ODBS: Final Report

Systems Team, June 15th, 2009 (revised)

Marta Chudolinska, Sally Choi, Margaret Lam, Brenda Lauritzen, David Tremblay

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PREFACE

While this project began with a simple idea of making books available to First Nations communities, our class quickly realized the full potential of what we were trying to create. The explosion of ideas and approaches to the project was a blessing as well as a curse due to the limited time we had within a class structure. In hindsight, while it was the cause of much frustration and uncertainty, it was perhaps our job to dream of all the possibilities in order to inspire ourselves and others to make dreams a reality.

We are submitting this report for review by community stakeholders, potential sponsors and partners, and any others who are interested in learning more about this project.

ACKNOWLEDGEMENT

This opportunity for graduate students at the Faculty of Information to be immersed in a real life situation would not have been possible without the support, good will and enthusiasm of members of K-Net (*Brian Beaton, Angie Fiddler, Jesse Fiddler, Lyle Johnson, Fernando Oliveira, Cal Kenny*) and KORI (*Brian Walmark, Franz Seibel*), who put up with our rookie behaviours.

We were also fortunate to have had guest speakers (*Gabe Juszel, Ricardo Ramirez, Bill McIver* and *Susan O'Donnell*) who shared their wealth of experiences, which were often quite personal, on many occasions. Many individuals to whom we reached out on a whim also provided invaluable insight and made themselves available to us on the hardware (*George Walker* and *Tim Inkster*) and "software" (*Jeff Orchard, Steven Hockema, Jackie Esquimaux-Hamlin*) components of our work.

We are also grateful for the connections we made with YICT workers with whom we chatted in their Breeze Room. They may not realize the full extent of their contribution, but Danika Tom from Big Grassy, Chad Kakepetum from Weagamow, and Jeff Naveau from Mattagami were the inspirations for many of the recommendations in this report. They are model examples of the individuals we want to serve: bright, hardworking, enthusiastic and eager to give back to their communities. We hope there will be more like them drawn to the project in the future.

Last but not least, this would not have been possible without the chance Prof. Nadia Caidi and co-instructor Adam Fiser took when they decided to brew this experiment of a class. Their patience, guidance and determination, all together, are incomparable to the incredible amount of trust that they put into their students.

Thank you.

1. Our Team

Team Objectives and Design Statement

In evaluating our work on this project, it's important to review our original design statement and objectives to assess how much of what we set out to do was accomplished; to examine the challenges and barriers that affected our abilities to achieve those objectives; and to reflect on lessons learned. This section looks at what we've accomplished based on our original design statement and goals.

We developed the following statement as our guiding principles as we worked towards a design proposal.

Our intention is to develop a design proposal for an ODBS system (digital and analog) which:

1) Is compliant with OCAP principles

2) Is done in collaboration with stakeholders from the community

3) Takes into consideration the expandability, life cycle, maintenance and resources required for sustainability

As described in subsequent sections, we faced various challenges and difficulties in our development of a design proposal.

In terms of our design statement, the most immediate barrier was in establishing contact and facilitating collaboration with community stakeholders. We, as the Systems team, were unsure of our role in this process and how it overlapped with other teams. At the same time, it was difficult to know where to begin in creating a design that would meet the needs of the community.

Working backward, we developed a wireframe for a sketch of a design concept as a basis for soliciting feedback from community members and stakeholders and opening up the discussion. Moving forward, we believe that community collaboration and participatory design will be essential to the development of the ODBS, though we have been unable to incorporate these approaches due to time constraints and uncertainty in how to proceed.

Hence, we modified our objectives from drafting a design proposal to **exploring all of the different possibilities and potential uses for the ODBS**. Our goal is to present these options as well as the various design questions that we faced to future teams so that they are equipped to move forward in collaboration with community stakeholders.

Regarding the principles of OCAP, we've been proceeding with the intention of documenting and delivering all of our work to northern First Nations communities, who own the project. We have attempted to adhere to these principles in all of our

communications with community stakeholders.

In exploring all the possibilities for the ODBS, we took into consideration our third design statement principle regarding sustainability of the system. In particular, the hardware system design options that we seek to present were put together with long-term sustainability in mind.

Team Dynamics

In a project such as this, which called for close collaboration among team members and sometimes intense time commitment, good team dynamics are essential. Our ability to work well as a team was evident in our willingness to support one another in our tasks and to accommodate everyone's communication style. Our face-to-face meetings were highly productive, efficient and positive.

Some of us were able to define a role for ourselves within the team based on strengths, interests and abilities, while some of us had more difficulty in establishing a role. Some were natural leaders and initiators, and some were more supportive and facilitative. Despite other course and work commitments and a lack of clear direction at times, we each held ourselves accountable and contributed whatever way we could to the project. (See Appendix A for personal reflections of our individual experiences of the project.)

Although we initially assigned liaisons to facilitate collaboration with other teams and community partners, as we predicted in our project proposal our roles were implemented organically with each of us supporting one another based on practicality and availability.

Research Roles & Tasks

As the project progressed, our individual roles and research objectives evolved as we adapted to various challenges and direction changes. Below is a brief summary of each member's role and how it evolved.

Marta – Hardware Systems Developer

As the team expert on book-making, Marta took complete charge of the hardware component. She looked into the question of how to develop a hardware system that is sustainable over time and that can be adapted to the different needs and capacities of various communities.

Tasks included:

- Building a small wooden printing press to demo/test hand-binding methods
- Learning the use of a Fastback binding machine and other equipment donated by the Internet Archive
- Developing illustrated how-to guides (Appendix I) and video tutorials teaching the use of machine- and hand-binding methods
- Creating a simple self-assessment tool for use by community members or information providers to determine the feasibility of the ODBS system according

to their particular context (Appendix H)

Margaret – Online Communications Facilitator and Interface Designer

Margaret's role grew from ODBS Meeting Place administrator and online communications facilitator to interface designer and community liaison. She generated a real presence for the ODBS on Moodle, which served as a vital link between our class and the community as well as an important piece of legacy.

Tasks included:

- Analyzing how Moodle relates to the three components of our design statement
- Facilitating class and community partners' use of the ODBS Moodle site by responding to questions and making suggestions on potential use for other teams
- Giving a seminar to the class on effective Moodle use
- Identifying online communities that already exist and collaborating with David on determining potential user groups
- Sketching a mock-up of the interface design concept and creating wireframes (Appendix D)
- Initiating development of the ODBS Breeze Room to facilitate usability feedback from community members
- Liaising with YICT workers and soliciting usability feedback
- Collaborating with Digital Contents team on framework for portal organization and design

David – Community Research, Usability and Feedback Coordinator

As community research/usability/feedback coordinator, David was interested in making the design process a two-way interaction between the community and the designers to ensure that our designs would be sensitive to the community's cultural needs and way of knowing.

Tasks included:

- Looking closely at how OCAP principles affect our design process
- Maintaining close contact with the Community Research team
- Contacting external community partners on behalf of the team
- Creating a script for usability testing (Appendix G)
- Collating feedback on the wireframe design (Appendix E and F)

Brenda – System Requirements Analyst

As our focus turned from learning and evaluating CMSs to designing the interface, Brenda's role shifted from content management systems developer to system requirements analyst.

Tasks included:

- Consulting with Contents team on system requirements of portal based on digital content
- Analyzing the functional requirements of the web portal
- Developing use cases (Appendix C)
- Creating alternative community-oriented design for the portal interface (Appendix D)
- Developing recommendations for future consideration and lessons learned

Sally – Systems and Design Documentation

Sally's role also somewhat shifted from evaluating Drupal and assisting Brenda with evaluating CMSs to focusing on documenting our findings in a useful way.

Tasks included:

- Exploring Drupal and documenting relevant findings for future consideration
- Researching into various design approaches
- Developing user scenarios to capture the motivations and potential tasks of YICT workers obtained through online conversations (Appendix B)

Research objectives still to be addressed:

- How can we best address the needs of the First Nations communities and provide them with an ODBS system that is reliable, sustainable and maintainable?
- How do we design an ODBS system that's accessible (e.g. meaningful architecture/categories)?

2. Hardware Development

The On-Demand Book Service started off with the idea that community members would be able to print and bind their own books. While the potential uses of the ODBS portal have expanded and evolved, the production of books has continued to be explored as a potentially beneficial practice in the community. The printing and book-making machines are a part of the ODBS system referred to as hardware.

What Are the Basic Tools Needed to Run an On-Demand Book Service?

The basic components of the ODBS and their associated costs are outlined in an illustrated document in Appendix H. The following are the basic tools required to operate an ODBS.

The most basic material needed to make books is paper. Recycled paper is available, though slightly more expensive. Paper that is approved by the Forest Stewardship Council of Canada is also available (http://www.fsccanada.org/). In developing a funding structure for maintaining the materials needed for book-binding, the cost of shipping paper must be considered along with the cost of the paper itself.

A printer is required to print the pages of the books. A laser printer is recommended for printing black and white text. Though these printers are often more expensive than inkjet printers, they are faster and use cartridges at a slower rate than inkjet printers. The cost of the printing will mostly be in replacing printer or toner cartridges over time. It is likely that there is already a printer in the community, and depending on where it is located, it could be adapted for ODBS use. Possible sites that may have a printer include schools, CAP sites, and band offices. These are all public spaces already used by the community, which may be an ideal place to start off an On-Demand Book Service, even if a separate site is eventually desired.

After the pages are printed, a book-binding method must be used to run a few loose pages into a durable book. Several book-binding options were considered. They are compared and evaluated below.

The term perfect binding refers to a method of binding books that involves gluing one side of a stack of pages together with a soft cover attached. This is the process used to make paperback novels. Two types of perfect binding methods were explored: thermal machine binding and binding with a simple DIY wooden press.

Thanks to a generous loan from the Internet Archive (http://www.archive.org/texts/bookmobile.php), the team was able to experiment with a Fastback thermal binding machine. Thermal binding refers to the process where a strip of glue is heated up, melted onto the edge of the book and quickly cooled. The Fastback model is older than what is currently produced and current models go from $2000-$5000 US (http://www.powis.com/). The machine performs many variations of the same binding. Though it produces books quickly and is very easy to operate, at times its various functions — typically jamming, unexpected electronic errors — get in the way of its

usability. The books produced by the machine appear strong and could stand some wear over time. The major setbacks of this machine are its price, the cost to ship it (e.g. approximately $127, excluding coverage, to ship from Toronto to Fort Severn based on Canada Post's website estimates) and the cost of ordering replacement glue strips ($60 for a box of 100 strips). Maintenance of the machine may also be questionable over time; if the machine breaks, repairing it may be a long and complex process.

Hoping to find a less expensive and more sustainable alternative, the team produced a simple wooden press built from plywood, strip wood, wing-nuts and a few screws. This press used a slower perfect binding method: white glue applied to the spine, which is then clamped and left to dry over night. This press costs less than $20 to make. However, tools such as drills and saws are required as well as basic carpentry knowledge and skills. It is not advised that someone without woodworking experience try to build a press on their own. Alternately, the presses could be built in one location and shipped out to various communities as needed. The benefit of this book-binding method is that it costs much less than thermal machines, is composed of very basic materials and could be built within the community. The process of binding books on such a press is slightly more complicated than operating the Fastback machine, but is still composed of a few basic steps. In this method, a thin, loose-woven fabric called tarlatan is used to add strength to the spine and add to the durability of the book over time.

Another potential book binding method that could be used is wire or plastic coil binding. This was an alternative not fully explored in this course mostly because of a lack of access to the technology. This method involves punching holes into one side of a stack of pages and then threading a wire spiral or a plastic coil through the holes to connect the pages. It is often used in business settings for binding reports and is sometimes used in schools. One of the main drawbacks of this approach is that its product looks less like a traditional book. However, books bound this way are actually more durable over time (the book can be laid flat and one doesn't have to worry about cracking the glued spine). It may be more useful for children's books or how-to manuals such as technical manuals or cookbooks, which must be able to lie open easily onto a particular page if someone is building, fixing or cooking something. This type of binding may already be available in a school or administrative office.

Additional Features/Options

Another tool on loan for the project was an Ideal brand paper cutter. This tool helps users cut the pages of their books to any size. Upon being evaluated, it was decided that this tool is not necessary for the basic functioning of the ODBS, as all the books could be printer page size (8.5 x 11 inches). This particular paper cutter is quite heavy and dangerous due to its large blade. Smaller paper cutters are available. If a paper cutter is desired, it would be less expensive (in shipping and costs) to buy a small paper trimmer from a brand such as Premier.

A welcome added feature to the ODBS would be colour and duplex (double-sided) printing. An additional printer could be purchased or may be available for colour printing, particularly for children's books, comic books and specialized manuals or maps. Inkjet

colour printers are the most affordable, but again the cost of cartridges must be considered over time.

For further development of the ODBS site and hardware, a scanner or high-resolution digital camera may be desired for digitizing resources that communities make or want to publish themselves. Further inquiries into ODBS hardware should explore such possibilities.

Resources Produced for ODBS Hardware

In order to assist communities with selecting an appropriate book-binding method and learning how to apply it to their own iteration of the ODBS, several educational tools were produced by the Systems team. Four instructional videos were created and posted on www.odbs.K-Net.ca under the themes:

- Printing and Paper Cutting
- Fastback Thermal Binding
- How to build a Wooden Press
- Binding with a Wooden Press

Four step-by-step photo guides were also developed under the same themes and are available in Appendix I.

Recommendations and Future Challenges

As the ODBS project moves forward, further research should be done on how the hardware will be positioned in the community. Where will the machines be housed? Will they be integrated into an existing community space (part of the school or library), or should it stand on its own as a new development? Who will operate the system? How will they be recruited and trained? Will this be a paid or volunteer position? K-Net's YICT workers are a group that could be potential operators or could at least assist with recruiting a community member for the project.

As the development of the ODBS software moves forward, more consideration will need to be put into investigating how the printing and binding of books will be integrated with the online component. Will users be able to print books themselves, or will they submit requests that are forwarded to an individual/group responsible for making books?

Further research and development of the hardware of the ODBS system will have to consider grant opportunities and funding agencies that could provide ongoing support for the project. It is not simply a matter of buying or using existing hardware in the community but also replenishing supplies (paper, cartridges, binding supplies) and operational costs (maintenance over time, person costs in maintaining and operating hardware, as well as the online software and electricity). Future hardware developers could focus on investigating potential funding structures and donors to support the ODBS hardware.

3. “Software” Development

Scope of Explorations

The Systems team began by studying the content management systems (CMS) currently used by the First Nations communities for which we are creating the ODBS. Drupal was used to create the K-Net web portal, while Moodle drives K-Net’s Meeting Place and is used for collaborative and educational purposes. The ODBS Breeze Room was created towards the end of the course with the intent of using it as a design collaboration/consultation tool.

Moodle

Moodle is a module- and template-based, open-source learning management system (LMS) that can be adapted for a variety of other collaborative and educational purposes that are not based around traditional classrooms. We spent on average about 10 hours a week actively designing to site to suite the evolving needs of our class as well as collaborators.

For our class, it served as a public space where our discussions can be recorded and as a way for us to directly engage with community stakeholders that are otherwise quite far away. It also serves as a digital archive and project management space that encourages passive and active engagement.

At the time of this project, the Meeting Place on K-Net was most actively used by the YICT workers to coordinate administrative functions as well as serve as a virtual space for online training and collaboration. Within a couple of weeks of the ODBS Meeting Place being established, it was already the most active meeting place, followed by the YICT Meeting Place. Fernando Oliveira is the administrator and system designer who has been developing a First Nations version of Moodle (Moodle FN) that is specifically catered to the needs of the communities. He launched a new version of the meeting place in late March, where the ODBS Meeting Place is currently housed (see odbs.K-Net.ca).

The functions of the ODBS Meeting Place include:

- Dissemination and data collection of community research survey
- Open discussions by University of Toronto students on various topics
- Digital archive of tangible assets (i.e. contact list, research results, image galleries, promotional materials)
- Online presence for the ODBS initiative
- Public outreach

ODBS Breeze Room

Through interactions with Angie and the YICT workers vis-à-vis their meeting place, the Community Research and Systems team discovered the Breeze Room, which is an online collaborative software owned by K-Net. There was no cost from the project's perspective, as K-Net already owns a comprehensive usage license. It allows for video and voice, white board functions, and a variety of chat setups that can cater to different kinds of presentations. Angie used it as a place to hold meetings and training sessions with her YICT workers, who are located in various communities in Northern Ontario. In exploring this technology, the Systems team recognized the Breeze Room's potential for participatory design. We had set up breeze.K-Net.ca/ODBS as a design consultation space with two YICT workers (Chad and Danika) near the end of the course. While the technology has great potential, it was not easy to coordinate a time during which both parties were available and not encountering technical difficulties in accessing the ODBS Breeze Room. More time and coordination would be required to fully utilize this technology, and if properly set up and managed, it can be a great tool to encourage participatory and collaborative design from a systems perspective.

Another way of utilizing the Breeze Room, which we did not explore, is to create a "Design Room." The idea is inspired by Bill Buxton's discussion of a "common space," like a cork board, where the best work is posted for people to view and comment on. Ideally, select users would have access to use the white board functionalities, to share design ideas, and to offer critique of the existing system.

Drupal

Drupal is the open-source CMS used to create the K-Net portal and many of the subsections. We initially explored it to get a better understanding of what it can do so that we may better assess its appropriateness for the development of the ODBS portal. We have not been able to make a full assessment as the design is still in its early stages, but in this report we have included a summary of things we have learned that we believe may be relevant for future considerations.

Flexibility and Scalability

From our initial research and exploration, Drupal appears to be a powerful and versatile CMS that can be used to create a variety of websites, including web portals, community sites, blogs and forums.

Drupal provides a number of core features, which include content creation and editing (blogs, pages, books) by multiple users; forums and comments; advanced search; categorization and controlled vocabulary; and user registration and profiles. What makes it flexible and scalable is the ability to expand site functionality through add-ons (modules) contributed by the open-source community. (The following may be a useful guide to contributed Drupal modules: http://ceardach.com/blog/2008/09/newbies-guide-contributed-drupal-modules.)

The core taxonomy module also sets Drupal apart from other CMSs, providing power and flexibility to structure the content in any way desired (Mercer, 2006, p. 232),

including complex hierarchies. It's an efficient system that enables content to be categorized by the author at the time of creation and allows a particular content to belong to several vocabularies at once, which enables faceted tagging and helps with cross-referencing.

Plus, the system can be extended through various add-ons, including community tagging modules, cloud tagging modules as well as free-tagging ones that allow users to add their own descriptors to content. These features are especially relevant to the development of the ODBS, as we have also been considering a feature that would enable community members to create their own stories or upload their own resources.

Customization

In addition to core themes, there are community-contributed themes that can be used to change the look, feel and layout of the site. The majority of these themes seem to be geared toward blog or news sites, which would impose a limit on the design of the portal. However, themes can be modified to create a customized look and feel; Zen and Genesis (see themes library on Drupal.org) are two examples of starting themes that people use for this purpose.

The site can also be made to appear differently depending on the user's role when they log in, which would be good for personalizing the site based on types of users, such as children, teenagers or health practitioners. The Role Theme Switcher module, for example, enables different themes to be assigned to different user types.

Ease of Use

As a powerful content management system, Drupal does require an above-average investment of time to learn how to use the system to create and customize a web portal. Although putting together and administering a basic site is not difficult and does not require programming skills, customizing or creating themes for the look and layout of a site requires knowledge of CSS, HTML and possibly JavaSript and PHP, while some knowledge of PHP and understanding of database tables and SQL statements are necessary for creating modules. Hence, the learning curve is fairly steep.

Once the portal is built, however, it should be easy to maintain the site and add content. This is because Drupal allows precise control over what users can do, which is achieved by creating specific roles (e.g. authenticated user, anonymous user, forum moderator, blogger) and assigning each role with permissions to access various site functions as needed, or restricting access to administrative functions to certain roles (e.g. administrator). Hence, users can add or edit content without having to be overwhelmed with administrative options or negatively impacting the system.

There are also modules available that enhances usability for the end-user. For example, the taxonomy access control module allows administrators "to maintain exceptionally fine-grained control over who is allowed to do what and on what type of content" (Mercer, 2006, p. 16), and WYSIWYG editor modules provide a Word-like interface for creating content.

However, because of our limited technical knowledge and skills and the steep learning curve involved, Drupal was not appropriate for rapid prototype development at this stage, since we would have had to design around the CMS and our limited abilities to use it, rather than design around user needs. Alternatively, using Drupal to build a prototype that would match any designs we could envision for the user interface would take more time and skills than we had and may be beyond the scope of an information studies class project.

Community Support and Documentation

That there is good support from a large and very active developer community is another reason to consider Drupal as a CMS option. People in the community are often contributing knowledge and expertise in the discussion forums, as well as codes, bug fixes, themes and add-on modules — chances are that one can find a module (from several thousands on Drupal.org) for almost every functionality that may be needed for one's website.

There is also fairly extensive documentation in the form of handbooks, troubleshooting FAQs and videos. Please see the References for some helpful guides in getting started with learning about Drupal and building websites and portals.

On the other hand, even though the number of available modules is huge, it's quite possible that modules won't exist for specific functionalities that may be required for the ODBS prototype. Future teams that decide to use Drupal would have to customize an existing module or create a new one. They may have to look into the usability and effectiveness of various modules as well, which could affect the choice of CMS.

Other CMS Options

Although we did not have time to explore additional CMSs, we had considered other options such as Joomla! and Plone. For reviews of various content management systems, please see Appendix J, which contains a list of additional online resources.

ODBS Wireframe Design

The wireframes developed by our team was inspired by the slogan developed by our class: “Search! Print! Create! Read!” It was a good place to start building wireframes in order to solicit feedback.

While the creation of the wireframe was in part motivated by our time constraints, we recognized in hindsight what an essential part it can be to a system designed with community needs in mind. It allows for a quick creation of multiple design concepts, while soliciting rich and insightful feedback from stakeholders and other consultants. Furthermore, revisions to a wireframe are a lot simpler than revisions to a developed prototype, and designers and programmers often have an easier time scrapping a wireframe that took a week to create than a prototype that took a month to develop (Buxton, 2007).

The approach we took was a rather organic one, taking cues from class discussions and developments and developing a design based on what “we” know. Inspired by Bill Buxton’s approach to designing user experience (Buxton, 2007), the form in which we created the wireframe — an interactive PDF — was an attempt to emulate the user experience of the ODBS portal in an efficient and low-cost manner. The PDF wire frame took about 3 hours to create, compared to over 100 hours spent on just learning content management systems, and maintaining the moodle site.

The wire frame takes into account all the basic functionalities that we consider essential in the portal: a search or browse function, a way to display the results, a way to print the books, a way to allow people to create their own books, and a way to facilitate the creation of an online community around the ODBS. In addition, the ability for the community to provide feedback should be prominent and accessible at all times. Below are some design questions our team explored in relation to the functionalities above.

Searching Vs. Browsing

One issue that came up in discussion with the Digital Contents team was the organization and accessibility of the information. While most of the questions we had — such as issue of taxonomy, classification and how to enable knowledge discovery and sharing — were beyond the scope of our individual knowledge, we recognized that there was an inherent bias in designing either a search or browse function.

Regular library users are used to the term “searching” and what that means when seeking resources. However, the ability to search for information through an online search engine may require a different kind of information literacy than searching in a library setting. We also hypothesized that the motivations for First Nations users to use the ODBS will be very different from those of regular library users (see Appendix B, mock scenarios). What we are not clear about are the information-seeking behaviours of our users, which will make an excellent topic of investiation for future classes. What is clear is that we cannot presume they will use the ODBS service as we envision ourselves using it.

Browsing allows more freedom for users to control how the information is found, instead of being prescribed a method or classification system which they have to navigate. Browsing will ideally inspire First Nations users to make "discoveries" of the kinds of content available through the ODBS, and perhaps enable a narrative or storytelling-based approach to information-seeking. We are unsure of how this will play out specifically, as the ODBS portal is still at its sketching phase.

What we encourage future teams to ask are the following questions:

- What is the distinction between searching and browsing?
- What approaches do we take to teach information literacy to encourage use?

Display of Results

Realizing the potential for the portal to hold more than just "print-ready" content, we explored the idea of multimedia content very early on. How results are displayed, how selected results are viewable online, and how printable resources are formatted for printing are all questions that cannot be answered at this time. However, we feel that they are quite important to keep in mind.

Our choice of digital contents can have a major impact on the accessibility and usability of the content to First Nations communities (Hockema interview, 2009), and the choice of format cannot be arbitrarily chosen. Temporary placeholders are necessary to actually collect digital content, as well as the creation of actual prototypes, but they should be kept as flexible and open as possible for future changes. As more user information becomes available, and more digital formats are explored and tested, the rationale for using certain formats will change as the design develops.

We would like the future teams to consider the following:

- What digital formats will the "printable content" be in?
- How do you display results in all formats (audio, video, print)?
- How will users be able to "view" the content online?

Printing

We anticipate that users may want to be able to customize their printing to a certain degree, and we should not be surprised. After all, we are giving them the ability to bind their own books. Why would we give them ownership over the physical creation of the book but not the digital creation of the book? Will the binding take place at the user's community, or is a request submitted to the nearest community with book-binding facilities? These are questions that cannot be addressed appropriately without the involvement of community members.

- What sizes are appropriate for printing?
- What kinds of customization should the user have access to?
- Will printing take place within or outside of the community?
- What are the financial and logistical constraints that a community faces?

Creating

The idea of allowing users to create their own books holds some of the most interesting possibilities for the ODBS portal. Not only do we have no idea what, if anything, First Nations users may be interested in creating, we also have very little information about what kind of content they want to create. The wireframe betrays a bias towards the traditional formatting of books (chapter headings, indexes, prefaces, etc.), which would not mean as much to a culture whose history is based on oral traditions. That is not to say that such formats are not useful, but it cannot be assumed that they are sufficient. We would like to recommend that future teams come up with at least one alternative content creation function that is specifically catered to an identified "creation" need in the First Nations communities.

- Should this be a template-based process? If so, what templates?
- Can they create more than just "books"? What about galleries for visual and multimedia content?
- What are the project management elements? (Members, images, notes, etc.)
- Can the user limit who can access the final published work online?
- How will copyright and ownership of the work be assigned?

Sharing

It is clear from the explosive success of MyKnet (Budka, 2008) that with the right medium, social behaviours migrate online. They are based on real-life needs to stay connected with friends and family who are located over a great distance, as well as the intrigue of new social technologies and exploring their possibilities. While our team was unable to come up with concrete applications for the community aspect of the portal, we are quite certain that it will be the success factor in the sustainability of the ODBS, just as successful open-source technologies are sustained and continually upgraded by the contributions of passionate community members. An active community ensures that the ODBS grows based on feedback from the community of users, allowing them to have some ownership over the service and perhaps take on more leadership roles in developing the service. While the development of such an online environment takes time, finding out how the ODBS can be used as a way for people to connect and share with others is an important consideration. We received a lot of suggestions in this regard, which can be found in the Community Feedback section.

- How can we take advantage of the active online communities in FN communities?
- What are the social aspects of book or reading culture that currently exists in FN communities that we could emulate or facilitate?
- What are the social aspects of book or reading culture that exists in non-FN culture that may serve as a good model for developing the sharing aspect?

Design Summary

Many of the questions posed above need to be answered in consultation with community members, First Nations information professionals, and other stakeholders. We are hesitant to submit a more concrete "design brief" for future project participants. We anticipate that future developments may or may not have any resemblance to the wireframes that we have created, nor do we have any delusions about the capabilities of the to-be-created prototypes to fulfill all the functionalities that we have outlined. What we wanted to do was to dream up all the possibilities an ODBS portal holds and begin sketching a design that would inspire others to dream along with us. Furthermore, we also encourage future teams to adopt a design process based on Bill Buxton's sketching approach (Buxton, 2007).

As a quick reference, below are three main recommendations:

We would encourage new teams to recognize the diversity of skills that are used in designing a content delivery system. These include understanding of programming languages, information architecture, digital content formats, classification systems, interactive/ experience design, graphical skills and mock-up skills (which could include proficiency with white glue, clamps and video cameras). This is important to recognize so that those who are not computer majors do not feel that they cannot contribute as a member of the Systems team. We recognized quite late in the course that there was a lot of overlap with the Digital Contents team's efforts, and we wish we had collaborated earlier on to discuss digital content delivery and organization issues.

Be realistic about what you want to achieve. Another reality check is about what can realistically be accomplished. Our team did not turn into developers well-versed in Drupal overnight, but we tried. Part of it was because we didn't have a full picture of what goes into system design and development, and we were approaching it based on what we were familiar with. Although we learned this lesson late in the process, we hope that by passing it on, future teams will be able to maximize their time involved.

Getting the user involved is essential in the design process. Due to the pioneering nature of the project, one thing we were quite unprepared to do early on was to actually engage the community with design and system-related questions, which the Community Research team could not address in their first survey. We needed time to learn about and evaluate different options and directions for a prototype, as well as learn new tools and design approaches. We were unsure of how to begin thinking about design development without first obtaining a better grasp of the needs of the community, and this will surely be a challenge that future classes will have to tackle. There are many ways to become familiar with a community, especially its online manifestations. Browse and read what has been published, try to understand how online spaces are being used, and do not be afraid to engage. There may be physical boundaries that separate us from remote and isolated communities, but many of those barriers fall away in an online environment and the opportunity to connect works both ways. There are many ways to engage in participatory design (see Appendix J), and we will leave it up to future teams to devise appropriate methods.

4. Communication & Collaboration

The communication plan that the Systems team had developed changed over the course of the project. Originally, we were trying to find our roles (as teams), and we did not know if we as the Systems team could make connections ourselves and get feedback directly from people at K-Net and the respective communities they represent. We did not want to step on the toes of the other teams, such as Community Research and Outreach and Promotions.

At the beginning, we attempted to communicate between teams by assigning liaisons. A few weeks into the project, the ODBS Meeting Place became a place for dialogue between class members and individuals at K-Net. It gave each person in the class the ability to participate in their own dialogue and engagement with First Nations community members.

Margaret became especially involved with Angie and the YICT workers through the Breeze Room. The Breeze Room is an online meeting room where Angie and her YICT workers could meet to discuss class issues and agendas. Angie was very helpful in letting our class participate in and watch these discussions. Some of the class members, including Margaret, would have regular conversations with YICT workers.

In addition, Marta contacted professionals about issues regarding book-binding and hardware; Sally reached out to others regarding community informatics/ participatory design and the accessing of content from the Internet Archives; Brenda contacted those in the Digital Contents team in order to collaborate on classification; and David contacted people from K-Net, First Nations House and the Faculty of Information to get feedback on the wireframe mock-ups that the Systems team created. As a team, this worked best for us because of the differing schedules we all had and the constraints of other responsibilities.

During the end of the class our team had aspirations to set up our own Breeze Room (which we did with the help of those from K-Net) and then to have it open for anyone at K-Net to give us feedback on our wireframe mock-up. However, because of the lack of time/scheduling and the fact that the people at K-Net are very busy themselves it did not work out. This is something to look into for future feedback on design iterations.

5. Lessons Learned

Project Management: Organization and Community-Based Projects

One of the most difficult parts of this entire endeavour would have to be the project management component. There is an innate challenge that comes with attempting to work with so many people and coordinating efforts while seeking to produce complete, cohesive materials. For this project, the organization consisted of teams of 5-10 students. The teams devised by the instructor were Systems, Digital Contents, Community Research, and Outreach and Promotions. The teams themselves were on the large side, and many students found it difficult to really establish their role within the team.

There was also a lot of overlap in the teams' roles conceptually: the Systems and Digital Contents teams' roles were blended and not clearly defined, and it was only at the end of class when we realized that it would have been more prudent for our teams to have worked in closer collaboration.

Class constraints led to other project management issues. At the beginning of the term we found it difficult to get going; we were waiting mostly on Community Research to provide us with the information that we needed in order to move forward with the requirements analysis and system design. Once we began to take initiative and coordinate with the community research partners ourselves, however, the entire process seemed to flow more smoothly. It was also apparent that there were many other interdependencies within the teams: Systems was waiting for information from Community Research, Digital Contents was waiting for system design and specifications, and Outreach was waiting to see whether they would really have a product to market at all. In a commercial or working situation, these issues would have been avoided by having the product divided temporally; we encountered most issues because we were all thrown into the project and forced to all work together on something concurrently.

Lastly, we learned a lot about the adaptability of community-based projects. Since this is the first iteration of this course, the entire management of the course was based on our ability to forge our own way. We were required to make our own proposals and work towards our own goals, while collaborating with other teams who had their own proposed goals. Throughout the term, we found that we had to be adaptable and allow the tasks we set for ourselves to change to adapt to stumbling blocks and incorporate learning experiences, and we did not entirely fulfill the objectives we had originally set out to accomplish in our proposal. This is not to say that this is a bad thing; rather, this aspect of adaptability has allowed us to understand our own strengths and shortcomings in this process.

Design Process

We also had several learning opportunities with respect to the design process. Firstly, and perhaps most importantly, we learned that for this type of non-profit, community-based project, participatory research is paramount. The main point that we kept coming back to when considering what we would have done if we had the opportunity to start over is that we should have gone to our community partners earlier. We may not have felt ready to do so at the time, but in this case our partners were so knowledgeable, so understanding and so helpful to us that it is clear that we would have benefited from their advice and direction earlier in the process.

Perhaps one of the biggest differences between this design process and that of a commercial product is the way in which it has to be approached. Participatory design is so very important because we had to constantly remind ourselves the proper order in which to do things. Current Western ideas might have us design a product and then try to convince people that they need it, whereas a community-based, non-profit product such as this demands that we find out what the people need, and then we design a product to meet those needs. Knowing this and being able to apply it to the design process are two different things, and this difference was something we had to negotiate around as we worked through the project.

Overall, we accomplished many of the design goals that we set out to achieve in our proposal. The one area in which we fell short of what we had originally hoped to do is that of the implementation of the project. We had set out to create prototypes of the design, or at least to learn and evaluate the content management systems. About halfway through the term, however, we discovered that learning Drupal and being able to implement a prototype might be beyond the scope of what we could accomplish due to the time constraints within which we were working.

As the term went on, we realized that we may have been rather ambitious about the project at the beginning. The difficulty for us lay in scaling back those ambitions to a level where we could keep the overall goal in mind while being content with taking small steps (and meeting individual tasks) that could lead the project toward our objectives.

Community Engagement

There are a few things to keep in mind when looking to get in touch with people in remote communities who have very limited access to the Internet. Their time is precious just like anyone else's and sometimes more so, because in their community it is not uncommon for people to work in jobs with more than one formal title that serve multiple functions. The best way to get to know the community is to engage them as much as possible, when appropriate, by whatever means are available. As stated above time restriction is a big factor that can hinder engaging and communicating with people who live in remote communities. One last thing to keep in mind is that these people are just exactly that: people; and we believe that, as a team and class, we made a relatively good effort to get to know the community as best we could and showed respect for the time and effort that they put into this project as well.

6. Recommendations

For Future Class Organization

Have students be a part of multiple teams. Since there was so much overlap between team roles, it might be prudent for students to have one main team and one secondary team. That way, collaboration can be enhanced between teams and the class can work more together as a whole.

Assign K-Net mentors to students. Having a community partner for particular students or for teams would be extremely helpful in the future. These people are so knowledgeable that their continued help over the course of the entire term would have been invaluable.

Collaborate with other classes. As the design phase continues and the implementation phase for this project begins, it will become increasingly important that this class might collaborate with more technically oriented courses in information systems or computer science.

Focus on deliverables, not 'themes.' The issue of a cost analysis in all the team's work hardly had a chance to come up as we attempted to establish what the ODBS could be about. For future classes, deliverables should be identified along with community stakeholders, and incorporated into the course outcomes.

For Future Design

Recognize the diversity of skills that are used in designing a content delivery system. Not a computer whiz? It's okay! It takes more than just computer know-how.

Be realistic about what you want to achieve. What are your strengths? Do you understand what your limits are? What can you achieve and leave as legacy?

Getting the user involved is essential in the design process. Designing on your own means you are developing a system that is only useful to you. Remember the community you are trying to serve.

Question your assumptions. If you think a certain feature or function is good, can you justify it with a rationale? Show it to someone else. Do they agree with you? Can you find someone that disagrees with you?

For Future Class Members

Don't reinvent the wheel. There is a vast amount of resources available, and all of these technologies have been implemented already in similar ways. Research and don't try to start from scratch.

Reach out. Do not neglect to think of those who are close by that can give feedback or input. Any feedback or guidance is helpful; you never know who has done what and could have really valuable information.

Ask the tough questions. There will inevitably be questions that you will not want to answer: For whom are you doing this project? Is a book service really necessary in a culture of oral history? Take these types of questions in stride, and see them as an opportunity to grow for the participants and the project itself. If it doesn't work out, that's okay too! It's the process that matters.

Challenge assumptions. There are so many assumptions that are made without knowing it, especially in terms of design. Get outside opinions. Ask the community members. Leave no design choice unchallenged!

Be realistic. The term is short, and there might not be a presentable project at the end. Set a goal and make baby steps towards it. Do not be discouraged if ambitious expectations cannot be met.

Have fun! This is a learning opportunity that will shape you in a lot of ways. Try to take as much away from this experience as possible.

For Future Project Researchers & Stakeholders

Ownership of the project. We have worked on this project with the intent that it might be picked up by others with similar goals that we have. We are releasing all of our work with the expectation that it will be used to create a service that is non-proprietary in nature. Anyone is free to use the information and work created herein, provided that it is in the spirit in which we began this project.

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CONTACT

Questions or comments about this report can be addressed to:

systems2125@googlegroups.com or **margaret.lam@gmail.com**