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Conference Paper · October 2016

DOI: 10.1109/VSMM.2016.7863189

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Digital Archiving for Interdisciplinary Knowledge Transfer in Intangible Heritage

Sum Wai Yuan Hedren

Library, Student & Academic Services Department

Nanyang Technological University

Singapore

hedrensum@ntu.edu.sg

Abstract— “Exploring the crossroads of linguistic diversity: language contact in Southeast Asia” is an interdisciplinary project with a disparate team of 11 researchers from linguistics, art, design and media. A range of digital assets in different formats, including publications, films and datasets, were created as part of the fieldwork and research done. Using this project as a case study, this paper seeks to explore an approach on how digital assets from an interdisciplinary research project can be captured, preserved and (re)presented in a form of a digital archive. It results in a digital archive with dedicated views for each type of digital asset to meet specific viewing needs. It also used a modular design approach to achieve flexibility and meet the knowledge transfer objectives of the research project.

Keywords— digital archive; knowledge transfer; interdisciplinary research; intangible heritage

I. Introduction

How can I document and promote my research? Where and how can I store my research output? How can I allow others to reuse my research? How can others access my research even after my research grant is completed? These are some of the questions that researchers are asking when conducting their research projects. The research environment, or the *research ecosystem* of people, content and technology [1], is constantly evolving to bring in new trends in conducting research, visualising data, documenting research and sharing knowledge.

Interdisciplinarity “analyzes, synthesizes and harmonizes links between disciplines into a coordinated and coherent whole” according to [2]. The nature of interdisciplinarity in research provides a framework for designing digital archive and understanding various relationships among people, content and technologies.

This paper discusses an approach to represent different types of digital assets from an interdisciplinary research project through the creation of a digital archive. It also explores how digital archive contributes to knowledge transfer of the research outcomes.

II. Context

Technological advancements in the digital era with mobile technology, ubiquitous computing, digital humanities or scholarship have brought an explosion in number and diversity of sources and tools

available for research [3]. As of September 2016, more than 600 active digital research tools were found in the DiRT Directory. The project, which is supported by the Andrew W. Mellon Foundation, “aggregates information about digital research tools for scholarly use” [4]. The listing of tools are ranged from content management to analysis, annotation and visualisation, Top universities in the world including Massachusetts Institute of Technology (MIT), Stanford University and Harvard University are constantly developing new digital tools (or software) for research. Such tools introduce new methodologies for analysing, interpreting and visualising data [5] and often creating different formats of digital content.

Projects today are also becoming more interdisciplinary, as indicated from an analysis report by Van Noorden [6]. A search on the citation database, Web of Science, indicated that the number of papers mentioning interdisciplinarity in the titles has fluctuated over the years (Fig. 1). Van Noorden mentioned that such fluctuation reflects the priorities of funding agencies in interdisciplinary research.

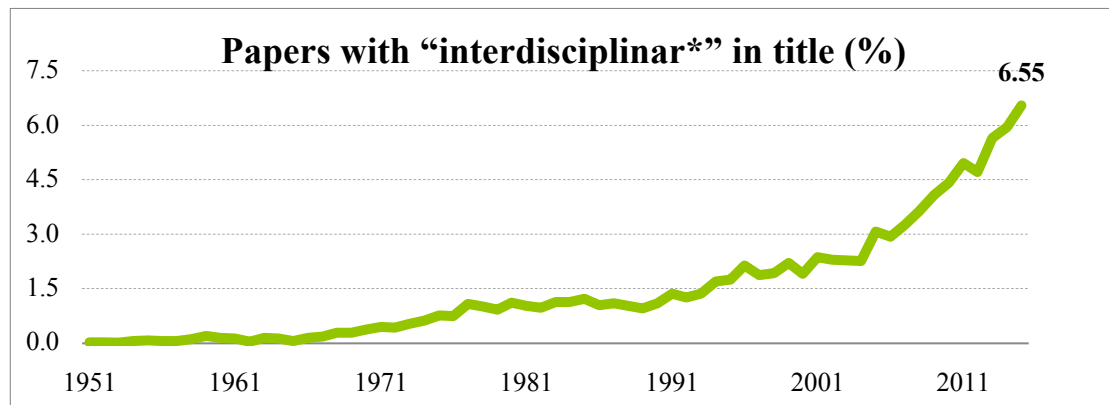


Fig. 1 Papers with “interdisciplinary*” in title (%)

With projects becoming more interdisciplinary coupled with technological developments, much of the knowledge base, research outputs and intellectual assets by academic institutions are in digital form. As the heterogeneity and complexity of digital content grows, the need for the managing, maintaining and accessing and communicating becomes critical and also challenging [7]. Some of the issues include metadata inconsistencies, representation of multi-format entities, and the communication of the context to the users who may not have specific background to the subject matter [8].

III. Case Study

A digital archive was created from scratch to (re)present the different research outcomes of a research project entitled “Exploring the crossroads of linguistic diversity: language contact in Southeast Asia”. It was carried out as a project in the Digital Intangible Heritage of Asia (DIHA) research cluster at the College of Humanities, Arts and Social Sciences (CoHASS), Nanyang Technological University (NTU). Led by Associate Professor Alexander Coupe, the project ignited with a linguistic approach to study the unique languages and oral traditions in the Indonesian islands of Alor and Bali, and Nagaland in Northeast India. The research expanded to culture, design, art and media. This led to the formation of an interdisciplinary team of 11 researchers from different fields coming together to explore “situations where different communities and languages come into contact with each other” [9]. As

indicated in [10], researchers used different methodologies to conduct their research and collect data. As the result, a range of different digital assets was created as part of the fieldwork and research done. The digital assets, which include publications, photographs, films, interview videos with annotations, transcripts and source files, and digital images of textile collections (Table I), had different requirements in storing, describing and presenting. The next few sections will cover the process of creating the digital archive.

Title	Type
Exploring the Crossroads of Linguistic Diversity: Language Contact in Southeast Asia	Publication
Mon Mot Mon – Giant Snake Mon Mot	Publication
Humanities @ Work	Film
Children Mon Mot	Film
Digital Images of Abui Textiles	Dataset
Digital Images of Nagaland Textiles	Dataset
Interview Videos of Mon Mon Mot	Dataset
Video footages of the Abui Tribe	Dataset
Transferring research on intangible heritage & culture to public spaces	Exhibition
Project collaterals	Resources

Table I: Listing of digital assets

IV. Project Definition

The objective of this digital archive project was to develop an approach to capture, communicate and promote the scholarship of the research in a form of a digital archive.

The digital archive was built as:

- An informational website, where it can be used as a outreach tool to inform and educate users on the research project as the whole
- An exhibition artefact, where it can be used to complement a physical exhibition with more in-depth information on the subject matter or individual digital assets
- A digital preservation platform to allow on-going management of the digital assets in different formats for current and future access

The above usage scenarios identified from conversations with researchers provided a direction on what content to curate and how they should be presented. In addition, the digital archive should have flexibility to manage changes. A back-end interface should be included for researchers or project officers to modify existing records and add new ones easily.

A. Design considerations

The interdisciplinary nature of the research project presents characteristics for similar research in intangible heritage or humanities. An approach to determine the considerations for designing the digital archive is through the idea of knowledge transfer, where the main goal is to connect the researchers (or

their research outputs) to those who needed it – academically or strategically [5]. It helps to frame the requirements of the digital archive by thinking about the impact of research and how different group of users can benefit from the content presented. Below were the key considerations derived:

- The design of the interface should allow or otherwise, encourage exploration, access and reuse of the digital assets by different groups of users.
- The digital content are of different types, as indicated in Table I. Each type should be characterised and described with specific metadata structure, and best presented using digital tools.
- How users browse and search for digital content in the archive? The navigational structure of the archive should be easily understood.
- The digital archive is constantly evolving; researchers or administrators can make improvements to the archive whenever needed. Existing content can be updated and new ones can be added.

B. Development

The digital archive was built and hosted on blogs@NTU, a Wordpress-based campus-wide online publishing platform in NTU. It was created as a sub-site under the DIHA research cluster website. The development of the digital archive can be broken down into the following key phases: (1) Defining the modules; (2) developing the metadata structure; and (3) designing the views and forms.

Leveraging on the capabilities of the Wordpress platform, a modular approach was implemented in developing the digital archive. The modular approach was chosen as each module can be optimised or edited independently of other modules. They can also be added or removed easily. In the context of this digital archive project, modules refer to the different types of digital assets presented. Fig. 2 shows a breakdown the different modules in the project.

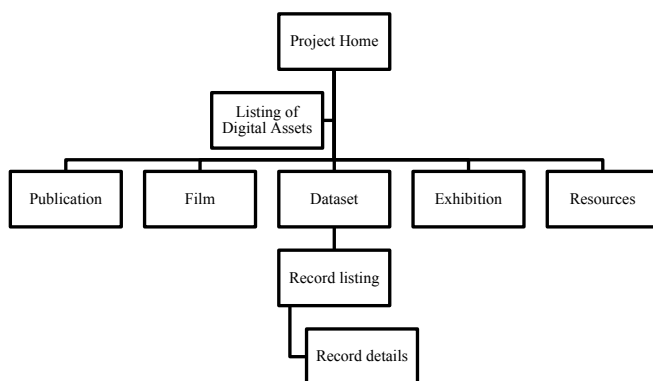


Fig. 2. Hierarchy of modules in the digital archive

Consultation sessions with researchers were critical to understand the nature of the each module. This helped to determine the appropriate metadata structure, which is key in organising, drawing relationships and facilitating access between different modules.

Views refer to the specific properties, design elements and layouts required to present the digital assets. The design process of views determined the different perspectives for users to access and navigate within the digital archive. The process also characterised the digital assets. Forms were created to facilitate the editing and adding of records. The fields of the forms were based on the metadata structure designed. More details of the views and forms will be discussed in the next section of this paper.

V. Interface Description

As mentioned in the previous section, specific views were created to display each of the digital assets or modules in the digital archive. Each layout was designed with a modular approach where components can be removed or added easily by tapping on the capabilities of the Wordpress-based blogs@NTU.

A. Listing digital assets

The listing shows an overview of all digital assets derived from the research project (Fig. 4). Automatically populated based on the default metadata fields, each digital asset is listed with a thumbnail image, title, contributor(s) and short description. Users can filter the list by the digital asset type and researcher name.

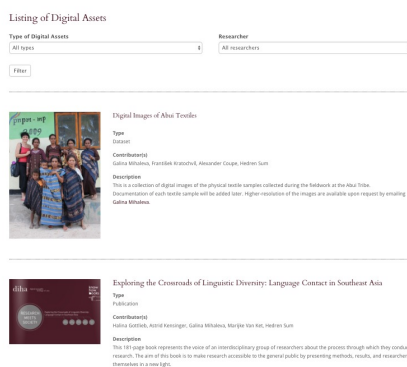


Fig. 3. Listing of digital assets

B. Digital asset detail page

From the listing, users can navigate to the view the detail page of the digital assets (Fig. 5). The page can be displayed in two different layouts: default layout and customised layout. The default layout is a standard layout that applies to all types of digital assets. Customised layouts are alternative layouts that provide project owners, researchers or administrators flexibility to optimise the digital asset detail pages to suit the page content. The layouts, which can be built easily using the page builder feature in the platform, can be created as standalone pages for display and exhibition purposes.

Digital content of different formats were presented differently on the detail pages: (1) videos were uploaded to YouTube and embedded into the pages; (2) publications were converted to PDF, uploaded to a external digital publishing platform, Issuu, and embedded to the pages where users can flip the

pages like a book; (3) and listing of images were shown as thumbnails, where users can select to enlarge.

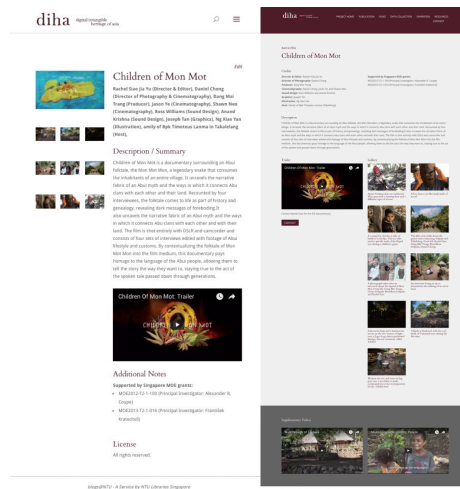


Fig. 4. Default and customised detail page for a film digital asset

Additional links to subpages or other webpages can also be added to the detail pages. For example, a link was added to a dataset digital asset to show the listing of records in the dataset (Fig. 6), with individual record pages (Fig 7).

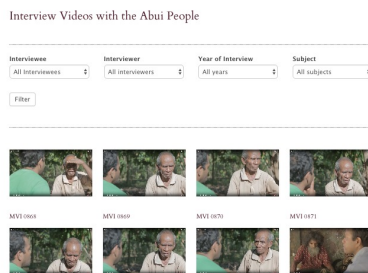


Fig. 5: Listing of records in a dataset (Interview videos)

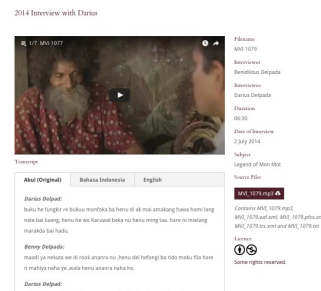


Fig. 6. Dataset record page (Interview videos)

C. Digital asset form

Content details of each project were managed by the use of forms. The dynamic form (Fig. 8), which was accessible only by authorised logged-in users, provides a structure or information framework for different types of digital assets. It contains a set of default fields that apply to all types of digital assets: title, URL link to customised asset page, description, contributors and additional notes. Researchers can indicate the type of digital asset and the additional metadata fields specific to the type chosen will be shown.

Add Project Asset

Project
Exploring the crossroads of linguistic diversity: langua...

Asset Description

Asset Type
Film

Asset Title
Children of Mon Mot

URL to Customised Asset Post / Page
<http://blogs.ntu.edu.sg/diha/language-contact-in-sou>

Description / Abstract

Visual Text

b / u **b-quote **del** ins **img****

ul **ol** **li** code more close tags

Children of Mon Mot is a documentary surrounding an Abui folktale, the Mon Mot Mon, a legendary snake that consumes the inhabitants of an entire village. It unravels the narrative fabric of an Abui myth and the ways in which it connects Abu clans with each other and their land. Recounted by four

Keywords

URL of Trailer
<https://www.youtube.com/watch?v=Nla>


Featured Image
Choose File

Children-of-Mot-Mot-11ajya-Zer5DA.png

Fig. 7. Digital asset form (Film)

VI. Conclusion

This paper explored digital archiving for an interdisciplinary project in intangible heritage. The digital archive presented an approach to capture, preserve and manage research outputs in different formats by a disparate team of researchers.

In the design process, potential usage scenarios for the digital archive were created based on the knowledge transfer of research outcomes as communicated by researchers. This set the basis for deriving the requirements of the design of the digital archive. For instance, it helps to determine the adequate amount of descriptive metadata and content to include for each type of digital asset.

The project also served as an experimental purpose where the design of the digital archive is constantly evolving. Designed and developed with a modular approach, flexibility can be achieved to allow informational components and content to be edited, removed or added. Customised interfaces allowed dedicated views to be created for different types of digital asset to suit specific viewing needs. The varying formats, such as videos, images and publications, were presented using a mash-up of digital tools to optimise viewing experiences.

Overall, the digital archive draws a connection between people, content and technology. With more digital tools available and evolving research trends, a digital archive should be versatile enough to accommodate changes. As the content in digital archive grows, added emphasis should be placed on relationship among content and people, such as creating thematic paths between different digital assets, developing researcher profiles to consolidate research contributions and impact, and creating new ways to explore research content using information visualisation techniques.

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