisher logos: Wizards of the Coast, Hasbro, and Avalon Hill Games. Avalon Hill Games is now a subsidiary of Wizards of the Coast, which is also a subsidiary of Hasbro. If the box provides a statement of publication starting with "Wizards of the Coast," this information is sufficient to determine that Wizards of the Coast is the publisher of the game.

This manifestation of *Betrayal at House on the Hill* has a copyright date of 2010. RDA 2.11 instructs catalogers that the copyright date can be taken from any source.[68] Additionally, RDA 2.11.1.3 states that when recording the copyright date, precede the date with a copyright symbol (©).[69]

264 _ 2 Renton, WA : $b Wizards of the Coast, $c [2010].
264 _ 4 $c ©2010.
710 2 _ Wizards of the Coast, Inc., $e publisher.

The MARC 264 is repeatable, which allows multiple functions to be noted. Multiple functions might be information about the publication date in the first 264 and the distribution information in the second. In the example above, publication information is recorded in the first 264 _1 and the copyright information in the second, the 264 _4.

Describing carriers

The carrier is another core RDA field. The specificity of the information recorded in this field can be determined locally. RDA 3.0 includes information on how to transcribe the physical characteristics from the preferred source.[70] The description of a manifestation's carrier in the MARC 300 Physical Description field can be as simple as the word "game." For cataloging purposes, a game is a three-dimensional form. RDA 3.4.6 includes information about transcribing three-dimensional forms.[71] The typical extent of this type of the three-dimensional form is "1 game." Other types of three-dimensional artifacts and realia can include the number or types of component pieces in parenthesis after the carrier type. Three examples of specificity in the MARC 300 field subfield $a are provided below:

300 _ _ 1 game (various pieces)
300 _ _ 1 game (25 pieces)
300 _ _ 1 game (5 red coins, 10 blue tiles, 10 green marbles)

The MARC 300 field subfield $b details the composition of the materials. RDA 3.6.1.3 includes a list of base materials.[72] Catalogers can also create and use terms not on this list if necessary to describe the manifestation.

300 _ _ 1 game (various pieces) : $b plastic, cardboard

The MARC 300 field subfield $c provides the dimensions described by RDA 3.5.1.4.13.[73] The dimensions listed for a tabletop game are for the container, which is described by the height times width times depth in centimeters.

300 _ _ 1 game (various pieces) : $b plastic, cardboard ; $c in container 12 x 8 x 1 cm

Further descriptive RDA fields are the content type, media type, and carrier type. The content type (RDA 6.9) for a tabletop game is *three-dimensional form*, which is recorded in the MARC 336 field.[74] The media type (RDA 3.2.1.3) for tabletop games is *unmediated* since tabletop games do not need a device to view, play, or run.[75] This information is recorded in a MARC 337 field. The carrier type (RDA 3.3) for a tabletop game is *object* because it reflects the format of the storage medium and is recorded in the MARC 338 field.[76] These three fields are standard across all tabletop game core records. An example of the 3XX fields follows:

336 _ _ three-dimensional form $b tdf $2 rdacontent
337 _ _ unmediated $b n $2 rdamedia
338 _ _ object $b nr $2 rdacarrier

Additional content, media, and carrier types can be added to improve discoverability. Catalogers can also include the MARC control subfield $3, which specify the type of item before the $a subfield in the 336, 337, or 338. This example describes all materials included in a manifestation. The specificity of this information is set locally.

336 _ _ $3 game $a three-dimensional form $b tdf $2 rdacontent
336 _ _ $3 guide $a text $b txt $2 rdacontent
337 _ _ $3 game $a unmediated $b n $2 rdamedia
338 _ _ $3 game $a object $b nr $2 rdacarrier
338 _ _ $3 guide $a volume $b nc $2 rdacarrier

Another MARC field that also improves discoverability is the 380 form of work (RDA 6.3.1.3).[77] This information is core when distinguishing among different formats of a work.

380 _ _ Board games $2 lcgft

Beyond differentiating between formats of a work, this field is useful as a facet to show broad-level content types. Its use in the public display or searching can be set locally.

Notes

RDA core does not require note fields, but the following can be added to aid in discoverability: the title found note if applicable (RDA 2.17.2), language of content (RDA 7.12), related works (RDA 24.4.3), and intended audience for resources intended for children (RDA 7.7).[78] Local practices can also include more RDA fields: creation/production credits note (RDA 2.17.3), summary (RDA 7.10), the duration of play (7.22), and number of players.[79]

546 _ _ Rulebook in English, French, and German.
500 _ _ Title from website.
500 _ _ Duration of play: 60 minutes.
500 _ _ For 3 to 6 players.
521 _ _ Aged 10 and up.
520 _ _ This horror-themed tile game never plays the same way twice. You build the house tile by tile, room by room using 50 haunting scenarios. During the game, one player becomes the traitor and must be defeated.

RDA Core Access Points

The number of access points can be set locally, but RDA core requires the principal creator or corporate body be included to meet minimal requirements (RDA 19.2, 19.3).[80]

100 1 0 Glassco, Bruce, $e designer.
710 2 _ Wizards of the Coast, Inc., $e publisher.
710 2 _ Avalon Hill Games, $e production company.
710 2 _ Hasbro, Inc., $e distributor.

An example of a full-level RDA core record follows:

020 _ _ 0786935405
100 1 0 Glassco, Bruce, $e designer.
245 1 0 Betrayal at house on the hill : $b a strategy game / $c by Bruce Glassco.
250 _ _ 2nd edition.
264 _ 2 Renton, WA : $b Wizards of the Coast, $c ©2004.
264 _ 4 $c [2004]
300 _ _ 1 game (45 room tiles, 2 haunt books, 6 plastic figures, 6 double sided character cards, 80 cards (omen, item and event cards), 291 tokens, 30 plastic clips, 1 turn/damage track, 8 dice, 1 rulebook) : $b cardboard, paper and plastic ; $c in box 27 x 27 x 9 cm
336 _ _ three-dimensional form $b tdf $2 rdacontent.

337 _ _ unmediated $b n $2 rdamedia
338 _ _ object $b nr $2 rdacarrier
546 _ _ In English.
500 _ _ Duration of play: 60 minutes.
500 _ _ For 3 to 6 players.
521 _ _ Aged 10 and up.
520 _ _ Betrayal at House on the Hill continues the tradition of great Avalon Hill games. This horror-themed tile game never plays the same way twice. You build the house tile by tile, room by room using 50 haunting scenarios. During the game, one player becomes the traitor and must be defeated.
710 2 _ Wizards of the Coast, Inc., $e publisher.
710 2 _ Avalon Hill Games, $e production company.
710 2 _ Hasbro, Inc., $e distributor.

Additional fields

While discoverability is sufficient with a core record, the following fields can aid in further discoverability for medium to large collections. The MARC 046 Special Coded Date field includes creation date, which is the earliest known date of the manifestation (RDA 6.4.1.3) and is valuable for users interested in the history of games.[81] A more advanced discovery layer can display or include this information as a facet. The subfield delimiters vary for the type of date and the specificity in this field can be determined locally. For this instance, the $k for beginning or single date created was used.

046 _ _ $k 2004

The MARC 257 Country of Producing Entity field includes the location of the producing entity. This can help a researcher narrow a search by country of origin.

257 _ _ $a United States $2 naf

Expansions and editions

Expansions and new editions are often published for popular games. Expansions include new game content or characters, but sometimes require the base game (original manifestation) for play. The format and size of an expansion can vary from a few cards to a full box of new items. Catalogers typically address this on a case-by-case basis. The size of the expansion and how the game is played affects cataloging decisions. Smaller expansions requiring the base game to play can be combined into one box with the expansion information added to the base item's local bibliographic record. An example for the game *Gloom* follows:

020 _ _ 158978068X
020 _ _ 9781589780682
046 _ _ $k 2005
100 1 _ Baker, Keith, $e designer.
245 1 0 Gloom : $b the game of inauspicious incidents & grave consequences / $c by Keith Baker.
264 _ 1 [Roseville, Minn.] : $b Atlas Games,$c 2009.
300 _ _ 1 game (20 character cards, 58 modifier cards, 12 event cards, and 20 untimely death cards, 1 rule sheet) : $b plastic ; $c in box 9 x 14 x 2 cm. + $e 2 expansions (110 cards)
336 _ _ three-dimensional form $b tdf $2 rdacontent
337 _ _ unmediated $b n $2 rdamedia
338 _ _ object $b nr $2 rdacarrier
500 _ _ Title from box.
500 _ _ Expansion adds 1 player per expansion.
500 _ _ Duration of play: 60 minutes.
500 _ _ For 2 to 4 players.
500 _ _ Includes expansions Unfortunate expeditions (55 cards) and Unquiet dead (55 cards).
508 _ _ Concept and game design: Keith Baker ; editing and project coordination: Michelle Nephew ; art and graphic design : Scott Reeves & Michelle Nephew ; publisher : John Nephew.
521 _ _ For ages 13+.
520 _ _ Players assume control of the fate of an eccentric family of misfits and misanthropes. The goal of the game is for players' characters to suffer the greatest tragedies possible before dying. Game ends when an entire family is eliminated. Players total Pathos points on each character's Character cards, adding to get total Family Value. Player with lowest total Family Value wins.
520 _ _ Unfortunate expeditions adds 55 transparent cards to your game including morbid new Modifiers, Events, and Untimely Deaths, and another family -- intrepid explorers who've faced misfortune across the globe.
520 _ _ In Unquiet dead, the spooks come out to play. This expansion set adds 55 transparent cards to your game including morbid new Modifiers, Events, and Untimely Deaths, and introduce Stories, Undead, and Timing Symbols.
505 0 0 $t Gloom: unfortunate expeditions -- $t Gloom: unquiet dead.

700 1 _ Nephew, Michelle, $e editor.
700 1 _ Reeves, Scott, $e artist.
700 1 _ Nephew, John, $e artist.
710 2 _ Atlas Games (Firm), $e publisher.

Larger expansions, such as *Betrayal at House on the Hill*, *Widow's Walk*, typically receive their own bibliographic record and a note about their compatibility with other titles in the series.

020 _ _ 0786966084
024 1 _ 630509487592
100 1 _ Selinker, Mike, $e designer.
245 1 0 Betrayal at house on the hill. $p Widow's walk, an expansion / $c by Mike Selinker for the game designed by Bruce Glassco.
246 3 _ Widow's walk
264 _ 2 Renton, WA : $b Wizards of the Coast, $c [2016]
264 _ 4 $c ©2016
300 _ _ 1 game (1 rulebook, 2 haunt books, 20 room tiles, 30 cards (omen, event, item), 76 tokens) : $b cardboard, paper, color ; $c in box 27 x 27 x 5 cm
336 _ _ three-dimensional form $b tdf $2 rdacontent
337 _ _ unmediated $b n $2 rdamedia
338 _ _ object $b nr $2 rdacarrier
500 _ _ Title from container.
500 _ _ "You must have the Betrayal at House on the Hill base game to use this expansion" --Container.
500 _ _ Duration of play: 60 minutes.
500 _ _ For 3-6 players.
521 _ _ Ages 12+.
520 _ _ A new world of horror opens up with this expansion of the board game Betrayal at House on the Hill. New rooms, monsters, items, omens, events, an additional unexplored floor, and 50 new haunts are included.
100 1 0 Glassco, Bruce, $e designer.
710 2 _ Wizards of the Coast, Inc., $e publisher.

Titles are also released with different editions. An example is the game *Clue*. Many variations of the original game have been released, such as *Clue: Juicy Couture*, *Clue: Seinfeld*, and *Clue: Simpsons*. While the general play is the same, each game is a different stand-alone game not meant to be combined for play. In these cases, each edition or version should be cataloged with a separate record.

Genre Terms

When the UNT Media Library began cataloging games in 2010, there were few established genre terms to describe games. The library could manage with a few headings when the collection was small, but as it grew, more terms were necessary to facilitate use and circulation. To aid discoverability and collection use, the authors created a set of fifty genre terms in an open access resource entitled *Genre Terms for Tabletop Games*.[82]

This process started with an evaluation of the collection, its continued growth, and the perceived user needs. The authors wanted the chosen headings to work both for their collection and also for other libraries with similar collections. The headings needed to reflect the language of current tabletop gamers plus anyone new to tabletop gaming. This required terms that were broad enough for novices yet concise enough for experts.

The authors also wanted to use terms from a known source to ease cataloging and classification decisions for librarians who are not gamers. They used Board Game Geek, a crowd-sourced database/website with information on board games.[83] The site offers sufficiently accurate information for creating an RDA core bibliographic record with at least two general genre terms for most tabletop games. It provides a large list of terms, each with its own page of information about the term: name, description, linked forums, and linked items. The terms chosen to describe this collection drew from the type, category, and mechanisms lists with a few additions.

Each term chosen relates back to the specific content of the authors' collection and goals for its growth. Games support the education, recreation, and research interests of faculty, students, and staff. Specifically, one of UNT Libraries' goals is to support the use of games in curriculum development; therefore, the authors added broad education-related genre terms. However, the collection does not include many games for very young children, educational or otherwise, and it was decided that the broad term *Children's games* could sufficiently describe these types of games.

The broadest genre term in the UNT Libraries' genre list is *Tabletop games.* Everything in the tabletop game collection receives this heading. This term becomes more granular by including the terms *Board games*, *Card games*, *Dice games*, and *Roleplaying games*. Every game acquired specifically to support an educational goal also receives the heading *Educational games*. This term can be broken down into more granular genres of educational games such as *Math games*, *Language development games*, and *Physics games*. Each of the fifty genre terms received its own authority record with the appropriate variant and authorized access points for related entities, a note on its use, and information about the source data. This list is evaluated

annually as the collection grows, and new terms are added if warranted.

Although the headings are specific to the Media Library's needs, they are broad enough to offer a starting point for other tabletop game collections. Catalogers using Board Game Geek as a resource and the UNT Library's *Genre Terms for Tabletop Games* list are set to increase potential discoverability and use of their collection. However, making sure the catalog effectively uses this information is equally important to aid users in their search for materials.

Facets

As the game collection grew, the authors observed that it could benefit from even greater discoverability in addition to full cataloging and the use of genre terms. Since the UNT Libraries planned to migrate to a faceted discovery layer, the authors found a unique opportunity to use the new genre terms and add a field specifically geared toward faceting on duration of play, number of players, and age of players.

These three data points are characteristically found on the preferred source and typically lack a uniform structure. Therefore, if this data was limited to a regular free text MARC 5XX note field, it would be difficult for a faceting system to collocate the terms and structure them correctly. This potential obstacle led the authors to create their own structure based on what would work best for their faceting system. They created common groupings around the three data points and assigned a unique code to each grouping as shown in table 1. Since the codes have a similar structure, they can easily be included in one field.

Because of the flexibility of the faceting system, the authors decided to record the codes in the MARC 590 Local Note field, separating each code by a semicolon. This allows for easy visual checking when entering or correcting codes in a record. It also allows for easy preparation of the codes outside the ILS to enable batch insertion into existing records in the library system.

590 _ _ d30t59; p2t4; p4t8; a5t9; a10t13; a14t16; a17t100

Since the UNT Libraries had already cataloged a few hundred titles, they needed a way to insert the facet codes without corrupting the quality of the records. To accomplish this, the authors created a master spreadsheet containing data about every game in the catalog. They reviewed each physical game, took the appropriate facet data from the preferred source, and coded it according to the predetermined groups. The spreadsheet data and the exported game records were merged using MarcEdit, which allows for easy manipulation of records and includes record cleanup functionality. The authors reloaded the merged and cleaned records into their ILS so that the faceting system could read the codes in the new MARC 590 fields and appropriately display the correct labels. Providing full-level bibliographic records, new genre access points, and a local MARC 590 field for faceting is only part of the way to improve discoverability. The final step was to add the new discovery layer Blacklight so that users could easily access the full data.

Table 1. Groupings, labels, and codes for the three data points

Grouping	Label	Code
Number of Players	One	p1
	Two to Four	p2t4
	Four to Eight	p4t8
	More Than Eight	p9t99
Duration of Play	Less Than 30 Minutes	d1t29
	30 Minutes to 1 Hour	d30t59
	1 to 2 Hours	d60t120
	Over 2 Hours	d120t500
Age of Players	1 – 4	a1t4
	5 – 9	a5t9
	10 – 13	a10t13
	14 – 16	a14t16
	17 and Up	a17t100

Implementing Custom Tabletop Games Facets in Solr and Blacklight

Age, *duration*, and *number of players* are important characteristics of tabletop games that library catalogs do not typically use for faceting or limiting search queries. Implementing them effectively as actionable fields requires the ability both to index the custom facet fields and to present them appropriately in the user interface—requirements that the Libraries' chosen software, Solr and Blacklight, capably address.

Apache Solr

Apache Solr is a Java-based, open-source, full-text search engine. It functions much like a database: it stores data records (or *documents*, in Solr parlance) and provides facilities for querying and retrieving the stored data. Unlike a typical database that stores information in a normalized,

structured form, Solr stores content in a flatter, de-normalized form that it pre-parses for easier (and faster) retrieval by full-text search applications.[84]

Solr is not a library-specific product and does not include everything needed to serve as a standalone library discovery system: it lacks an end-user interface, and it has no built-in facilities for transforming MARC 21 records into an acceptable format for indexing. However, it *is* highly configurable, and modifying its behavior does not require editing Java code. Instead, the system provides extensive configuration files, many of which are in an easy-to-edit and easy-to-read XML format, that control how information is stored and how it can be queried.

One such file is the *schema*, which tells Solr what fields to store, what type of data each field contains, how each field can be searched, and how to parse each field during indexing. Keyword searching involves matching individual words (or *tokens*) in a user's query to the words contained within an index, and the schema's data-type definitions specify precisely how Solr should break field data into words during indexing (a process called *tokenization*).[85] For instance, to match a user's keyword search for "bach," the software must index the author heading, "Bach, Johann Sebastian, 1685-1750," in a field with a data type that tokenizes the heading appropriately. To handle such common cases, creating a default *text* data type that removes punctuation, removes stop words, normalizes case, and tokenizes on whitespace (for example) is a common practice.

However, faceting, unlike searching, involves grouping sets of records based on complete, unbroken textual strings—such as terms or phrases from a controlled vocabulary. Grouping records on the entire author heading, "Bach, Johann Sebastian, 1685-1750," is more useful for helping users find resources by that author than having a separate group for each of the individual words, "Bach," "Johann," "Sebastian," "1685," and "1750." Attempting to facet on a tokenized field would result in the latter. Fields intended to be used for faceting therefore often use Solr's built-in *string* data type, which indexes field data as a single token.

Furthermore, grouping on the exact strings that appear in the indexed data is Solr's default approach to faceting, but generating human-readable facet groupings during indexing is not always practical. The approach is sound for faceting on a field such as author because the author headings in the catalog *are* (or are very close to) the strings likely to be used as human-readable labels in the end-user interface. However, for faceting on a field such as publication date, facet groupings are not so well-defined—one could use ranges of any number of years, for example, as categories. If catalogers are tasked both with creating the categories *and* storing the human-readable labels in the catalog records (before they are indexed), changing either the categories or the labels requires updating batches of catalog records. Even if the categories and labels are derived during indexing, they lack flexibility: changing them still requires re-indexing the affected catalog records, even if the data in the records has not been changed.

When hardcoding facet groups within the index is problematic, Solr allows front end applications to define the facet groups *dynamically* based on data stored in the index when an application submits a query. The application simply needs to issue a facet query telling Solr exactly what subqueries to use to construct each facet category. Often this is used to construct dynamic categories based on numeric data: if a Solr index stored a "publication year" field, an application could use a facet query to build dynamic facet categories out of numeric date ranges.[86] Additionally, facet queries can serve to generate human-readable facets based on encoded data—to translate coded values into human-readable labels, enabling the labels to be changed without requiring changes to the index.

The authors weighed these possibilities when considering how to assign and store tabletop games categories and how to structure the Solr schema to power their custom facets. They settled on a hybrid approach. The Media Library's catalogers developed the applicable facet categories for age ranges, durations, and numbers of players. They assigned these categories during cataloging to the MARC 590 field using coded values instead of human-readable category labels. This approach put catalogers in charge of assigning and maintaining the categories, and left the implementation flexible enough so that the labels could be changed without incurring the need to re-index. Additionally, because the coded game facet tokens do not overlap, the authors' approach allows storing all facet data in one multivalued string field in Solr (called *game_facet*) rather than storing *age*, *duration*, and *number of players* as separate fields.

Indexing Tabletop Games Facets from MARC in Solr

Building a Solr index for a custom library discovery system is useless without having the infrastructure to extract MARC 21 records from an ILS and load them into Solr. A general discussion about methods for interpreting and transforming standard MARC data programmatically is outside the scope of this paper. However, enabling the searching and faceting of non-standard fields requires creating customized processes to derive search index data from MARC, possibly in non-standard ways. Prior to implementing Blacklight at the UNT Libraries, the authors' institution had already built such a system for indexing MARC records in Solr from its ILS, Innovative Interfaces' Sierra. Their system allows writing export processes that pull data from Sierra's SQL database and convert it into a format to load into Solr. Different export processes use different mechanisms depending on

the nature of the data they export. Exporting data from bibliographic records, for example, involves converting records from the internal ILS data format to MARC and defining custom processes to convert the MARC records to the appropriate Solr fields.

To index the tabletop games facet codes, the MARC record indexing process first performs pattern matching on the custom values in the MARC 590 $a to ensure that it only loads data into the *game facet* field that conforms to the specification. When it finds matching data, it extracts the semicolon-delimited string of coded game facet tokens in the MARC 590$a, splits it into individual strings, and assigns each string to the Solr field as a separate value. For instance, a MARC record containing the string *d30t59; p2t4; p4t8; a5t9; a10t13; a14t16; a17t100* in a 590 $a translates to the below data structure in the Solr index.

```
"game_facet": [
    "d30t59",
    "p2t4",
    "p4t8",
    "a5t9",
    "a10t13",
    "a14t16",
    "a17t100"
]
```

Configuring Tabletop Games Facets in Blacklight

To serve as the user interface for their new discovery system, the UNT Libraries adopted Blacklight, an open-source application explicitly designed to provide library discovery features on top of a Solr index. Blacklight handles the interaction between end-users and the index—translating users' requests to Solr queries and Solr's results to readable displays. If a running Blacklight instance has access to a running Solr server, it queries the index by sending the correct query parameters to the appropriate URL; the Solr server returns results to Blacklight in JavaScript Object Notation (JSON) format.

Though Blacklight *is* a library-specific application, it is designed so that it does not impose library-specific requirements on how the underlying Solr index is set up, making it an excellent choice for libraries desiring highly custom systems (provided that they have the technical resources to implement and maintain it). Configuring a basic, working Blacklight instance on top of even a heavily customized Solr index is straightforward, provided one knows the details of how the Solr index is set up. The primary means for customizing the interaction between the interface and the index involves editing a configuration file instructing Blacklight on exactly what Solr fields and parameters it should use to provide features such as fielded searches, facets, and record views. Blacklight then tailors the queries it sends to Solr so that they use the Solr fields defined in the configuration file, and it processes results so that fields are displayed to the end-user using labels and options defined in the configuration file.

In Blacklight, each of the three tabletop games facets the authors developed is implemented as a facet query that queries the *game_facet* Solr field to find the appropriate coded value for a given grouping. The bulleted list below demonstrates how the Blacklight configuration file defines these. *Facet Label* is the label for the facet that displays in the user interface; each *Facet Value Label* is the string that displays for each facet value. Each *Solr Facet Query* is the subquery sent to Solr as part of the facet query defining how to derive each facet grouping.

- Facet Label: "Games - Duration"
  - Facet Value Label: "less than 30 minutes"
    Solr Facet Query: "game_facet:d1t29"
  - Facet Value Label: "30 minutes to 1 hour"
    Solr Facet Query: "game_facet:d30t59"
  - Facet Value Label: "1 to 2 hours"
    Solr Facet Query: "game_facet:d60t120"
  - Facet Value Label: "more than 2 hours"
    Solr Facet Query: "game_facet:d120t500"
- Facet Label: "Games - Number of Players"
  - Facet Value Label: "1 player"
    Solr Facet Query: "game_facet:p1"
  - Facet Value Label: "2 to 4 players"
    Solr Facet Query: "game_facet:p2t4"
  - Facet Value Label: "4 to 8 players"
    Solr Facet Query: "game_facet:p4t8"
  - Facet Value Label: "more than 8 players"
    Solr Facet Query: "game_facet:p9t99".
- Facet Label: "Games - Recommended Age"
  - Facet Value Label: "1 to 4 years"
    Solr Facet Query: "game_facet:a1t4"
  - Facet Value Label: "5 to 9 years"
    Solr Facet Query: "game_facet:a5t9"
  - Facet Value Label: "10 to 13 years"
    Solr Facet Query: "game_facet:a10t13"
  - Facet Value Label: "14 to 16 years"
    Solr Facet Query: "game_facet:a14t16"
  - Facet Value Label: "17 years and up"
    Solr Facet Query: "game_facet:a17t100"

By configuring these structures as query facets in Blacklight, the human-readable labels can be easily changed without re-indexing the affected records. However, changes to the underlying facet codes in the MARC 590 fields will still require re-indexing.

Customizing the End-User Discovery Experience Takes Teamwork

Effective resource discovery requires that the data and the systems work in tandem. Actively enhancing the discovery of library resources—especially collections of unique or nontraditional materials—requires catalogers, systems librarians, and Information Technology (IT) staff to collaborate to plan, design, and enact the required changes. Implementation will ultimately fail if systems and technology staff are not committed to maintaining the customizations over time. For many libraries, customizing systems to this degree is not possible, either because they lack the needed human and technological resources or because the organizational barriers that segregate librarians from systems and IT staff prevent such projects from emerging.[87]

The UNT Libraries recognize that meeting the needs of a twenty-first-century research university requires providing technology-based services tailored to the populations they serve, which in turn requires a better integration of technology into traditional librarian roles. They have attempted to structure their organization so that it buttresses more traditional roles in public services and cataloging with roles that enable and support local system development. Librarians and staff who develop and maintain local systems serve on cross-functional workgroups alongside librarians and staff with more traditional roles, encouraging informal collaboration among groups that may not otherwise tend to interact as equals. Figure 1 illustrates the structures most relevant to the UNT Libraries' faceted catalog implementation and development of tabletop games facets.

Cataloging at the UNT Libraries is largely decentralized. A main Cataloging and Metadata Services Department manages the cataloging of general collection resources, but other divisions and departments—such the Media Library, the Music Library, Government Documents, and Special Collections—have cataloging librarians and staff who maintain their own specialized materials. The Cataloging Workgroup exists so that representatives from each department can collaborate to address tasks and projects that require a more unified approach than decentralization would typically afford, such as maintaining consistent standards and ensuring that user facing systems and interfaces utilize those standards effectively.

The Digital Libraries Division drives many of the Libraries' web and discovery projects; it develops and maintains the UNT Digital Library, the library's website, and most of the major discovery systems that the library uses. This division employs a staff of software developers and librarians with software and web development experience, including the Resource Discovery Systems (RDS) Librarian. The RDS Librarian serves as the ILS administrator, the administrator of the Libraries' Web-Scale Discovery platform, and is co-administrator of the Libraries' website in conjunction with other members of its department, the User Interfaces Unit. This position is responsible for working collaboratively with staff throughout the library to ensure the Libraries' public-facing discovery interfaces serve library users well and is therefore a permanent member of the Cataloging Workgroup.

Finally, a dedicated Facilities and Systems department manages the Libraries' IT infrastructure and serves as a liaison to campus IT. Staff in this department manage the most fundamental levels of library technology, providing systems, server, and network administration along with helpdesk support. Though they rarely serve directly on cross-functional workgroups, they provide an invaluable resource on all technology-related library projects, providing the low-level support for hardware and systems that makes the projects possible in the first place.

This organizational structure reduces friction in developing and customizing end-user discovery interfaces while simultaneously maximizing opportunities for input and collaboration. Pathways have grown for sharing and developing project ideas organically, with consideration for system capabilities and technological resources built in, without wanton bureaucratic overhead. Enhancing discovery of tabletop games using custom facets is an exemplar of such a project. The idea germinated from discussions among the Media Library staff and Cataloging Workgroup members. Blacklight was considered when the RDS Librarian began discussing User Interfaces' work investigating a Blacklight-based faceted catalog at Cataloging Workgroup meetings. This led to the idea to develop custom facets for tabletop games in Blacklight to explore developing custom facets and metadata fields in general.

Ultimately, systems and technology require significant resources to develop and maintain, and any project or initiative involving system development must account for this fact. If a library values providing its users with systems and services tailored to their needs, it must find vendors willing to provide that level of customization or it must provide explicit organizational support for performing and maintaining in-house customization.

Conclusion

Enhancing the discoverability of collections to increase their use is a common goal among libraries—one that they can achieve incrementally based on the resources at their disposal, as the UNT Libraries' efforts surrounding their tabletop games collection demonstrate. Simply getting items into the catalog is a great place to start. Improving those

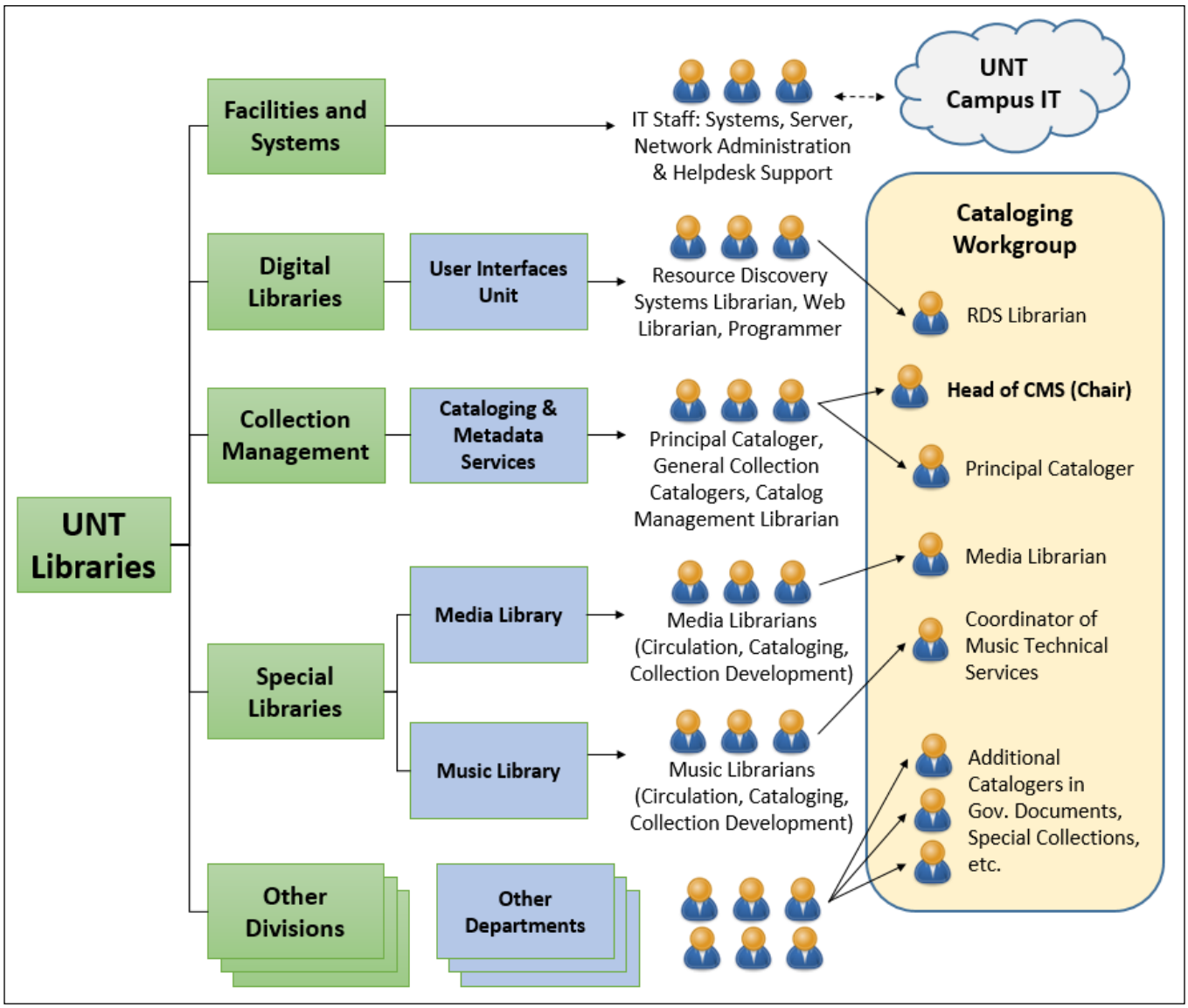

Figure 1. Organizational structures most relevant to the UNT Libraries' faceted catalog implementation and tabletop games facets.

bibliographic records by using RDA Core requirements and other enhancements further increases the likelihood that users will find those items—but only if the end-user discovery interface can utilize that metadata. If it cannot, considering how to process the metadata or customize the interface to take full advantage of what is available may be the next step—one that the UNT Libraries have taken by adopting Solr and Blacklight. Although this technology is effective, implementing it requires a level of institutional support the authors recognize that not all libraries have. Regardless of a library's size or type, or what steps that library can afford to take, *collaboration* is the fundamental key. Somebody must first start the conversation, and they must ensure that those who create the metadata, those who create and maintain the systems, and those who interact directly with library users all talk to one another.

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