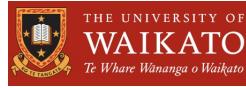


**University of Waikato  
Faculty of Computing and Mathematical Sciences**



**Report of first prototype - CSMAX570-23A**

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**Waikatōhea's eBook prototype**

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# General introduction

Waikatōhea is a Māori tribe of the eastern Bay of Plenty region in New Zealand, known for their rich cultural heritage, deep connection to the land and sea, and their ongoing efforts to promote the sustainable management of natural resources for future generations [11].

The goal of this report is to introduce how we start the work to make traditional books more accessible to young generations. These books are an important part of the iwi's cultural and historical identity and contain valuable information about their way of life, customs, and beliefs.

To achieve this goal, the Waikatōhea iwi has decided to scan their traditional books and convert them into E-books format. This will make it easier for young members of the tribe to access these books and learn about their heritage. The books will be made available on a dedicated online platform, which will also serve as a space for sharing and exchanging knowledge and ideas about the tribe's culture and history.

The platform will allow users to read the books, share their thoughts and opinions, and interact with other members of the tribe. It will also provide a space for non-members to learn about the Waikatōhea iwi and their culture. The platform will be open to anyone who is interested in learning about the tribe's culture and history. At the same time, it will serve as a way for members of the tribe from different locations to connect and learn from each other.

To achieve this goal, the group 1 has conducted extensive research into various online platforms available on the market. We have identified key features and content formats of successful platforms and hope to incorporate them into our own platform in order to meet the specific needs of the tribe and project.

# Chapter 1

## Background and requirements

### 1.1 Whakatōhea

The Whakatōhea is a Maori tribe located on the east coast of New Zealand's North Island. An important part of the Whakatōhea culture is their language, arts and cultural traditions, including Maori dance, traditional Maori handicrafts and wood carving[3].

The Whakatōhea tribe has experienced many challenges in the past, including land loss and cultural oppression during the colonial period, but they have always insisted on preserving and passing on their culture and traditions, and now they play an important role in protecting their territory and Marine resources[2].

#### 1.1.1 Māori Culture

Māori culture refers to the culture of the Māori people, the indigenous people of New Zealand. The Māori are the indigenous people of New Zealand. They have a rich history and cultural tradition that includes a unique language, art, music, dance, traditional medicine, architecture and food.



Figure 1.1 – Māori Culture

In order to promote Māori culture around the world, our project as a digital library platform will focus on presenting Māori culture based on the Māori language and supplemented by English.

### 1.1.2 Project Objects

The content of our project - Māori Cultural Digital Library mainly includes the following aspects, some of which can be made into electronic materials. Include: Māori language and culture Materials, Māori Arts and Crafts, Māori History and Cultural Geography.

### 1.1.3 Project Content

The content format of digital library is mainly based on the following formats: E-Books, Video and audio files, Image and text documents, Interactive Applications.



Figure 1.2 – Digital Libraries

### 1.1.4 Project Direction

Our project can be made into a digital library of Māori culture, which aims to collect, preserve, display and disseminate the Māori cultural heritage online platform.

The Māori Cultural Library initially provides curriculum education to young people (13-18 years old). It integrates Māori language lessons into textbooks and provides a Māori language learning environment for teenagers.

Digital Collection of Māori Cultural Heritage: The Māori Cultural Digital Library collects important Māori heritage such as traditional culture, history, art and language through digital technology, forming a digital cultural database, so that more people can easily access and understand Māori culture.

Promoting the inheritance and development of Māori culture: The Digital Library of Māori Culture is not only a platform for the collection and preservation of cultural heritage, but also an important tool for promoting the inheritance and development of Māori culture. Through digital display and dissemination, more people can learn and understand Māori culture, and help Māori themselves better protect and pass on their own culture.

Providing education and research resources: The Digital Library of Māori Culture is not only a showcase, it also provides a wealth of education and research resources, so that students, teachers and researchers can understand and study Māori culture more deeply, and promote the development of Māori cultural research.

Collaboration with other cultural digital libraries: Māori cultural digital libraries can collaborate with other cultural digital libraries to share cultural resources and experiences and enhance cultural exchange and understanding. In this way, more people can know about Māori culture, and at the same time, Māori can better understand and respect other cultures.

Protecting and inheriting the sustainability of Māori Culture: The Māori Cultural Digital Library is an important tool for protecting and inheriting Māori culture, which needs to be constantly updated and improved to ensure the sustainability of Māori cultural heritage. At the same time, it is also necessary to actively participate in community cultural activities to promote the development and inheritance of Māori culture.

## 1.2 Background analysis

### 1.2.1 Digital Library

Digital library refers to the library that uses digital technology to store, organize, retrieve, transmit, utilize and protect document resources. Different from traditional physical libraries, digital libraries are mainly dominated by literature resources in electronic form, which can be retrieved and accessed through computer networks. Digital library is the product of the information age. It uses the digital way to manage the document resources, which makes it more convenient for people to obtain and use the information resources, and also provides a broader space for academic research and education[7].

Digital library is of great significance to academic research and education. It provides more extensive and deeper information resources for education and research, and provides a more convenient and efficient learning, research and teaching platform for scholars, researchers and students. At the same time, digital library also provides a wider range of cultural and knowledge resources for the society, and promotes cultural exchange and knowledge innovation.

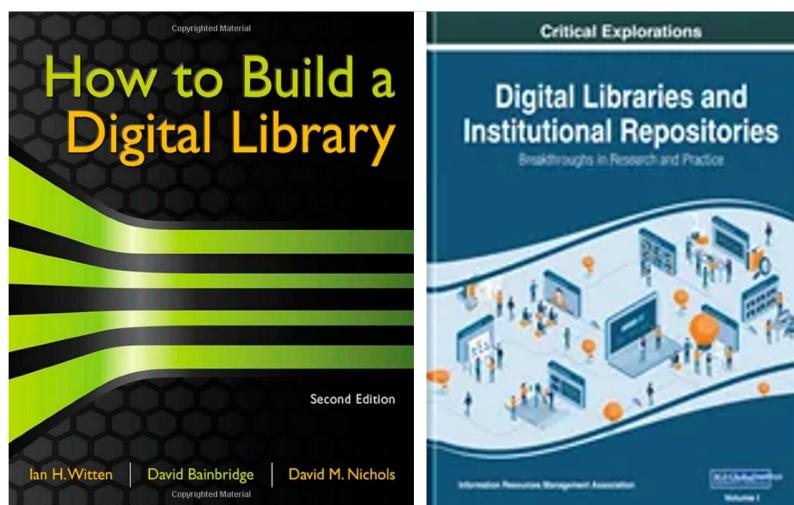


Figure 1.3 – Books about Digital Libraries

### 1.2.2 Main Features

The main features of a digital library include: Electronic resources, Resource sharing, Search function, Knowledge management, Globally, etc[8].

### 1.2.3 Content

In general, digital library includes literature resources, metadata, search tools, digital library systems, services and support, and rights management. These contents together constitute the basic elements of digital library, providing users with convenient, fast and efficient

information resources services. Literature resources, Metadata, Search tools, Digital library system, Services and Support, Copyright Management.

#### **1.2.4 Usage**

In order to give full play to the role of digital library, enterprises should ensure the effective protection of information retrieval, knowledge management, training and education after the establishment of digital library system. Enterprises also need to be equipped with special digital library administrators, responsible for the maintenance and update of digital library, to ensure that the resources and functions of digital library always keep the latest, the most comprehensive, the most valuable.

#### **1.2.5 Cost**

In general, most of the cost of digital library lies in the establishment and maintenance. However, the advantage of digital library is that it can greatly save the storage space and maintenance cost of traditional library, and digital library can provide richer and more convenient resources and services to bring better experience for users.

# **Chapter 2**

## **Background design**

### **Introduction**

**A**s In order to achieve the objectives of the project, Group 1 researched some of the typical platforms that are currently popular in the industry and analysed their main features, with the aim of incorporating their strengths in the project. Popular software used for the development of digital library systems and platforms include Greenstone, Dspace, Invenio, Omeka S, EPrints, Mukurtu.

### **2.1 Key Features of typical platforms**

#### **2.1.1 Greenstone**

Greenstone is basically a relatively complete open source software to meet the needs of the general digital library, but also very suitable for newcomers to start. Its main features are support for multiple languages, multiple digital material formats and cross-platform. greenstone can run on multiple operating systems, including Windows, Mac OS X, Linux, etc. In addition, greenstone supports a variety of open standards and protocols, such as OAI-PMH, Dublin Core, MARC, etc., can Easily integrate digital libraries and web publications with other systems[10].

#### **2.1.2 Dspace**

DSpace is an open source digital repository software, the main features of DSpace are its security and community support, DSpace provides a complete permission management system that helps users control who can access and edit the content in the repository while keeping the content secure[4].

#### **2.1.3 Invenio**

Invenio is a framework and not a repository software delivered directly. So it requires developers to develop code to refine the implementation of their own platform. Its main features are the powerful search functionality and the ability to handle data storage[9]. It uses all the features of Elasticsearch.

#### **2.1.4 Omeka S**

It is a free, open source web application for creating and managing digital documents and online exhibitions. The main feature of Omeka S is the customisable exhibition functionality,

The figure displays two screenshots side-by-side. On the left, the 'Greenstone3 Showcase' interface features a green header with navigation links for 'Login', 'Help', and 'Preferences'. Below this is a section titled 'Select a collection or group' containing several buttons for different collections like 'Paradise Gardens', 'Niupepa: Māori Newspapers', 'Simple Image Demo', 'Kath's Photo Collection', and 'Kath's Photo Metadata Edit Demo'. A note below these says they represent a group of collections. Another section for 'Documented Example Collections' is shown. On the right, the 'DSpace' interface shows a search results page with a search bar, filters for 'Author', 'Date', 'Has files', and 'Item Type', and a list of results including 'Cat & Dog' and 'An evaluation of computerized adaptive testing for general psychological distress: combining GHQ-12 and Affectometer-2 in an item bank for public mental health research'.

Figure 2.1 – Greenstone & DSpace

with custom exhibition settings based on user needs and support for a wide range of exhibition templates and themes[6].

The figure shows two screenshots of digital repository interfaces. On the left, the 'Invenio' interface has a dark header with 'chinese' and a search bar. It displays a list of results for 'Der Chinese des Schmerzes' and 'HSK [Hanyu shuiping kaoshi] jingjie huoye tixian = Simulated HSK tests [Chinese proficiency test] : an illustrated booklet'. On the right, the 'Omeka S' interface shows a detailed edit screen for an item titled 'Main Navy and Munitions Buildings'. The screen includes sections for 'Values', 'Media', and 'Item sets'. It allows users to add properties to the item, such as 'Title' (Main Navy and Munitions Buildings), 'Description' (An account of the resource), and 'Date' (1918 [Constructed]). A sidebar on the left provides navigation and administrative options.

Figure 2.2 – Invenio & Omeka S

### 2.1.5 EPrints

The main features of EPrints are its support for a wide range of metadata standards and its statistical and analytical functions. It supports a wide range of metadata standards to facilitate the input and output of data. In addition, its statistical and analytical features help users to understand the usage of the digital repository, user preferences for resources, etc[5].

### 2.1.6 Mukurtu

Mukurtu is an open source digital library and community framework. Its most important feature is that it provides a way of managing cultural heritage that can help preserve and pass on the heritage of a culture. mukurtu's emphasis on community collaboration allows community members to participate in the management and sharing of cultural heritage. In addition, Mukurtu supports the creation and management of cultural protocols, allowing cultural heritage to be managed and shared in accordance with the traditional cultural protocols and norms of the community. This feature allows for the conservation of cultural heritage and the interchange of cultures within the project[1].

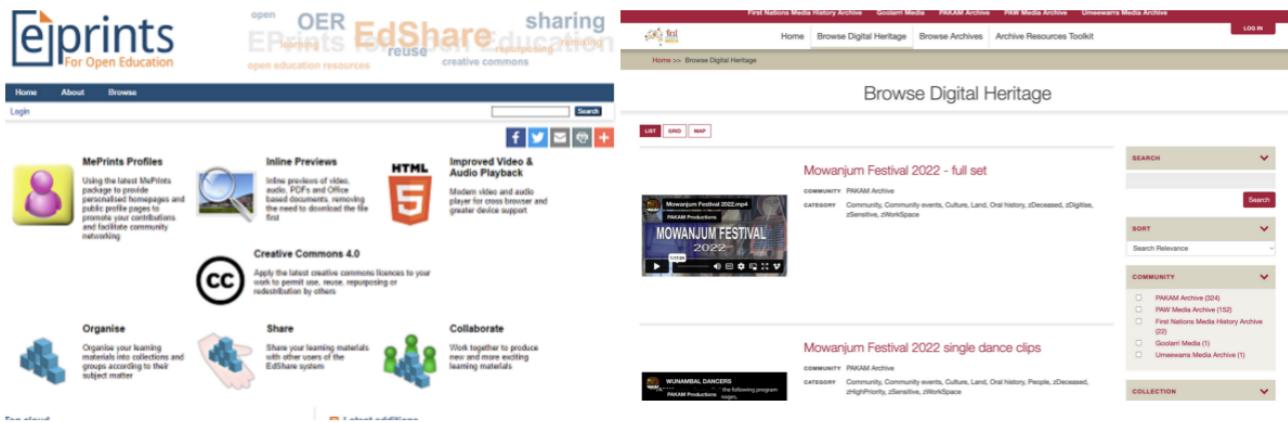


Figure 2.3 – EPrints & Mukurtu

## 2.2 Comparison Chart

Group 1 has selected a few key attributes that need to be met in a project, comparing the six popular open source software for creating digital libraries mentioned above and creating the following comparison chart. These key attributes can be used to target the advantages of some platforms into our projects.

Platform	Mobile browser	Multimedia support	Storage	Security	Installation Requirements	cost
Greenstone	yes	Image, video, audio, text	collection folder	SSL certificates	requires Java	Free and open source, may require additional IT support and maintenance costs
Dspace	yes	Image, video, audio, text	bitstream	Single Sign-on and LDAP authentication	Java and PostgreSQL	Free and open source, costs of servers, storage, backup, integration and support with other systems.
Invenio	yes	Image, video, audio, text	Standard database	Single Sign-on and Shibboleth authentication	Elasticsearch, PostgreSQL, and Redis	Free and open source, cost of servers, maintenance and support
Omeka S	yes	Image, video, audio, text	Standard Web server storage	SSL certificates	PHP and a web server such as Apache or Nginx	Free and open source, costs of servers, storage, backup, integration and support with other systems.
Eprints	yes	Image, video, audio, text	Standard database	SSL certificates	requires Perl	Free and open source, costs of servers, maintenance and support, integration and support with other systems.
Mukurtu	yes	Image, video, audio, text, Specialised formats such as CAD files and GIS data	File system storage	SSL certificates	PHP and a web server such as Apache or Nginx	Costs include licence fees, server and storage costs, support and training

Figure 2.4 – Comparison Chart

## 2.3 Conclusion

The main features of six popular open source software for creating digital libraries were analysed through a study of their main features, and according to the requirements of the

project, to achieve the transmission and preservation of Māori culture, there was also a need to provide a platform space to allow cultural exchange between members. These requirements are the main aims that need to be achieved. But for the essence of the platform such as data security, multimedia files, cost etc. these are the factors that need to be considered. It is possible to combine the different characteristics of the above platforms and incorporate their main strengths to create the project.

# Chapter 3

## Frontend Design

### 3.1 Introduction

In this chapter, we will summarise all the previous research, with a particular focus on users, book format reading experience, sharing, communication and other functions in detail. At the same time, we will filter the common E-book formats available on the market from a technical perspective, expecting to find a suitable format among them.

### 3.2 Research summary

The structure of the book resources shown as Fig 3.1 is supported by most of the current platforms.

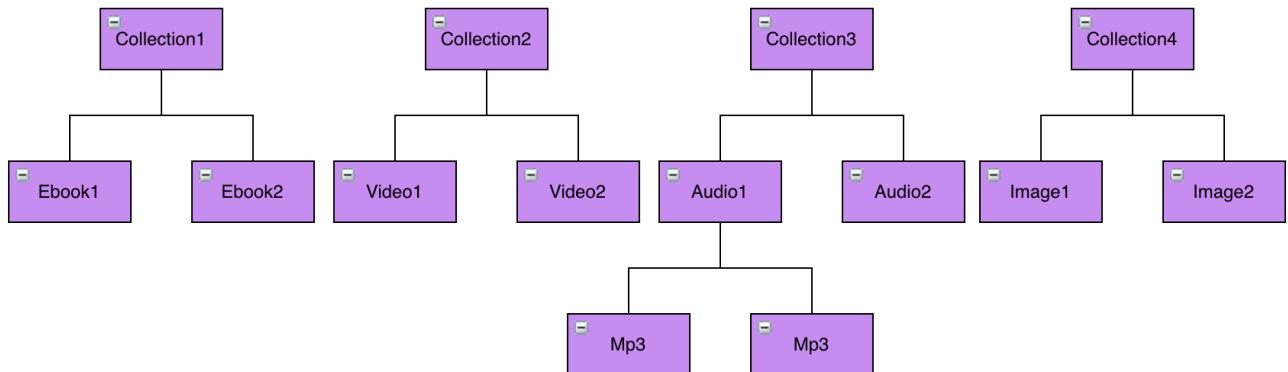


Figure 3.1 – Collections

Commonly supported data formats are E-books, audio, video and pictures. They are all grouped together by subject, similar to how a library book index is managed. Because the audio is often in the form of a playlist, it is a little deeper in the hierarchy.

User sharing and connection is a weakness of these platforms. This is because the fact that platforms are often seen as purely online libraries. It is common that a platforms do not take into account the online user community.

### 3.3 Demo

In this initial demo, our main considerations are compatibility and usability.

### 3.3.1 compatibility

Because the user range is 13 to 18 years old and there is a possibility of future expansion to other user ranges, compatibility is the first thing. This is because good compatibility across multiple devices will minimise the cost of future development for the habits of different age groups. They can use this platform on multiple devices.

As same as other common platforms, we can take HTML5 responsive development to get an interface that is compatible with both pc and mobile devices. So that only one development is needed to get a consistent user experience on PC, mobile, ipad and other devices at the same time.

### 3.3.2 usability

Usability is mainly concerned with the different experiences with different file formats. It is also known as the reader experience.

#### 3.3.2.1 Books

A reader in book format is shown in the left of Fig 3.2. The most important elements are page turning, sharing and commenting. Turning pages allows a book to be partly free and partly paid for or partly open to visitors in the future. Sharing and commenting is a very important place to keep people of the tribe connected.



Figure 3.2 – Books, Videos, Audios Readers

#### 3.3.2.2 Videos

The reader for videos is shown in the middle of Fig 3.2. It needs to be a very versatile video player. Unlike the last one, its key features need to include subtitles, volume, progress bars and so on.

#### 3.3.2.3 Audios

The reader for audios is shown in the right of Fig 3.2. It needs to work as well as some mp3 online players. Its important features need to include previous song, next song, jumbled play and possibly lyrics like subtitles too.

#### 3.3.2.4 Images

The reader for images is similar as books. There may be a need for a previous next picture viewing mode. And there may be a choice of resolutions to suit the speed of the network.

### 3.4 E-book formats

We have collected and collated a range of E-book data formats (Table 3.1) and selected the ones that suit this project. They are only aggregated from a technical level so they are senseless to end users. In the actual project, there is also the possibility of adapting the final data format to suit the trade-off between network speed and resource quality.

On the other hand, if the current file formats fail to meet the requirements, it may be necessary to develop a proprietary format to achieve the optimal user experience.

Table 3.1 – Ebook formats

Ebook format	Description
EPUB	A widely used open standard for ebooks that supports reflowable text, inline images, and DRM. EPUB files can be read on a variety of devices and platforms.
PDF	A popular format for ebooks that preserves the original formatting and layout of the document. PDF files can be viewed on a wide range of devices, but may not be optimized for smaller screens.
MOBI	A format developed by Amazon for use on their Kindle devices. MOBI files support advanced features such as reflowable text, adjustable fonts, and inline images.
Markdown	A lightweight markup language that is easy to write and read. Markdown files can be easily converted to a variety of formats including HTML, PDF, and EPUB.
HTML	A web-based format for ebooks that can be read in any modern web browser. HTML files can include advanced features such as multimedia content and interactive elements.

### 3.5 Overall conclusion

This report involved extensive market research and analysis, leading to the development of a initial demo that meets the requirements. While we recognize that further communication and collaboration will be necessary to refine the final prototype. We are confident that this project has the potential to provide the iwi with a powerful electronic platform for sharing and connections.

This project holds significant importance for Waikatōhea iwi, because it aims to digitize the collection of books and create an electronic platform that can be accessed by iwi members and others. By sharing iwi's culture and history through this platform, we hope to strengthen iwi community and build connections with each other. This project is a step towards preserving the heritage and making it accessible to future generations.

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