

Agora — A Collaborative Virtual Learning Environment

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1 Introduction

The Virtual Museum of Canada (VMC), developed by the Canadian Heritage Information Network (CHIN), is a portal that brings Canada's rich and diverse heritage into Canadian homes and schools. The VMC gives member museums the ability to reach Canadians and an international audience via the Internet.

The VMC features a guide to Canadian museum services and events, as well as a large image repository and over 200 virtual exhibits and games. With over 41 million visits from more than 200 countries since its launch in March 2001, the VMC is now established as one of the world's premier heritage gateways.

2 Agora — A Concept

Analysis of feedback obtained from visitors to the VMC found that a significant number of visitors were from educational institutions with specific learning-based needs, including students completing homework assignments and professionals doing research.

Since its inception, the role of the VMC has been to showcase quality content created by Canadian museums. Evolving social technologies and changes in user behaviour made it apparent that the second generation of the VMC would have to actively involve users in the creation of content on the Web site.

Our solution was to create a learning space on the Virtual Museum of Canada specifically for these audiences. Originating from the Greek word for "meeting place", aGOra is a call to action that accentuates the dynamism of participative learning. Agora is envisaged to provide Canada's educators and learners with an interactive online environment that offers reusable learning resources created by Canada's heritage institutions.

Agora will provide teachers and students with a structured compilation of learning resources (text, images, video, audio and Flash) and tangible learning outcomes created by museums. These resources will be presented in a manner that facilitates access and use in various learning scenarios. Users will also have access to content creation and communication tools.

This paper presents the objectives of the project through an examination of design and policy decisions that were made in order to foster the creation of an accessible, open, and collaborative educational environment, comprised of authoritative, heritage content. The pilot and phased approach to the release of this project are described.

3 The Agora Input Template

With the goal of encouraging "learning by doing" our highest

level concept design focused on providing users with a collaborative and participatory environment in which they could not only access authoritative museum content, but could play with, share and add to this content as well.

Content had to be created in a manner that would allow it to be manipulated by users. During our initial research phase we examined the idea of "learning objects" and found no universal definition of a learning object — a concept over which there is much debate.

For purposes of research and development of the learning space, we focused on a project-specific definition of learning objects as being stand-alone entities that can be coupled and decoupled in multiple ways to create various learning or training scenarios.

We then asked six art galleries from across Canada to create their own idea of a learning resource based upon our definition. This resulted in six products that varied in size, depth, technology, intention, level of interactivity, interoperability, etc. While all of them had rich educational content, none of them could easily be coupled and decoupled for use as we had planned. They provided us with something upon which to comment and consider, and helped us determine how to go about structuring and assembling content.

With the existing content, we explored the possibility of creating guidelines or a template to allow museums to structure their content in a modular way. The challenge was to facilitate the creation of modular learning resources that would meet set standards without burdening our member museums with hundreds of pages of guidelines or technical challenges. The solution we designed was an input application that allows museum educators to assemble content in a way that easily permits users to break it down and reassemble it. This was the fundamental design concept of the Agora Input Template.

Using the Agora Input Template application, (along with some developed guidelines for content specifications – files size, dimensions, etc) museum educators are now able to assemble modular Learning Resources through form-like web pages. The resulting Learning Resources are made up of media files, metadata, and learning objectives.

Every piece of modular content, no matter the media type, is combined with metadata conforming to the Government of Canada Education (GCED) metadata application profile. The GCED is based on Dublin Core and Cancore profiles. The implementation of metadata compatible with universally accepted metadata standards allows for interoperability with other e-learning initiatives.

Once content has been entered by the museums, the resulting Learning Resources are produced by the application. These can be saved in whole or in part by Agora users and then re-aggregated,

contextualized, expanded upon, and shared within the Agora Studio.

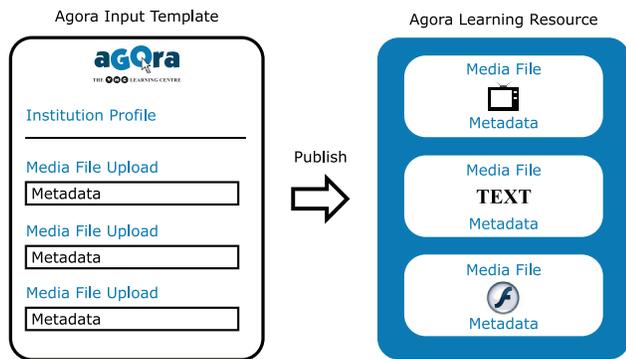


Figure 1: Museums upload content (Media Files) and enter meta-data using the on-line Agora Input Template. The output of this application is a fully formatted, modular Learning Resource.

4 The Agora Studio

The “learning by doing” theme was central to the concept design of the Agora space. At the heart of the space is museum content and a personal aggregation tool. Users can browse Agora and retrieve both didactic and activity based Learning Resources. The complete resources or their individual media files can be saved to the user’s personal studio where they can be re-aggregated. Users can create their own compositions consisting of museum content combined with their own texts.

All visitors are able to view content, but only users with a password and personal studio are able to save content, use the aggregation tool, and use any of the collaborative or communication tools.

In order to access the Agora Studio, a user must complete a free registration process. There are various user profiles – the Teacher profile, the Student profile, and the Museum Educator profile. The Teacher has access to all of the tools that Agora provides, and can create classes of student users and manage these classes. The Student has fewer permissions and available functions than the Teacher, and the Museum Educator has the same access and functions as the Teacher. Anything produced by the Museum Educator has a visual treatment that distinguishes it from what has been produced by a Teacher.

The central function in the Agora Studio is the personal aggregation tool. This tool is used by Teachers and Students to create their own compositions. By saving media files and/or complete Learning Resources users can re-assemble these content pieces, thus creating their own compositions. Using this tool, Teachers and Museum Educators can create “Lessons” and students can create “Projects”. Besides permitting the aggregation of museum content, the tool allows users to upload their own content rendering the Lessons/Projects unique.

Lessons created by Teachers and Museum Educators can be made “public” so that all Agora users can view and save them along with other Learning Resources. Lessons are otherwise shared among the classes created by a Teacher or Museum Educator. Student projects are shared only within their class.

The aggregation tool has been surrounded by communication and collaboration tools that include Blogging functions, Class Wikis, a messaging system, and web conferencing. Multiple Blogs can be created and shared by each user profile. Teacher Blogs can be shared across classes, while Student Blogs are shared with their Teacher and classmates. Wikis are created by the teacher and can be accessed by Students on a class-by-class basis.

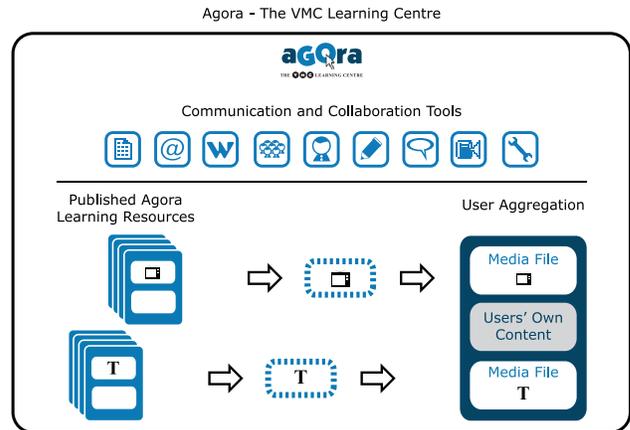


Figure 2: The Agora Studio provides communication and collaboration tools as well as the personal aggregation and content contribution tool.

5 Challenges

5.1 Copyright

Copyright restrictions related to museum content being shared in the space, as well as copyright issues with user-created content, were challenges that we had to accommodate throughout Agora’s development.

As copyright rules apply to contemporary artistic, literary, and dramatic works, it is important that all material, including content in text, image and multimedia format are provided to users free of copyright. Museums that are selected to create learning material sign an agreement with CHIN in which they agree to only use material for which they own or have obtained rights. In Agora, all content that is created by a museum is accompanied by full references and a copyright statement.

As the Lesson and Project creation tool permits users to create their own compositions, visual design treatments were needed in order to distinguish between authoritative museum content and content that has been contributed by users. All museum content used in a Teacher, Museum Educator, or Student composition, besides being given a unique visual treatment, is accompanied by copyright statements as well as explicit links back to the original source. Any media files contained in user compositions cannot be saved individually from the composition. In order for a user to save a media file individually, the user must obtain it from the original source – the museum created Learning Resource. This ensures that users who wish to save any museum content will always first see it within its original context, as intended by the museum.

5.2 Privacy

Regulations that apply to all Federal Government entities required that specific privacy issues be considered when working with minors in a participative space. A Privacy Impact Assessment (PIA) was conducted to provide a high level assessment of the privacy issues and risks associated with Agora and to ensure that privacy protection was a key consideration in the framing of the project's objectives and activities.

Subsequent to the PIA, we made the decision to restrict the collection of student information to username and password only. Students are therefore not required to provide their names, or any other personal information. This decision impacted the registration scenario. Because users who register with Agora do so without an email address, there was an impact on the design of the space through application-to-user feedback, and the scenario in which Teachers invite students to participate in classes.

5.3 Policy

A policy decision was made during the creation of the project that we would place responsibility on institutions for the registration of users. This meant that a school representative would have to agree to allow teachers from their school to create classes and invite students to Agora. This also meant that the space had to be designed to allow the institution representatives and teachers to have access to all content created by users under their responsibility and to edit content if required.

Web products of the Canadian Federal Government are subject to standards governing accessibility created and governed by the Treasury Board Secretariat. This impacted the design through inclusion of mandatory interface elements and restricted use of certain technologies.

In Canada, there is no integrated national education system. Education is under the jurisdiction of provincial governments. Each of the 10 provinces and 3 territories is responsible for developing and overseeing their own curriculum. For this reason, Agora was designed with enough flexibility for our member museums to define - with teachers from their community - relevant content to supplement their lesson plans. Content can be retrieved by subject or age range by teachers across the country. When creating compilations of Agora content, teachers have the option of defining learning objectives based on their curriculum and sharing them with other teachers in the Agora space.

6 Design Methodology

Throughout the design of the Agora concept, its interface and graphic design, and its development, the design methodology placed the user at the center.

Long before work began on the concept design of Agora, we conducted research and test projects to see how teachers and students could use online museum content to teach and learn. We also studied the relationship between virtual and physical interactions with museum content in order to better understand how the experiences could compliment and enrich one another. These projects, helped us to determine how our Learning Resources would be created, as well as their functionality.

Paper testing of the scenario and concept design was done with

teachers and students, while focus group testing was completed with teachers, students, and the general public for interface design, function design, and brand. Museum Educators were involved in demos, feedback sessions, and evaluations for both the Agora Input Template and the Agora Studio. Finally, in-class testing was done where teachers used Agora over the course of a week to teach their curriculum. The feedback and data we received from each testing exercise was largely responsible for directing Agora's design and development.

Interface and function design adopted as many established conventions as possible. This was important as testing revealed a large portion of users were not advanced or even moderate Internet users. Many users had little experience with Blog or Wiki functionalities, but those few who had experience had certain expectations based on existing applications and were not likely to easily adapt to new scenarios.

Graphic and visual design was done with a minimalist style. Since Agora is more of an online application than a web site, importance was placed on simplicity. The amount of information required onscreen at one time is vast, so there is little room for superfluous graphics or creatives. Iconography is used, and was tested for usability and pedagogical value, to free up more space onscreen. For information design, importance was placed on creating clear visual hierarchies, while a white web page background and the blue colour palette were chosen for high-contrast potential, as well as optimum legibility and usability.

Separation of content from presentation is key to the adaptability, scalability and long-term growth of Agora. Prolific use of CSS on the presentation layer, as well as strong semantic markup, permit us to provide more extensive personalization options to users, as well as helping to ensure that Agora is widely accessible.

Overall, each facet of design was based on data provided by users and then tested by users.

7 Phased Approach

In order to ensure that we properly address the many constraints encountered and issues raised by the elaboration of this type of project, we have implemented a phased approach to user content contribution.

In the first iteration of Agora, we have secured text-based content contribution to user-created compositions. As we continue to work through copyright and privacy constraints, as well as government policies, we have planned for the integration of rich user-created content, such as images, audio, video and multimedia.

Personalization options are initially limited to content featuring in the Agora Studio and basic colour choices with the Agora Input Template. Our phased approach has accommodated far more input into the look and feel of a user's own personal space. With the separation of content and functionality from presentation, a user will be able to toggle "on" and "off" features and functionalities, as well determine a style (look and feel) that suits them best.

Communication has been modestly established on a class-level. Teachers and Museum Educators can communicate across their classes and to their students, while students can communicate within the class. Elaboration of communication has been planned to permit communication at the application level, between Teachers, Students, and Museum Educators.

8 The Future

In Autumn 2007, Agora will be released as a pilot project for evaluation with over two hundred Learning Resources available. Users will be able to register at the space, access authoritative museum content, create their own compositions, and share, communicate and teach to, with, and about this content to students.

The Future of Agora will be to design solutions based upon users feedback, and to expand the options that are currently available through a staged process.

Agora will be customizable, open, and allow the inclusion and publication of varied multimedia content from users as well as from other standards-based external sources. Agora's tools and content will be available for use in other portals or personal learning environments, while Agora will interoperate with other 3rd party applications and content.

Acknowledgements

We wish to recognize the Agora core team for their outstanding commitments in working on this concept from research through design and development of the pilot. We also wish to thank Suhas Deshpande for editing this paper.