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Here lies the Database of Demons and Death Gods: a full-text database of stories about death gods and demons from around the world. This paper describes the background literature useful to the creation of such a database and a detailed walkthrough of the process of creating and launching the database. Process topics include system architecture, principles of story selection and file naming, metadata, search functionality, user interface, graphic design, database launch and evaluation, and areas for future development.

Headings:

Database design

Full-text databases

Storytelling

DATABASE OF DEMONS AND DEATH GODS: THE CREATION PROCESS

by

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Introduction

The world of stories is vast, full of magic, and has existed for thousands of years. Stories have existed and been told in various formats over that time: first orally, then through the written word, in both print and later electronic formats. For those who wish to partake in the rich tradition of storytelling, there are many ways to engage; for example, those who favor the oral tradition might look to their local storytelling association (e.g. the North Carolina Storytelling Guild, http://www.ncstoryguild.org/), while those who favor the written word might turn to a resource like the Storyteller's Sourcebook (MacDonald & Sturm, 2001), or simply browse their local library or bookseller's selection of folktales.

Storytellers who prefer electronic resources face a more challenging environment. The most user-friendly tool for finding stories on the web remains the search engine. There do exist some significant collections of folktales on the web, such as the Multilingual Folktale Database (http://www.mftd.org/index.php?action=home), D. L. Ashliman's Folklore and Mythology Electronic Texts (https://www.pitt.edu/~dash/folktexts.html), and the YASHPEH International Folktale Database (http://folkmasa.org/yashpeh/yashpeh.htm). However, the user interfaces of these collections are generally very limited.

Literature Review

Consideration of the construction of databases in general is necessary before considering the best practices related to the construction of digital library applications, as well as to the metadata required by them. This shall be the order in which the literature is introduced and discussed, concluding with a survey of practical examples. The practical examples include storytelling databases and digital libraries currently extant, as well as some that have been documented but are no longer operational. Both groups of examples offer examples of features, successes, and pitfalls that can all be considered as learning opportunities for improvement in future applications.

Database Design

Blaha (2001) published a compilation of the results of the reverse-engineering of 35 relational databases over the course of 9 years. Part 1 of the study profiles the case studies, including a characterization of the case studies, the purpose of the reverse engineering in each case, available inputs and desired outputs, and database and model evaluation. Of particular note is the design grade given to each database and the database grading scale, which offers generalized guidelines of what to look for in a good database design and what to avoid in a bad one. For example, a grade A database "has no major flaws. The style is reasonable and uniformly applied," while a grade B database "has flaws that are not readily apparent in the operation of the application. The flaws can be repaired without much disruption" (Blaha, 2001a). Examples of design flaws in a grade B application include "data types and lengths are not uniform. Not-null constraints are not used to enforce required fields. Candidate keys and enumerations are not defined in

the database. Columns have cryptic names" while examples of model flaws include "anonymous fields that application code must interpret" (Blaha, 2001a). A grade C database is defined as having "major flaws that are difficult to fix and cause noticeable problems (bugs, reduced performance, difficult maintenance) in the application," a grade D application "has severe flaws that compromise the application," and a grade F application "does not run properly or runs only because of brute-force programming effort" (Blaha, 2001a).

Part 2 of the study offers a closer look at the details of database design (including approaches to identity, keys, data types, and indexes) as well as issues surrounding database design style (including parallel columns, heavily denormalized tables, and enumerations). Blaha reports on the design style of the databases in the case studies and the resulting conclusions reveal areas for improvement through the identification of the best practices to which database design should be held. Best practices include the declaration of primary and foreign keys, using consistent data types, indexing all database keys (primary, candidate, and foreign), responsible and minimal use of parallel columns, using normal forms to increase data consistency, and declaring enumerations rather than encoding them (Blaha 2001b).

While Blaha addresses the fundamentals of relational database design, Wirfs-Brock (2008) and Martyn (2000) bring to the table a more nuanced approach to issues that come up during database design and how they might be addressed in continuum or prevented altogether by reconsidering the design process. Wirfs-Brock discusses antipatterns—"design ideas hatched with good intentions that prove problematic over time"—and how repair, rework, and redesign must be evaluated objectively in order to determine how best

to resolve the antipattern that is undermining the database application. Where Wirfs-Brock focuses on remediative action (repair, rework, redesign), Martyn focuses on preventing the need for remediation by means of more rigorous pre-design. Instead of the classic three-step methodology for database design (conceptual design, logical design, physical design), Martyn advocates separating implementation design from its place as a sub-step of either logical design or physical design and giving it its own place, making a four-step methodology. By using the four-step methodology, database design benefits from increased consistency in the application of implementation design techniques, which can otherwise be applied in an ad hoc manner, potentially leading to some of the same issues (antipatterns) addressed by Wirfs-Brock.

Digital Libraries

According to Hallo et al., "digital libraries allow online access to devices that contain digital knowledge. Libraries have traditionally worked on publishing data; however, in order to solve more complex queries, connection to external data sources is necessary. ...Furthermore, applications can be developed on metadata to build services on top of them such as adding maps to locate resources, putting together resources with similar issues, making recommendations, allowing users to create semantic annotations, etc." (2016). There are several studies that offer insight into the best practices needed to achieve these goals.

The development of the Digital Latin Library used extensive involvement of typical users to inform the design of the digital library; methodology included semi-structured individual interviews, task demonstrations using a think-aloud protocol, and task diaries

(Abbas, Huskey, & Weaver 2015). In contrast to this user-oriented approach, Meyer et al. (2015) considers the development of digital library applications as a function of the different technologies required by the type of content to be included in the digital library, as well as the longevity necessary for its preservation. Buchanan et al. (2005) provide a more technical approach, focusing on an open-source digital library system, Greenstone, which offers a framework for creating digital library applications. There are two major versions of Greenstone, Greenstone2 which is widely used around the world and Greenstone3 which is under active development (New Zealand Digital Library Project 2015). Verma & Kumar (2018) compare Greenstone with two other digital library software applications, DSpace and Eprints, and their various limitations and differences are thoroughly analyzed. Verma & Kumar also include a DSpace implementation that offers a counterpoint to the implementation of Greenstone in Buchanan et al. While the best software is ultimately determined by either the user needs (as in Abbas, Huskey, & Weaver) or by the collection requirements (as in Meyer et al.), Buchanan et al. and Verma & Kumar illustrate the technical side of the digital library story.

No library (digital or otherwise) would be complete without metadata. Some discussion of metadata has featured in each of the authors discussed thus far, increasing in quantity as the discussion has moved from databases in general to digital library applications in particular. Buchanan et al. (2005) in particular discuss the implementation of Metadata Encoding and Transmission Standard (METS) schema maintained in the Network Development and MARC Standards Office of the Library of Congress (2019). Buchanan (2006) also discusses the application of FRBR (Functional Requirements for Bibliographic Records) to digital libraries. FRBR is a recommendation that allows for

enriched description of creative works included in digital indexes such as databases and digital libraries. Specifically, FRBR differentiates between a work (i.e. a specific creative work), the expression of a work (i.e. various editions of the specific creative work), the manifestation of the work (i.e. the format of the expression) and individual item (i.e. a particular copy of a manifestation). Accounting for these four facets allows for greater bibliographic control, and in the context of digital libraries, opens the door for improvements such as "improved search facilities where cataloging data for a particular work varies due to indexation practice or factual uncertainty, provide enriched alerting for accessions and changes in a digital library, ...and enrichens the facilities of the library for many tasks and for readers and librarians alike" (Buchanan 2006). FRBR is the only conceptual metadata format included in Meyer et al.'s comparison of metadata formats (2015). For developing conceptual schemata beyond FRBR, Wedemeijer proposes active, passive, and abstraction strategies for engineering conceptual schemata; active strategies improve schema flexibility, passive strategies stabilize the schema, and abstraction strategies increase data independence (2001).

Practical Examples

While examining digital library applications in the abstract offers a good conceptualization for the proposed project, it may also be useful to consider some specific instances of web applications (databases or digital libraries) similar to the application proposed, and in particular the features they do (or do not) contain. A brief, chronological overview follows.

Short Fiction on Film is an electronic relational database commissioned by the California State Department of Education and created on DataRelator, a relational database manager (May 1990). The database was organized by "file cabinets drawers" from which the user could select and navigate. The "drawers" were essentially pieces of metadata that the user used to navigate the database. The top-level "file cabinet" contained the following drawers: author, fiction genre, fiction technique, film genre, film technique, story, and theme. In 2004, EBSCO Publishing made its Short Story Index available via EBSCOhost; the Short Story Index is a detailed database of citation information for short stories. It is searchable by much the same criteria as were used by the Short Fiction on Film database's "file cabinet": namely, users can search the Short Story Index by author, title, subject (subjects include theme, locale, narrative technique or device, and genre), keyword, date, literary technique, and source (EBSCO Publishing 2004). The Short Story Index is still available at the time of writing, while Short Fiction on Film has become obsolete.

In 2010, the Storytime database was created by two masters students at the University of North Carolina at Chapel Hill (Kahn 2010, Lunden 2010). Storytime was noteworthy in that its creators intended for it to serve as a digital library as well as a database, unlike the Short Story Index and Short Fiction on Film databases. Storytime also utilized a content management system as a significant part of its architecture—an interesting choice, as it contrasts with the digital library architecture proposed by Meyer et al. (2015), where a content management system was used only for the web presentation. Meyer et al. prioritize technology that is informed by the content it is intended to serve and preserve, and if multiple technologies are necessary to meet the goals of a project, then the task

becomes a matter of integrating them. Kahn and Lunden's implementation (i.e. use of the content management system to meet multiple goals) was informed by the more ad hoc consideration of long-term maintenance than the best-practice ideals of Meyer et al. Specifically, Kahn chose to use a content management system so that the end product would include a "friendly administrative interface," and a graphic administrative interface would allow a user "to make system changes and organize or update published content without any specific technical knowledge" (Kahn 2010). While this is valid reasoning, it was not enough to make Storytime sustainable in the long-term, and this digital library is no longer available.

Last but not least, the Folktale Storytelling Digital Library (FSDL) is a service of Story Squad, a literacy project based out of the School of Information and Library Science at the University of North Carolina at Chapel Hill (Story Squad, n.d., "About Us"). The FSDL is a throwback to the Short Fiction on Film database in many ways, barring the fact that Short Fiction on Film was strictly a database, and the FSDL orients itself as a digital library. The FSDL is searchable through a basic search field, and an advanced search field allows users to search by title, themes, characters, story origin, video storyteller, video length, and grade level suitability. All of the fields are free text inputs, save for video length and grade level suitability, which are range sliders. In addition to the search fields, users can also navigate the digital library via a sidebar which allows for browsing in a manner similar to the Short Fiction on Film database's "file cabinet drawers." The FSDL sidebar allows for browsing by grade level suitability, story origin, character, and theme, or users can view all videos in the library (Story Squad, n.d., "Folktale Storytelling Digital Library"). The combination of field-based searching

typical of databases (also seen in EBSCO's Short Story Index and Wells' LGBTQA YA Fantasy database) with the browsing functionality is a novel, seemingly redundant, design decision, but one that allows for flexibility in how the user accesses the content in the digital library. The FSDL is publicly available at the time of writing.

Project Concept

The concept for the project is a database of myths from around the world; more specifically of myths surrounding death gods. The name of the database is the Database of Demons and Death Gods (DODG, located at http://www.shortandsweet.wtf/dead).

The database organizes the myths using as subject headings both the death god or demon featured in the myth and the themes of the story. Each myth is also inventoried with metadata including the story author, story title, and geographic origin of the myth. The intended users include storytellers looking for new stories to tell as well as readers looking for stories to enjoy.

In terms of creating the resource, the database is maintained using the content management system WordPress with the Pods plugin to manage custom fields for the metadata and custom taxonomies. The database contains the full-text of the stories to avoid the need for maintaining the currency of a large collection of external links. The stories are collected from public domain works archived on HathiTrust (https://www.hathitrust.org/) and the Internet Archive (https://archive.org/). The stories are collected manually in order to evaluate relevance (for example, a god in one culture

sometimes has the same name as in another culture, and a determination must be made as to which geographic region the story belongs).

The Process

System Architecture

The database is hosted on the same WordPress installation as the Short and Sweet media review blog (https://shortandsweet.wtf/). The reasoning behind this decision is that Short and Sweet is a developed site and receives content updates routinely; this allows for the future possibility to incorporate the blog with the database to make it more trendy and accessible.

To facilitate ease of creating a custom metadata architecture, a plugin that allows for the creation of custom post types was necessary. The first plugin attempted was Custom Post Type Maker. However, this plugin caused an error in the featured image functionality on the blog part of the site so an alternative was necessary.

The next plugin attempted was the Novelist plugin which creates a custom type (book) with metadata fields common to books. It was not a perfect fit, but it was the best alternative at the time. The plugin allows metadata fields to be customized to display with different titles which allows for handling of the themes and regions. Upon discovery of the Pods plugin, the Novelist plugin and architecture was removed from the site but can be considered if any future issues arise with the Pods plugin.

The Pods plugin was the next plugin attempted and the one chosen for the final database. It causes no issue with the featured image and it functions similarly to Custom Post Type Maker (if not better). No issues arose with the implementation of the metadata architecture with the Pods plugin.

The ideal metadata architecture consists of the following: Author is a custom taxonomy based on the WordPress tags model (flat taxonomy); Title is stored in the story post title field; Region is a custom taxonomy based on the WordPress category model (hierarchical taxonomy); Demon is a custom taxonomy based on the WordPress tags model (flat taxonomy); and Theme is a custom taxonomy based on the WordPress tags model (flat taxonomy). "Demon" is the nomenclature used to refer to all death gods, spirits, demons, etc. The original term used was "subject" but this term was discarded as of 8/20/19 due to the ambiguity surrounding its use to describe topics as well as the subject death god, spirit, demon, etc.

The actual metadata architecture using Novelist is as follows: Author is stored in a text field and is not searchable; Title is stored in the book title field; Region is a custom taxonomy based on the WordPress category model, Novelist calls this Book Series; Subject/Demon (i.e. the name of the death god featured in the story) is not supported as of 8/16/19; and Theme is a custom taxonomy based on the WordPress category model. Novelist calls this Book Genres.

The actual metadata architecture using Pods follows the ideal metadata architecture.

Flat taxonomies are utilized for the author, demon, and theme metadata fields because a flat taxonomy is the best choice for fields that will have multiple entries with no

governing structure. On the other hand, a hierarchical taxonomy is the best choice for fields that will have one, or at most two, entries, and follow some sort of orderly structure. This is the case for the region field, and so it uses a hierarchical taxonomy.

Regarding the region field, mention must be made regarding the originally proposed list of geographic regions derived from Abel's Death Gods and the list of geographic regions actually implemented in the database.

The list of the originally proposed geographic regions with arbitrary region codes is as follows:

1.	Africa (AFR)	10.	China (CHI)
2.	Australian and Aboriginal (AUA)	11.	Christianity and Europe (CEU)
3.	Aztec (AZT)	12.	Egypt (EGY)
4.	Babylonia, Mesopotamia, and Related (BMR)	13.	Etruscan (ETR)
		14.	Finland (FIN)
5.	Bali (BLI)		
		15.	France (FRN)
6.	Baltic (BLT)		
		16.	Germany (GER)
7.	Bella Coola (BLC)		
		17.	Greece (GRC)
8.	Buddhism (BUD)		
		18.	Greenland (GRN)
9.	Celtic, Irish, and Welsh (CIW)		

19.	Hawaii (HAW)		35.	Norse and Teutonic (NOR)
20.	Hebrew, Ancient Israel, and Jewish (HIJ)		36.	Persian and Zoroastrian (PRZ)
			37.	Philippines (PHI)
21.	Himalayas (HIM)		38.	Phoenicia (PHO)
22.	Hinduism (HIN)		39.	Polynesia (POL)
23.	Iberia (IBR)		40.	Rome (ROM)
24.	Inca (INC)		41.	Russia (RUS)
25.	Inuit (INU)		42.	Saami (SAA)
26.	Islam (ISL)		43.	Scotland (SCO)
27.	Japan (JPN)		44.	Siberia (SIB)
28.	Kwakiutl (KWK)		45.	Slavic (SLA)
29.	Latvian (LAT)		46.	South America (SOA)
30.	Lithuania (LIT)		47.	Syrian (SYR)
31.	Maya (MAY)		48.	Tibet (TIB)
32.	Morocco (MOR)		49.	Voodoo (VDO)
33.	Narragansett (NAR)		50.	Yurak (YUR)
34.	Navaho (NAV)		51.	Miscellaneous (MSC)

The revised list of geographic regions uses the M49 standard made available by the United Nations at https://unstats.un.org/unsd/methodology/m49/. The list of regions implemented in the database is as follows, with region codes from M49:

1. Africa & Egypt (002)

    i. includes Morocco

2. Americas (019)

    i. includes Aztec, Bella Coola, Greenland, Hawaii, Inca, Inuit, Kwakiutl, Maya, Narragansett, Navaho, South America, Voodoo

3. Australian and Aboriginal (053)

4. Europe (150)

5. Eastern Asia (030)

    i. includes China, Himalayas, Japan, Tibet

6. Eastern Europe (151)

    i. includes Russia, Siberia, Slavic, Yurak

7. Northern Europe (154)

    i. includes Baltic, Celtic, Irish, and Welsh, Finland, Latvia, Lithuania, Norse and Teutonic, Saami, Scotland

8. Oceania (009)

i. includes Australian and Aboriginal, Polynesia

9. Southern Asia (034)

    i. includes Persia (including Zoroastrianism)

10. South-eastern Asia (035)

    i. includes Bali, Philippines

11. Southern Europe (039)

    i. includes Etruscan, Greece, Italy (including Rome), Iberia (Spain and Portugal)

12. Western Asia (145)

    i. includes Ancient Israel, Babylonia, Mesopotamia, Phoenicia, Syria

13. Western Europe (155)

    i. includes France, Germany

In addition to the changes made to conform to the M49 standard, several changes were made during the story collection process. These can be found in the section Story Collection.

Story Collection

The original plan was to include all death gods from all cultures/geographic regions, with 5-10 stories per god. The revised plan was to include one story from each geographic

area (one god per region). The reason for the revision was that original plan would prove too cumbersome for testing the database's system architecture, user interface, search interface, etc. Additionally, the revised plan used the selection of psychopomps (those deities tasked with guiding souls to the afterlife) to further narrow the pool of potential death gods and demons.

The selection principles and processes were thus as follows:

Selection of death god or demon

Goal: choose 1 story featuring a psychopomp from each of the revised list of geographic regions (13 regions in total)

- choose the first psychopomp (alphabetical) from first subregion

- if first subregion has no psychopomps, move to next subregion

- if no stories for selected psychopomp, move to next psychopomp

- if no stories for all psychopomps in a subregion, move to next subregion

- if no psychopomps (or no stories for psychopomps) in the geographic region, select a death god according to the same process

Story search and selection

Goal: find story in which the death god or demon features prominently

- search HathiTrust first

- if no results, try Internet Archive

- if no results, then there are no stories => move on according to death god

  selection algorithm

File naming

When a story has been located, save PDF copy according to file name standard

"Region_Demon_No.pdf"

- Region is the region's numerical M49 code

- Demon is the name of the death god or demon taken from Death Gods: an

  Encyclopedia of the Rulers, Evil Spirits, and Geographies of the Dead (Abel

  2009)

- No is a six-digit accession number assigned following the pattern 000001,

  000002, etc.

List of story files to be included in the initial database:

- 002_Thoth_000001

- 009_Bunyip_000001

- 019_Milu_000001

- 030_Emma-O_000001

- 034_Asmodeus_000001

- 035_Djinn_000001

- 039_Hermes_000001

- 145_Ereshkigal_000001

- 150_Devil_000001

- 151_BabaYaga_000001

- 154_Banshee_000001

- 155_Ankou_000001

Several changes were made to the proposed list of regions and the proposed story collection process, which are summarized below:

- Consolidated Australia and Aboriginal (053) and Polynesia (061) into a single category (Oceania (009)) due to overlap in story placement in hierarchy. Updated existing records (8/2/19)

- Removed Buddhism (034) as a covered topic to reduce overlap in story placement in hierarchy (overlapped with 030)

- Removed Hinduism (034) as a covered topic to reduce overlap in story placement in hierarchy (overlapped with 035 Bali)

- Creation of text files was proposed to be part of the story collection process, but to reduce time investment at this stage, PDF downloads from the source

are used for story collection and creation of text files will be handled at a
future stage

- Removed Christianity from the heading "Christianity and Europe" as there are
no longer any other religion headings in the database

- Removed Islam from the South-eastern Asia inclusion criteria as there are no
longer any other religion references in the database

Metadata

Metadata includes five items: story author (AU), story title (TI), geographic region (RE),
subject god (SU) (replaced with Demon (DM) to avoid ambiguity as of 8/20/19), and
theme (TH).

Themes from May 1990 include adults acting like children, aesthetic reality over physical
reality, antiwar, confrontation with death, denial of reality, human brotherhood, initiation,
isolation, poetic justice, reality as a game, retreat from involvement, scapegoating, the
mysterious stranger, the nature of evil, and woman in a male society. Themes added to
May 1990 include triumph by trickery.

Story metadata

002_Thoth_000001

- AU: Gilbert Murray

- TI: The book of Thoth

- RE: Africa & Egypt (002, Egypt)

- DM: Thoth

- TH: Confrontation with death, human brotherhood, the mysterious stranger, the nature of evil

009_Bunyip_000001

- AU: Daniel Vannorman Lucas

- TI: The Bunyip

- RE: Oceania (009, Australia)

- DM: Bunyip

- TH: The nature of evil, woman in a male society

019_Milu_000001

- AU: William Drake Westervelt

- TI: How Milu became the king of ghosts

- RE: Americas (019, Hawaii)

- DM: Milu

- TH: Confrontation with death, initiation

030_Emma-O_000001

- AU: John Murray

- TI: The thirty-three places

- RE: Eastern Asia (030, Japan)

- DM: Emma-O

- TH: Confrontation with death

034_Asmodeus_000001

- AU: Sabine Baring-Gould

- TI: Schamir

- RE: Southern Asia (034, Persia)

- DM: Asmodeus

- TH: Triumph by trickery

035_Djinn_000001

- AU: Rudyard Kipling

- TI: How the Camel Got His Hump

- RE: South-Eastern Asia (035)

- DM: Djinn

- TH: Poetic justice

039_Hermes_000001

- AU: Homer

- TI: Odyssey XXIV

- RE: Southern Europe (039, Greece)

- DM: Hermes

- TH: Confrontation with death, poetic justice, woman in a male society

145_Ereshkigal_000001

- AU: George Smith

- TI: The descent of Ishtar into Hades

- RE: Western Asia (145)

- DM: Ereshkigal

- TH: Confrontation with death, the nature of evil

150_Devil_000001

- AU: Washington Irving

- TI: The Devil and Tom Walker

- RE: Europe (150)

- DM: Devil

- TH: Initiation, retreat from involvement, the mysterious stranger, the nature of evil

151_BabaYaga_000001

- AU: William R. S. Ralston

- TI: Marya-Morevna

- RE: Eastern Europe (151, Russia)

- DM: Baba Yaga

- TH: The nature of evil, woman in a male society

154_Banshee_000001

- AU: Herminie Templeton Kavanagh

- TI: The Banshee's comb

- RE: Northern Europe (154, Ireland)

- DM: Banshee

- TH: Confrontation with death, human brotherhood, the mysterious stranger, triumph by trickery

155_Ankou_000001

- AU: Sabine Baring-Gould

- TI: A book of Brittany

- RE: Western Europe (155, Brittany)

- DM: Ankou

- TH: Confrontation with death, isolation, the mysterious stranger, woman in a male society

Search Functionality

ElasticSearch vs. Relevanssi

In the past I have used Relevanssi as it provides relevance-ranking and also allows for detailed handling of stopwords and synonyms. However, I have run into problems with Relevanssi in terms of interoperability with other plugins, specifically plugins that handle the creation and management of custom taxonomies. As custom taxonomies are a critical part of DODG, I chose not to use Relevanssi in favor of the Jetpack ElasticSearch plugin, which cooperates with the custom taxonomies I have established for the project.

Search Design

The proposed search interface consisted of keyword searching based on each of the metadata fields, as well as a free text search that searches the full text of each story. The actual search interface consists of a single search field that searches across all of the metadata fields simultaneously. It is located in the sidebar of the website interface.

On the backend, the search is configured in the widgets area of theme customization. The widget is called "Search (Jetpack)" and allows for multiple configuration options. The settings used in DODG are configured as follows.

Title (optional) is blank. Show search box is selected. Show sort selection dropdown is selected. Post types to search (minimum of 1) is set to: Posts, Stories (omitted: Pages, Media). Default sort order is set to Relevance (recommended).

Category filter: Filter type is Taxonomy. Choose a taxonomy is set to Categories. Title is Categories. Maximum number of filters (1-50) is 25.

Tag filter: Filter type is Taxonomy. Choose a taxonomy is set to Tags. Title is Tags. Maximum number of filters (1-50) is 25.

Author filter: Filter type is Taxonomy. Choose a taxonomy is set to Authors. Title is Authors. Maximum number of filters (1-50) is 25.

Demon filter: Filter type is Taxonomy. Choose a taxonomy is set to Demons. Title is Demons. Maximum number of filters (1-50) is 25.

Region filter: Filter type is Taxonomy. Choose a taxonomy is set to Regions. Title is Regions. Maximum number of filters (1-50) is 25.

Theme filter: Filter type is Taxonomy. Choose a taxonomy is set to Themes. Title is Themes. Maximum number of filters (1-50) is 25.

The maximum number of filters is the value that determines how many relevant filters are displayed in the interface. For example, if a user searches for a term, and all of the

results have 12 relevant filters, only 10 will be displayed if the maximum number of

filters is set to 10. It is currently set to 25, which should accommodate most if not all of

the search results based on the amount of posts and stories currently indexed on the site.

As the database grows, the maximum number of filters can be increased to accommodate

it.

The inclusion of both posts and stories in the search supports the objective of allowing

interaction between the blog part of the site and the database part. Users may search the

site and find all of the material that is relevant to their inquiry; this may reside

exclusively on the blog side or on the database side based on the search, but some

searches will retrieve material from both parts of the site. Inclusion of both elements in

the search provides an opportunity for users to find new information they may not have

considered if their search was limited to one part of the site.

User Interface

The proposed user interface for the web site included the application page, as well as a

home page, an "about" page to include information about the project, and a contact page,

which would allow users to submit questions, comments, and concerns. The contact page

was also to include a link to a user satisfaction survey designed to evaluate the database.

The survey proposed consists of four questions: 1, What were you looking for? (required

field); 2, Did you find it (required field), 3, Do you have any suggestions for a better

experience? (not required); 4, Do you have any complaints with your experience? (not

required).

The actual user interface combines the application page, about page, and contact features into a single page. The page consists of blocks in the following order: featured image, a quote about death from the TV show Supernatural, an introductory blurb (full text below), browsing instructions ("To start with, or if you aren't looking for anything in particular, you can browse the archive"), link to browse archive. search instructions (full text below), search module, request for feedback to be left in comments ("If you enjoy the Database of Demons and Death Gods, please support us by leaving feedback in the comments!")

The introductory blurb reads: Stories of death have been part of human culture across the globe for thousands of years. The Database of Demons and Death Gods (DODG) offers a hub where readers, storytellers, and scholars can find these stories indexed by the name of the god, the region where the story comes from, the themes in the story, and the author of the story.

The search instructions read: If you would like to take advantage of the indexing, you can search the archive. Narrow your search using the indexing criteria filters on the left side of the search results screen after entering your initial search query below. For example, if you are looking for ghost stories, try searching "ghost."

The decision to elicit feedback via comments rather than the initial proposed comment form was made in hopes that a simpler interface with fewer requirements will produce more results than a contact form with many fields.

Metadata display

The user interface also includes the metadata display on individual story pages. The

metadata display is handled through the Pods plugin's template capability. The template

for metadata display is coded as follows:

```
<table style="border-width: 0px 0px 0px 4px; border-style: hidden hidden hidden
double; border-color: red; box-shadow: 0 4px 8px 0 rgba(0,0,0,0.2); background-
image: url('https://shortandsweet.wtf/wp-
content/uploads/2019/10/greybg2.gif')"><tr><td>
        <b>Author:</b> {@author} <br />
        <b>Demon:</b> {@demon} <br />
        <b>Region:</b> {@region} <br />
        <b>Themes:</b> {@theme} <br />
</td></tr></table>
```

The items in squiggly braces ({}) represent the Pods framework's magic tags which pull

the pertinent data for each post.

The design of the metadata display is a single row, single cell table that displays the

author, demon, region, and themes each on their own line. The metadata is text-only and

is not hyperlinked. The metadata box is displayed at the top of the story, with the story

text following.

Graphic Design

The graphic design of the site was finalized after all other elements of the database and

website are in place. Graphic design elements consist of a banner image for the database

application page, a square "button" style image for promotional purposes, and a

downloadable e-book containing all of the stories in the launch of the database, available in PDF and epub formats.

Database Launch and Evaluation

The database went live on October 31st, 2019. In the first four days after the launch, the database had eight visitors, none of whom left comments in the feedback section. Most of the visitors did not proceed past the database home page (http://shortandsweet.wtf/dead) to actually explore the database. The most visited story in the database out of the two visitors who did explore the database was the story of Mary-Morevna (region: Eastern Europe, demon: Baba Yaga).

Although the feedback system was not an immediate success, it is too soon to consider it a failure. More time is necessary to determine whether this method of feedback will need to be revised.

Future Development

While the database is fully functional, there is of course room for future development. The primary task will be the continued addition of stories to the database. Additionally, there is room for improvement in the story record pages. Currently they are limited in functionality; while the metadata for each story is listed at the top of the story record, it is not hyperlinked, nor does the detailed search functionality appear on story record pages (there is a search bar in the side bar, but the filters display only on the search engine results page). These are all areas that can be improved upon in future updates to the database.

Bibliography

Abbas, J., Baker, S. R., Huskey, S. J., & Weaver, C. (2015). Digital Latin Library: information work practices of Classics scholars, graduate students, and teachers. In *Proceedings of the 78th ASIS&T Annual Meeting: Information Science with Impact: Research in and for the Community*

Abel, E. L. (2009). *Death gods: an encyclopedia of the rulers, evil spirits, and geographies of the dead*. Westport, Connecticut: Greenwood Press.

Blaha, M. (2001a). A retrospective on industrial database reverse engineering projects. Part 1. In *Proceedings Eighth Working Conference on Reverse Engineering* (pp. 136–146). Stuttgart, Germany: IEEE Comput. Soc. https://doi.org/10.1109/WCRE.2001.957817

Blaha, M. (2001b). A retrospective on industrial database reverse engineering projects - part 2. In *Proceedings Eighth Working Conference on Reverse Engineering* (pp. 147–153). Stuttgart, Germany: IEEE Comput. Soc. https://doi.org/10.1109/WCRE.2001.957818

Buchanan, G., Bainbridge, D., Don, K. J., & Witten, I. H. (2005). A new framework for building digital library collections. In *Proceedings of the 5th ACM/IEEE-CS joint conference on Digital libraries*

Buchanan, G. (2006). FRBR: enriching and integrating digital libraries. In *Proceedings of the 6th ACM/IEEE-CS joint conference on Digital libraries - JCDL '06* (p. 260). New York, New York, USA: ACM Press.

EBSCO Publishing. (2004). Short Story Index Now Available via EBSCOhost. *Information Today*, 21(1), 41.

Hallo, M., Luján-Mora, S., Maté, A., & Trujillo, J. (2016). Current state of Linked Data in digital libraries. *Journal of Information Science, 42*(2), 117-127.

Kahn, S. N. (2010). *A Storyteller's Database: Project Report*. University of North Carolina. Retrieved from https://cdr.lib.unc.edu/record/uuid:e47ec7a0-8b43-4674-81e0-40ef5ccc48e7

Library of Congress. (2019). Metadata Encoding and Transmission Standard (METS). Retrieved from http://www.loc.gov/standards/mets/

Lunden, S. M. (2010). *Creation of "Storytime: A Database for Storytellers" Website*. Carolina Digital Repository. University of North Carolina. Retrieved from https://cdr.lib.unc.edu/record/uuid:71ceac0b-1bf0-4d26-b57a-4d67702a30d8

MacDonald, M. R. & Sturm, B. W. (2001). *The storyteller's sourcebook: a subject, title, and motif index to folklore collections for children, 1983-1999*. Gale Group.

Martyn, T. (2000). Implementation design for databases: the "forgotten" step. *IT Professional, 2*(2), 42–49. https://doi.org/10.1109/6294.839366

May, C. (1990). *Short Fiction on Film: A Relational DataBase*. Retrieved from https://eric.ed.gov/?id=ED330316

Meyer, H., Bruder, I., Finger, A., & Heuer, A. (2015). Building digital archives: Design decisions: A best practice example. In *2015 4th International Symposium on Emerging Trends and Technologies in Libraries and Information Services* (pp. 59–64). Noida, India: IEEE. https://doi.org/10.1109/ETTLIS.2015.7048172

New Zealand Digital Library Project. (2015). Greenstone. New Zealand: University of Waikato. Retrieved from http://www.greenstone.org/download

Story Squad. (n.d.). About Us. Retrieved from https://storysquad.net/about-us/

Story Squad. (n.d.). Folktale Storytelling Digital Library. Retrieved from https://app-dept-fsdl.cloudapps.unc.edu/

United Nations. (n.d.). Standard country or area codes for statistical use (M49). Retrieved from https://unstats.un.org/unsd/methodology/m49/

Verma, L., & Kumar, N. (2018). Comparative Analysis of Open Source Digital Library Softwares: A Case Study. *DESIDOC Journal of Library & Information Technology, 38*(5), 361–368. https://doi.org/10.14429/djlit.38.5.12425

Wedemeijer, L. (2001). Engineering for conceptual schema flexibility. In *Proceedings Eleventh International Workshop on Research Issues in Data Engineering. Document Management for Data Intensive Business and Scientific Applications*. RIDE 2001 (pp. 85–92). Heidelberg, Germany: IEEE. https://doi.org/10.1109/RIDE.2001.916495

Wirfs-Brock, R. J. (2008). Valuing Design Repair. *IEEE Software, 25*(1), 76–77. https://doi.org/10.1109/MS.2008.26