Environmental Scan of Pricing Models for Online Content

Report II

Business Models for Object Repositories

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Executive Summary

This report investigates Canadian and other initiatives in developing e-content stores or repositories with special interest paid to their business and revenue models for background in determining a suitable sustainable business/revenue model for the OnDisC Alliance.

There is significant activity worldwide in the research and development of repositories of Learning Objects (LO) -- modular chunks of content that are combined and reused to form larger aggregations of education content such as lesson, units, and courses. The rationale for developing repositories of LOs is to reduce the significant cost of developing and customizing educational material. There is activity in developing LO repositories in both the public sector and the private sector. MERLOT is a large public and free LO repository co-operative. Some private firms developing LO repositories and the tools to create and use them include NetG, SmartForce and LearningWay. In addition to LO repositories there are many Learning Resource Gateways (LRG) which offer both free and non-free educational material of many levels of object "granularity". Additionally, organizations are emerging which are acting as learning resource brokerages or networks, such as UNIVERSAL in Europe and AEShareNet in Australia. There are insights and possible future business relationships for OnDisC to be realized in all of the above educational content delivery organizations.

A universal issue among public LO repositories and LSG is how to acquire funding/revenue to sustain the organization beyond initial project status. Most of them are following a sponsorship model where operating and development funds are received from government and/or other supporting organizations and individual educators provide content free. Their business/revenue model follows from a consideration that they are providing a public good which can/must be supported by third parties. OnDisC may be able to operate under a similar business model for similar public goods markets. Additionally, OnDisC may be

able to provide LO content to commercial content developers either directly, or through future online educational material brokerage sites/marketplaces.

A valuable tool for helping to formulate business and revenue models is a value chain assessment in which all significant value added processes or functions and determined and assigned to the different players or organizations involved in the value chain. Once value added assessments are made, appropriate revenue streams can be modeled. A relevant and useful value chain assessment to consider for OnDisC's situation is that of the traditional publisher-library book/journal distribution system.

A significant source of risk for the providers of digital content to a store or repository is the high cost associated with digitizing the material into a format suitable for distribution and use. A possible compromise between risk and service is to provide just-in-time digitization for material that has been chosen as desirable by an end user.

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1 Background

This report is an extension to a report written in the fall of 2001 – *An Environmental Scan of Pricing Models for Online Content.* In that report, information was gathered on relevant on relevant initiatives in distributing digital content to academic institutions in a variety of different media including text, audio, images and video. Additional research was conducted on electronic journal use in academic libraries and on business models in use on the Internet by organizations distributing various kinds of media to provide background and context. Specific pricing information was gathered where possible.

This, the Phase II report includes the objectives: of investigating the activities of e-content stores, or repositories across Canada including those at the federal and provincial level such as BELLE and POOL; investigating comparable and competitive content stores being offered or contemplated elsewhere, particularly with respect to their pricing and e-business models; of expanding the terms of reference of the research from educational institutions to include governments and government affiliated institutions and educational levels of K-12 in Canada, in particular SchoolNet. The report will review, discuss and assess current pricing models and their relative merits and applicability to both online distribution by the OnDisC Alliance as well as other object repositories. The report will recommend principles on which feasible e-commerce models may be based. Specific attention is paid to the those repositories which focus on content known generically as Learning Objects – modular “chunks” of information which can be assembled into larger levels of aggregation such as educational lessons, units and courses. The report will also review in some detail a template for assessing the value chain for information content distribution adapted from a publisher/library business model.

2 Learning Object Repositories – short summaries of who they are, and what they provide

2.1 Learning Objects – Definition & Background

This report looks at the Learning Object (LO) class of digital content. It is seen as one a content aggregator such as OnDisC may have a natural relationship with, either as a provider of learning objects, or as a supplier of fine-grained material to other organizations that will create the Learning Objects.

A Learning Object, sometimes called a Reusable Learning Object (RLO) is based on the Reusable Information Object (RIO). An RIO is a granular reusable chunk of information that is media independent, can either stand alone, or be combined with other RIOs to form an RLO. An example of an RIO is a list of key points, a diagram, or a short animation clip. An RLO is designed to fulfill a single learning objective and can be fashioned to reflect pedagogical standards. Other terms for RLOs and LOs include Educational Objects (EO), Content Objects (CO), Training Components (TC), or Knowledge Objects (KO).

The goal for developing Learning Objects is to increase the value of content thereby maximizing the return on investment whether the developer is a corporation, academic institution, or governmental body. Learning Objects increase the value of content by making the information more accessible, interoperable, reusable, and durable.

The advantage of using an object-based approach to creating content is seen in the example of Fidelity Investments, a financial services company in the US. Fidelity applied Object Oriented Publishing to the task of publishing mutual fund prospectuses for its 10 million customers. The Fidelity legal department created a “standard language library” for prospectus “chunks” which could be easily and quickly assembled into a myriad of different styles and types of prospectus documents reflecting their varied products and customers. The results were impressive: quality and consistency was improved, legal manager productivity

was increased by 40%, and process time was reduced from about three weeks to two hours. [1]

Similar kinds of improvements are foreseen in the creation of learning material in the corporate, government and academic fields. The following subsections will briefly examine some of the activity that has been done in advancing the use of Learning Objects.

2.2 Learning Resource Gateways

Learning Resource Gateways (LRG) are similar to Subject Based Gateways (SBG) that were discussed in the Phase I report[2]. The difference is that LRGs are focused on providing access to material that has a teaching or pedagogical value, whereas the SBGs do not make that distinction and instead focus on solely on providing information relevant to a chosen subject area. The distinction is a subtle one for many materials found through an SBG can be used for teaching purposes and content found on an LRG can be used for informational purposes apart from its value as teaching or educational material.

SchoolNet – is a Canadian Gateway service pointing to educational resources on the web as well as to resources provided by GrassRoots, a related initiative in which educational resources were developed by Canadian school themselves. The resources and pointers are heavily described with metadata. Currently there are about 5,000 evaluated resources available. A survey in 2000 revealed that the GrassRoots material was used and useful to schools, while the other resources were not as well used. An interesting spin-off from the SchoolNet project is that the lessons learned in its development are being used by the Office of International Partnerships in consulting contracts with other countries and was projected to bring in about CAN $35 M from 1995-2001.[3]

Copernicus Education Gateway – an extensive site catering to educators, students, and parents. It features free web content, selected and annotated for its

[1] Learning Object Network – http://www.learningobjectsnetwork.com/ServicesFactSheet.pdf

[2] Darimont phase one report

[3] SchoolNet - http://www.schoolnet.ca

suitability for education. The site features banner advertising from organizations such as The History Channel. This site is more an SBG focusing on education rather than an LO gateway.

Gateway to Educational Material (GEM) - Governed by the US Department of Education and a consortium of over 300 organizations and individuals. As of March 20, 2002, it has 24,480 education resources including lesson plans, activities, and projects for all levels of education. Content is quality controlled, but the resources are uncatalogued. GEM is free, but it includes pointers to material that are free, partially free and fee-based.

SMETE - Science Mathematics Engineering Technology Education, associated with the National Science Digital Library (NDSL) is a very large repository of educational resources, aimed at post secondary undergraduates and instructors but open to anyone. It is funded by the National Science Foundation but is also supported by a number of other government and academic organizations. In addition to providing a gateway to educational resources, SMETE/NDSL is an online meeting place to foster collaboration among educators.

2.3 Co-operative Learning Object Repositories

Educational Object Economy – EOE started as a National Science Foundation-funded project, hosted by Apple Computer, and included industry, university, and government collaborators. The EOE became the focal point for research and development initiatives covering a number of aspects concerning web-based education including: metadata for educational resources, component-software approaches in education, open source communities, intellectual capital appreciation licenses, new economic models, and internet cooperatives. This work led to the creation of the Generic Object Economy (GEO) a web-community template formed around an online database. GEO is free, and has been used by other Learning Object Repositories, including MERLOT and Jcampus. There are currently 2600 Java applet educational objects at EOE.

MERLOT (Multimedia Education Resource for Learning and Online Teaching) – is a cooperative educational object repository that currently has more than 2,000

modules from many institutions. In addition to functioning as a repository, MERLOT features ratings, peer-reviews, and discipline communities. Learning materials can be used as components of a course, but are not complete courses. Learning materials found through MERLOT include high quality simulations, animations, tutorials, exercises, and other organized learning material. MERLOT receives funding from government grants, partner fees ($25,000 per partner) and in-kind revenues from the California State University and partner members. There are currently 23 members.

BELLE – Broadband Enabled Lifelong Learning Environment is led by Netera Alliance, a leader in the design and management of advanced infrastructure. The BELLE project is further assisted by key researchers in online learning and evaluation from a number of Canadian universities. BELLE will offer a searchable database of multimedia content suitable for adult and higher education institutions that is interoperable among participating institutions and is peer-reviewed.

POOL – Portal for Online Objects in Learning is led by the TeleLearning Network Inc. of British Columbia and is funded by CANARIE and other partners in the eLearning industry. POOL is a prototype repository to promote the sharing and re-use of learning content.

2.4 Commercial Learning Object Organizations

There are numerous companies active in providing e-learning solutions for business, government, and academia. Some, such as NETg, SmartForce and LeadingWay feature Learning Objects as a core strategy in developing flexible, re-usable content.

NETg – is a leading global provider of learning solutions. Their educational material is based on a Learning Object architecture developed in the early 1990s. The company has over 75,000 learning objects that can be aggregated in a multitude of combinations. Their customers include Daimler-Chrysler, Honeywell, Proctor & Gamble, and Dow Chemical.

SmartForce – is the largest e-learning company in the world, and offers a wide range of off-the-shelf and custom content. Their flagship product is My SmartForce, an Internet based system that uses a Learning Management System (LMS) to organize and present chunks of content – learning objects. Clients include Dell, Computer Sciences Corporation and Pricewaterhouse Coopers.

LeadingWay – established in 1991, this company has a strong reputation for technological leadership. Their product, KnowledgeOne includes content authoring software for building reusable knowledge objects that can be added to a custom, in-house knowledge repository

Cisco Systems – has a well-developed in house training system that uses a Reusable Learning Object (RLO) strategy based on work by Dr. Ruth Clark and Dr. Merrill, leaders in the field of education and learning research.

Fathom – is an online gateway to the electronic courses authored by its member institutions. Their offerings include Knowledge Trails, software that provides a visual way of organizing and navigating knowledge, online forums, and courses that cost in the neighbourhood of US $400-500. The members include: Iowa State University, Michigan State University, Virginia Polytechnic Institute and State University, University of Washington, University of California Extension Online, Purdue University, and Columbia Interactive Arts and Sciences. Fathom also has an international presence including members such as the British Museum and the London School of Economics, whose offerings include a five hour multimedia history of the east end of London for £31.

2.5 Online Brokers for Education Material

Research has revealed several organizations specializing in providing brokerage and rights management services for educational institutions and content providers. Three are briefly discussed below.

UNIVERSAL – A European project to develop an online service linking suppliers and users of educational material in a business to business oriented brokerage

platform designed to support offers, enquires, bookings and deliveries of the educational material. The educational content is based on the IEEE Learning Objects Metadata standard and features four levels of learning objects – course, unit, lesson, and fragment. UNIVERSAL acknowledges many possible business models but have not yet made a decision about one for their circumstances.

HERON – Higher Education Resources ON-demand provides a unique copyright clearance and digitization service for UK Higher Education Institutions. It started as a project funded by UK's Joint Information Systems Committee (JISC) and by Blackwell Retail Ltd., a commercial academic bookseller. HERON has recently announced that it is being taken over by Ingenta, a leading online provider of published scientific, professional, and academic research.

AEShareNet – is a non-profit company established by the Australian Ministers of Education and Training to streamline the licensing of intellectual property for use in the VET (Vocational Education and Training) environment. AEShareNet includes descriptions of material available for licensing as well as standard licensing agreements that vendors and buyers agree to use upon becoming members of the network. AEShareNet's operating revenues come from fees it charges its members including an application fee, annual subscription fee, transaction fees, and a percentage of fees collected for licenses and royalties.

Lydia - Lydia is a privately held company founded in 2000 by Thomas Probert, PhD after seven years of R & D funded by US federal initiatives. Lydia is planning to be a global object repository/marketplace for the development and exchange of Learning Objects. A significant indicator of Lydia's progress is the fact that they have filed for patent applications, both in the US and internationally to cover their "method" for maintaining a registry for identifying and managing intellectual property rights, properties and constraints associated with creative works. World Patent application no. WO0219214, assigned to Probert was published March 7, 2002

3 Business Models – Value chain

Ultimately business models are evaluated in the market place and it makes sense to review existing successful business models for applicability to one's own situation. A detailed report, Business Models for Distribution, Archiving and Use of Electronic Information: Towards a Value Chain Perspective by Mark Bide & Associates which deals with the business models for traditional and electronic libraries was obtained by the author for this kind of real-world review. It is worth examining this report in detail for two reasons. First it gives insight into a general business model template that is suited for the delivery of information, digital or otherwise from a content author to an end user and as such can be used to understand the issues and relationships that a new distribution system such as OnDisC. In addition, it can give specific insight into the type of business model that OnDisC may find itself a part of, if libraries end up being the organizations that contract with OnDisC to provide access to digital content. The next sections discuss the content in the Bide & Associates report.

3.1 Players in a Traditional Publisher-Library Value Chain

3.1.1 Intermediaries

Library intermediaries (book jobbers, subscription agents, etc.) provide the services to the library relating to acquisition, cataloguing, and in some cases to aggregation (by allowing a librarian to browse intermediary holdings etc. thereby assisting in collection development decisions). Library intermediaries also provide a valuable distribution function for both publishers and libraries in that they allow a many to one to many relationship, which is much simpler and less costly than if many publishers had to deal individually with many libraries.

3.1.2 Publishers

Publishers provide a number of value added activities including: those associated with the publishing process – selection of appropriate projects, quality control, obtaining the right to publish, aggregating like works into series or serial

publication, and investment or financing content creation; those associated with the development process – content development and design, content formatting and quality assurance; those associated with access – manufacturing, customer service, distribution; and finally those with marketing – fitness of content for market, awareness, branding and authority.

3.1.3 Content Creator

Content creator – creates the primary raw material which supports the entire value chain. At times, the name of an author can be a powerful brand name, but regardless of that particular additional value, creators need the value added by the entire chain to give a composite or aggregated value to a work that an end user will accept and pay for.

3.1.4 Libraries

Libraries provide a number of value added activities including: aggregating content in one physical location; those associated with storage of content - archiving and preservation; those associated with providing access to the content including awareness, discovery, user training, access control; those associated with branding and authority – selection (collection development) and quality control; and finally providing ambience for end users.

3.2 Other players

3.2.1 Rights Management Societies

They collect photocopying revenue from libraries and distribute them to rights holders in a somewhat crudely accurate manner. The main value they add to the chain is providing a many to one to many relationship between users and owners replacing an unmanageable many to many relationship that would exist otherwise.

3.2.2 Abstracting and Indexing Services

These secondary publishers perform a special role as aggregators of meta-information and play an important part in the discovery and awareness of material by end users.

3.2.3 Document Delivery Services

These services provide documents to library users on a just-in-time basis and act to extend the aggregation of material beyond that which a single library is able to provide. The idea of replacing the standard just-in-case collection development strategy with one based on an extensive document delivery service is an ongoing consideration among library professionals. One library in the UK at Cranfield University has moved in that direction by cancelling all journal subscriptions and satisfying all information needs through document delivery. Doing so does entail risks, including disintermediation of the library as end users handle their information needs directly with the document delivery services, and in the potential for uneconomic use of the institutions funds.

3.3 Payment Flows in a Publisher – Library Value Chain

3.3.1 Payment to the Library

The end user in most library situations does not make direct payments; rather the user pays indirectly with tax money. Users do make direct payments on occasion through library fines on overdue material.

3.3.2 Payment by the Library – Acquisitions

A portion of library funding is used for the acquisition of tangible products through the supply chain, with the charging mechanism based on the receipt of the physical objects. In the case of monographs, a single purchase is made for single work. Serials are purchased through ongoing subscriptions. The amount of use of the object is not a factor in the price charged, however the library may decide to purchase additional copies of a particular object if demand for it is high.

3.3.3 Payment to the Library Intermediary

The costs of library intermediaries are offset by a combination of charges against customers for handling the delivery, claiming and financial transactions involved in serials subscriptions and discounts offered by publishers for buying books in volume.

3.3.4 Payment to the Publisher

Library Intermediaries pass on the bulk of the fees they receive from libraries to the publishers, who set prices for the books based on their costs and what the marketplace in general will bear.

3.3.5 Payment to the Author

Finally, the publisher makes payments to the author as a condition of the publisher having acquired the rights of the author to publish his/her work. In some cases, the author receives royalty compensation that increases payments in proportion to the success of the work. In other cases, the author receives a flat fee based on a work for hire basis, or as an employee salary. The marketplace also works in these transactions to some extent with successful authors being able to command higher fees or salaries.

3.4 Value Added in Electronic Distribution

3.4.1 Aggregation

The value of aggregation remains the same in delivering electronic content but the storage of the material is fundamentally different as it can be take place at any point in a distributed network and still be available to end users at a particular point in that network. Storage costs for electronic media are somewhat lower than the physical structures required to hold tangible media.

There are difficulties in archiving and preserving electronic material that will add to the overall long-term costs of storage. As technology advances, current data will have to “refreshed” and “migrated” to new platforms, and new media rich forms of documents will further exacerbate this, each constituent of which (video,

audio, text, etc.) may have its own updating requirements. One model for outsourcing the archiving of electronic media is that of JSTOR a company discussed in the Phase I report.

3.4.2 Access

The Information Technology (IT) infrastructure needed to access electronic media is broadly analogous to the physical building and shelves required to provide content aggregation under the traditional print model. This implies a shift from spending to provide aggregation towards spending to provide access.

The point of access, or portal, to the aggregated content will be a very important part in the value chain of content delivery. A common, perhaps standardized and effective, user interface may be delivered by third parties who will be able to provide the many to one to relationship between different content suppliers that may be required to standardized access.

The discovery of electronic resources may be enhanced by adding full text searching capabilities to metadata, and by using other tools such as recommended reading lists (Amazon). In an environment where information content is being supplied at ever increasing rates, the value of meta data which can lead to the discovery and awareness of that content becomes as important in the value chain as the content itself.

Another aspect of access to electronic content is the reliable location of it on the network. Citations lists in electronic journal articles and books may be valuable discovery tools, but are not very useful if a particular link to a valued reference does not work. The Digital Object Identifier is an attempt to provide robust reliable locator for published and valuable content on the World Wide Web.

User training is a value added function provided by libraries in helping users gain access to electronic material and one that is not likely to go away anytime soon.

Access control is much more important in an electronic delivery environment since free access to anyone would destroy the revenue model that the system

depends on. Value will be added in those systems that aggregate access control and avoid situations requiring users to navigate multiple levels of access.

3.4.3 Marketing

Brand value is a very important part of the value chain in information dissemination. Branding elements includes things like: the author's name; the author's affiliate; the publisher's corporate brand; a citation in another work; a recommendation from a colleague. A user filters and combines these brand elements to give an overall view of the authority, and hence value of the information in question. Without branding a user would have only their own judgment to depend upon to make choices about information selection. In an environment of prolific publishing, branding is an essential value added function and may in fact be the source of greatest value in the chain.

Table 1 - Primary Value Added Comparison

Primary Value Added	Secondary Value Added	Institutional User	OnDisC	OnDisC Member	Other
Aggregation					
	Storage			X	
	Archiving/ preservation			X	
Access					
	IT Infrastructure	X			
	Gateway		X		
	User interface		X		
	Discovery tools		X		
	Meta-information			X	
	Location		X		
	User training	X			
	Access control	X			
Publication					
	Selection			X	
	Rights acquisition			X	
	Content formatting			X	
	Content development			X	
Marketing					
	Awareness		X		
	Branding and authenticity			X	
Administration					
	Payment cycle		X		

4 Funding Models

There are several possible funding models that can be considered to fund the start up and ongoing maintenance of a digital content production and distribution system.

4.1 Subsidized (Sponsorship)

The entire value chain may be supported by external sources such as is the case with traditional libraries. This could be from a single government agency, or a consortium of sponsors.

Pros

- allows greater breadth of coverage (not restricted to high demand items)
- allows time to develop the service (incubation period) while exploring other funding options later
- allows greater market exposure (i.e. poor schools will not be denied access)
- consortium sponsorship may be able to provide people or services-in-kind in addition to funding

Cons

- Does not allow the true cost of the service to be recovered
- requires long term continued commitment, funding may be reduced due to other competing financial commitments

4.2 Advertising

Pros

- independence from sponsors

Cons

- viewing traffic, on which rates are based may be low
- might generate a bias towards certain material which generates higher traffic
- advertising may not coincide with the values/goals of the institution
- added administration expense of soliciting advertisers
- subject to the ups and downs of the business cycle

4.3 Pay per Use

End users may have to pay for using the system, recent eg. is Ebrarian a new initiative of Ebrary that makes online content available to libraries for free, but users pay a charge to make an actual print copy.

Pros

- best way of recovering costs for redistribution to content providers
- allows feedback about which kinds of content are successful and should be reinforced

Cons

- added transaction expense
- may discourage use
- hard to compete with traditional “free” services at point of use (eg. libraries)
- may conflict with the educational goals of the institution
- may lead to a bias against a broad coverage of materials

4.4 Member Organization Fees

Members of the organization pay an annual fee. eg. is MERLOT which receives a significant part of its funding from membership fees, and in-kind revenue from key academic supporters.

Pros

- allows for better cost recovery
- a stable source of revenue
- distribution of fees to non-for-profit members (subsidize)

Cons

- may discourage the listing of many quality resources from the private sector

4.5 Learning Institutions Fees

Learning institutions pay an annual fee for a license to use the content. Eg. is AMICO, SCRAN, and JSTOR as discussed in the Phase I report.

Pros

- allows better cost recovery
- distributed funding model may be more robust than funding from a single sponsor
- possibility of a stronger supplier/customer relationship

Cons

- may discourage institutions if other repositories are available for free
- may be difficult to compete with other institutional expense

4.6 Content Contributor Fees

Content contributors who provide not-for-free material pay to have their content listed. They could also pay royalty fees based on their volume of business.

Pros

- allows the aggregator a source of working revenue during a build up phase

- allows for better cost recovery for the value addition performed by the aggregator for the content provider

Cons

- may discourage contributing organizations from joining the consortium

Table 2 – Revenue / Value

Player	Value Additions	Potential Revenue Sources
Publisher (content creator)	Development Storage Archiving/Preservation Branding/Authority	Sponsorship Content Aggregator/Distributor Institution/Individual
Content Aggregator/Distributor	Gateway User Interface Discovery Tools Awareness Promotion Meta-tagging Peer review Copy Protection Distribution Channel Rights Management Administration	Sponsorship Advertising Institution Access Fee Individual Pay-per-use Publisher (member) Fee Content Contribution Fee
Institutional user	Access Control User Training IT Infrastructure	Sponsorship Individual user (tuition, pay-per-use)
Individual user	Use of the content	Debt :o)

5 Discussion

The Phase I report dealt with an environmental scan of pricing models for distributing online content to academic institutions. Pricing schedules for four online repositories of digital content – JSTOR, AMICO, SCRAN and ECO were examined and discussed in context with theory about product differentiation.

Phase I dealt with the delivery of online content to academic in a general case and did not examine in detail how or why the content would be of value to those academic institutions. This issue is addressed in this report by considering possible uses of digital content by the users within academic institutions.

The digital content that the OnDisC Alliance members will be offering to academic institutions can be described as having a fine granularity, similar to say the offerings of AMICO – individual images with some text description for context, but not much beyond that. The objects will have of course rich metadata that will allow enhance access but OnDisC objects will be qualitatively different from those that are described as Learning Objects. Learning Objects by definition include features such as peer review by educators, rating (for age level and curriculum) and pedagogical organization intended to impart a learning response on the part of a user. They can be described as coarse-grained objects and will have within themselves finer grained objects, such as those offered by OnDisC, which may be called media objects. Learning Objects in turn are organized into larger structures such as courses, or lessons. A physical analogy that one could use is that media objects are like yarn that is woven into cloth (learning objects) that is cut and sewn into clothing (courses, lessons).

OnDisC, as an aggregator and distributor of media objects can occupy a level in a value chain between the content authors (or owners) and those that will use the media objects to construct larger grained information entities. In such a chain, OnDisC would add value to the fine-grained media by providing a many to one to many relationship making it easier for the content of many authors to find its way to many users. The users of media objects need not be only those that use them in the production of learning objects; media objects will be useful to all manners of higher level information including books, papers, theses, reports, essays, web pages, projects, presentations, documentaries etc. OnDisC then can be useful beyond the value chain of courses and training in academic institutions. Different institutions, such as K-8, 9-12, government organizations or corporations may each find a service like OnDisC useful, but since each of them represents

fundamentally different markets, OnDisC would have to tailor a business and revenue model to reflect that. It would be beneficial to undertake some investigative research of what the various types of potential customer organizations want and need in relation to the value added content and services that OnDisC is planning to provide.

A recent Harvard Business Review article[4] discussed how a business model, syndication, commonly used in the entertainment industry is now seeing great application by Internet based e-commerce companies. Syndication involves the sale of the same good to many different customers who then integrate it with other offerings and then redistribute it. A classic example is the local television station that purchases the rights to broadcast a number of different shows produced by different studios. On the internet an example is the online brokerage house E*Trade which purchases a lot of content such as stock quotes, financial news, charts etc. from providers and repackages it with some of its own services such as trade execution. Both the television station and the online brokerage are in the business of aggregating syndicated content and redistributing it. Syndication is well suited for the Internet and the distribution of digital content because it allows for the easy duplication and transmission of modular content that can be aggregated and repackaged and sent to many distribution points. There are many parallels between a syndicate business model and the circumstances of OnDisC; it may be worthwhile to investigate syndicate business models more deeply.

The emerging online educational content brokerage organization UNIVERSAL appears to be one that is catering to suppliers of different levels of granularity of content, in effect acting as a marketplace for the developers of educational content in addition to the buyers and sellers of coarsely aggregated units (i.e. courses) which are a feature of most of the others such as Fathom or AEShareNet. OnDisC could offer its digital content collection as an aggregating supplier in a marketplace like UNIVERSAL or Lydia (or BELLE/POOL if they

[4] Harvard business article

develop along similar lines). Alternatively, OnDisC could act as a syndicate and sell the rights to the entire (or substantial parts) collection to private or public content developing institutions.

A key factor in a business plan involving the distribution of digital content is the cost of digitizing content that was created and stored by traditional non-digital methods. In some cases, this cost can be very large, as was the case with JSTOR who undertook the digitization of many thousands of pages of paper journal articles to create a digital journal archive. As was discussed in the Phase I report, JSTOR charges users of their system an initial one time sign up fee to help cover these costs. OnDisC may have to follow a similar model to help members cover their digitization costs. A large-scale digitization project carries a certain amount of financial risk - that the users of the content may be unwilling to pay a price that is sufficient to cover the cost of digitization. One could argue that such a financial risk entitles the digitizing organization to a greater share of the revenue generated by the system as a whole. Such a formula of greater risk equals greater reward is common in the marketplace. One possibility of reducing such a risk would be to offer a just-in-time digitization of content in a manner analogous to the service offered by Document Delivery Services. The digitizing organization would require staff and equipment to respond to content "orders" and the ongoing provision of this service may in fact turn out to be more costly than digitizing the entire library of content at the outset. It is an approach worth investigating however. It should be noted that the JSTOR service is appealing to libraries because it competes effectively with a service libraries already pay for – namely the provision of timely access to back issues of journals held by the library. In the case of OnDisC there is no current comparable service that libraries subscribe to; OnDisC will have to compete in the arena of electronic collection development and it's pricing should reflect the nature of that marketplace.

The major Learning Resource Gateways (LRGs), such as GEM, SchoolNet, and SMETE were all created and initially maintained by outside funding from

government departments or non-profit non governmental agencies. Membership in GEM is free, but their website implies that this may not be a permanent privilege and membership fees may be charged in subsequent years. The GEM database includes pointers to non-free materials so charging a listing or referral fee could be a source of revenue for them. Both SchoolNet and SMETE have government and corporate sponsors who contribute resources be they people, in-kind services or financial. Although all of the LRGs acknowledge that plans for long-term sustainability are necessary, there is no indication that they are considering a revenue model that would charge end users, either individuals or institutions for access to the network. On the other hand, SMETE does include an end user charging scheme in its list of hypothetical funding models based which would take the form of an annual membership fee, or charging for access to different degrees of service.

One thing that all of the LRGs have in common is that they include access to "public" goods which are non-depletable and non-excludable. Once a digital "good" is produced there is no marginal cost for providing another copy of it for an additional user, and it can be given away at no cost. Paying for the first copy of a public good requires an asymmetrical pricing scheme in which the cost paid by the user takes the form of a formal or informal economic tax. In the case of a person viewing a television program, he or she pays a marginal surcharge when an advertised good is purchased. Hallgren and McAdams[5] discuss the application of a public good business model that was used by Cornell University during the development of GateDaemon, a key enabling software product for the growth of the Internet. Cornell created a consortium of organizations that valued the development of GateD and were willing to contribute the economic "taxes" to fund it. The venture has proven to be successful, and has vast spillover benefits invaluable to the growth of the Internet and the subsequent Internet "economy". Public Learning Object Repositories, such as MERLOT appear to be following a similar kind of asymmetrical revenue/funding model.

[5] Hallgren and McAdams

Commercial Learning Object organizations, such as Netg, SmartForce and LeadingWay sell their learning resources as private goods and therefore make them excludable (although their digital nature makes them non-depletable). Their use of Learning Objects in a private aggregation is to improve their internal efficiency at developing new "large-grained" learning content. Given their role as large grained content creators, OnDisC may be able to act as a supplier to them of finer grained content that they could use in building up their learning objects.

The pros and cons of various revenue models discussed in the previous section reveal which may be suitable for an organization such as OnDisC. Since OnDisC will have elements of both a public and private distributor of digital content it may be necessary to consider having multiple sources of revenue which are suitable for each type of business. For example, since OnDisC will be a provider of much content that is not-for-profit and copyright free, a revenue model similar to that of a "public" goods institution is appropriate. In such a model, funds for digitizing, cataloguing, and distributing content will come from sponsorships from a variety of sources such as government, academia and business. An important advantage of this kind of revenue model is that it will provide dependable support during the initial start up phase of the service.

Since OnDisC will also be a distributor of "private" copyrighted material there could be a separate business model that covers the unique aspects of the relationships between OnDisC and the providers of the content. In such a circumstance OnDisC may use a revenue model that is similar to that used by AEShareNet, in which OnDisC receives compensation from the vendors of content in lieu of the value added provided by OnDisC to that content, such as marketing, meta-tagging, rights management etc. Revenue from the "public" stream of the operation will have to be distributed amongst both the public and private content providers but probably a greater amount should be directed towards the not-for-profit providers. It should be expected that the private, for-profit content providers bear the cost of digitizing their content themselves, if they expect to be able to benefit from additional future revenue from such material.

OnDisC may also need to consider different revenue models for different kinds of markets, such as higher education academic, K-12 and professional education content developers. For example faculty at a university may be charged less by OnDisC for copy-righted material that is developed for limited use within a single institution than if the same material was to be used by a education content developer that is planning on using the content in a product that will be offered for sale nationally. This is the case with AEShareNet, which uses two different kinds of contracts for matching sellers and buyers. They use three standard contracts for easy and quick sales agreements and a second kind of open-ended contract that allows the two parties to negotiate terms. AEShareNet receives a revenue premium for mediating the latter kind of contract. Similarly, OnDisC may have a separate kind of contract for institutions in the K-12 market segment that reflects the different nature of use and available funds that they will have compared with a higher education academic market.

It should be noted that OnDisC will offer access to a collection of digital content that may or may not be used by customers. Regardless of actual usage, the "potential" use of the collection is in itself a commodity of value and this should be reflected in the revenue model that OnDisC employs.

Finally, it should also be noted that in a broad sense OnDisC will have to compete with the free, co-operative Learning Object Repositories such as MERLOT and with the commercial suppliers of online educational content. In the case of competing with free content, OnDisC may successfully compete on the basis of the added values of scope of content and convenience, namely ease of location and use which includes minimal digital rights negotiation). In the case of commercial educational suppliers, OnDisC can compete by offering academic content developers the means to build their own custom designed Learning Objects and subsequent lessons, units and courses at significant cost savings.

6 Conclusions

The purpose of this report was to conduct research on the activities of electronic content stores or repositories across Canada and elsewhere at various levels including K-12, government and the private sector. The applicability to OnDisC of business and revenue models associated with the object repositories were reviewed and discussed. Some of the major findings of this research are:

- There is a great deal of activity in Canada and elsewhere in research and development of Learning Object repositories and networks; there is a great opportunity for the OnDisC Alliance to use its digital content assets to help supply future demand for LOs.
- Learning Object repositories are developing in both the public and private spheres; OnDisC may be able to act as a content supplier to both spheres.
- OnDisC may need to consider multiple business/revenue models if targeting different markets, such as K-12, academic institutions and commercial content developers. OnDisC should consider active investigative research of the wants and needs of these markets.
- OnDisC may need to consider a sequence of business/revenue models; during the initial implementation of OnDisC, stable revenue from committed sponsors may be most effective with subsequent revenue streams from users coming later.
- Value chain assessments will be a valuable tool in helping OnDisC determine its contributions and subsequent rewards with respect to the value chain; this will be particularly helpful if multiple markets and business plans are considered.
- Digitization of content will be a significant cost and risk factor for content contributing members; a just-in-time digitization model may be an effective way to compromise between service and risk.

- OnDisC should contact and/or maintain a watch on educational content brokerage networks such as UNIVERSAL and Lydia for valuable information about business models in addition to the possibility of future business relationships. This may be of interest to the other Canadian content repositories such as BELLE and POOL.

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8 Web Site References (Webliography)

Access.ca http://www.access.ca/	Coming soon – access to government and community information
AEShareNet http://www.aesharenet.com.au/index.asp	Australian educational content portal that acts as an IP clearinghouse handling licensing between providers and users
Apple Learning Interchange (ALI) http://www.ali.apple.com/ali/	Contains over 30,000 resources for K-12. (ID and password required for full access). Also featured is Units of Practice (UOP), a structured curriculum framework for sharing lessons, a result of collaboration between Apple, the National Science Foundation, and the New American Schools Development Corporation.
ArtsEdNet (The Getty's Art Education Web Site) http://www.getty.edu/artsednet/	Small site featuring Lesson Plans & Curriculum Ideas as well as Image galleries and exhibitions
BBC Learning http://www.bbc.co.uk/learning/	A large site which acts as a general Subject Based Gateway in addition to providing free online courses in a number of subjects

Becta Educational Software Database (BESD) British Educational Communications and Technology Agency (BECTa) http://besd.becta.org.uk/search/index.php3	Includes pricing and vendor information and links where possible to TEEM (Teachers Evaluating Educational Multimedia)
Bubl http://bubl.ac.uk/link/	Annotated, with Dewey classification and date last checked
Canada's Digital Collections http://collections.ic.gc.ca/E/home.html	Links to over 400 websites of educational material supplied by students working under grants from Industry Canada
Canada's SchoolNet http://www.schoolnet.ca/	Gateway service with metadata tag on external websites, 5000 resources evaluated by educators, resources catalogued by curriculum area
CAREO (Campus Alberta Repository of Educational Objects). http://careo.netera.ca/cgi-bin/WebObjects/Repository	A research prototype repository of multidisciplinary teaching materials for educators in Alberta and beyond. BELLE and CANARIE are partners in the project.

Center for History and New Media (CHNM) http://chnm.gmu.edu/	CHNM is supported partly by the National Endowment for the Humanities (NEH) and works with the American Social History Project at CUNY (City University of New York) It produces historical works in new media for the benefit professional historians, high school teachers, and students of history
Educational Object Economy http://www.eoe.org/	Research organization funded by the National Science Foundation (NSF) and Apple
European SchoolNet http://www.eun.org/eun.org2/eun/en/index_eun.html	A large Learning Resource Gateway providing service to educators in 23 countries
Fathom http://www.fathom.com/	Course aggregator; Columbia provides accreditation function of courses. Cooperative model of seven leading US academic institutions
Flexible Learning Advisory Group (FLAG) http://www.flexiblelearning.net.au/	Australian Advisory body with a five year mandate 2000-2005 on issues relating to online educational strategies

Gateway to Educational Material (GEM) http://www.thegateway.org/	Governed by the US Dept. of Education and a consortia of over 300 organizations and individuals. Substantial resources for all levels of education; information is quality controlled.
http://reusability.org/ http://educommons.org/ http://ia.usu.edu/app_user/ http://reusability.org/read/ http://www.opencontent.org/	David Wiley's sites, who is a leading researcher in the area of Learning Objects
IDEAS (Interactive Dialog with Educators Across the State) http://ideas.wisconsin.edu/index.cfm	A Resource for the educators of Wisconsin, it contains free educational material for PK-16. Similar to, but smaller than MERLOT.
iLumina http://turing.csc.uncwil.edu/ilumina/homePage.xml	iLumina is funded by the National Science Foundation and is a partner in the SOF (SMET Open Federation). iLumina is developing a cataloguing tool that can be used to create digital object libraries. The repository is free, and includes video material.

Learning Objects Network http://www.learningobjectsnetwork.com/index.html	A consulting company that has implemented LONs within corporations and is now focused on assisting organizations in moving towards a LO economy.
Lydia http://www.lydialearn.com/	Lydia is a US based repository/marketplace for the development and exchange of Learning Objects.
MERLOT www.merlot.org	Large site of multimedia learning objects which have peer reviewed average score, ability to add user comments
MIT OpenCourseWare http://web.mit.edu/newsoffice/nr/2001/ocw.html	Ambitious to provide all of MIT's course material on the web for free to challenge the "privatization of knowledge"; they received $11 M in grants from the Mellon and Hewlett foundations for the *start up* phase of the project.
National Education Association (NEA) http://www.nea.org/ http://www.nea.org/teaching/refs.html	Site with guide to web resources for teachers, students, parents

National Grid for Learning NGfL http://www.ngfl.gov.uk/index.jsp?sectionId=1&categoryId=null	Similar to SchoolNet The NGfL is a portal, or gateway web site specifically designed to meet the needs of the UK's education and lifelong learning sectors. It is the UK's national focal point for on-line learning, and provides an easy way for teachers and learners to find and use educationally valuable materials. Very similar to EdNA
NETg http://www.netg.co.uk/index.asp	Commercial Education provider, pioneer in LO, includes a specific definition of LO - objective, activity, assessment
North Central Regional Educational Laboratory (NCREL) http://www.ncrel.org http://www.ncrtec.org/	Non-profit organization that provides research-based expertise, resources and assistance for teachers, administrators and policymakers, includes links to similar organizations for different geographical regions in the US
Ontario Knowledge Network for Learning (OKNL) http://oknl.edu.gov.on.ca/eng/default.asp	Organization funded by the Ministry of Education. They produced a white paper on Learning Object Repository, but are not currently developing one. They are members of MERLOT.

SMETE (Science, Math, Engineering, Technology, Education) http://www.smete.org/	A large umbrella covering many organizations created to promote learning and teaching at all levels.
Teacher Resource Exchange http://tre.ngfl.gov.uk/server.php	Associated with the National Grid for Learning. This is a place where teaching and learning professionals can develop and share ideas for activities and resources. Contributions are many and varied, ranging from simple ideas and questions to complete lesson plans and schemes of work.
The Copernicus Education Gateway http://www.edgate.com/index.html	K-12 sector online resource for teachers, students and community. Includes a curriculum matrix and E-Class a distance learning tool using WebCT Free?

The Learning Online Network http://www.lon-capa.org/index.html	Research group at Michigan State University developing a learning object management and assessment system. The National Science Foundation funds them. Very interesting addition of educators and pedagogical design in the LON architecture.
The Pennsylvania Education Net Digital Object Repository (PEN-DOR) http://www.geminfo.org/Consortium/Members/pendor.html	An online educational resource containing a variety of types of digital objects – image, video, audio etc. as well as lesson plans. Educators can contribute their own objects as well as using the repository for their work.
The State Hermitage Museum, St. Petersburg Russia http://www.hermitagemuseum.org/html_En/index.html	A large and rich digital collection of works of art spanning several centuries.
UNIVERSAL http://www.ist-universal.org	A European brokerage service linking educators and content providers for the distribution of educational content. The project currently has 17 European universities as members.
Virtual Museum Canada http://www.virtualmuseum.ca/English/index_flash.html	Co-operative repository enabled by the museums of Canada, the Department of Canadian Heritage and the Canadian Heritage Information Network (CHIN)

Virtual Teacher Centre http://vtc.ngfl.gov.uk/	The VTC is a service for schools professionals providing news, support for professional development and the facility to search quality-badged resources across the National Grid for Learning