

Developing a university course for on-line delivery based on learning objects:

From ideals to compromises

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Abstract

Two course developers, a university professor and his research assistant, investigated and described from their personal points of view the complex and immediate challenges they faced as they designed an online university course based on learning objects. They examined whether the process of transferring interoperable learning objects from on-line repositories facilitated course production, both pedagogically and economically. As part of Athabasca University's "Learning Objects in a Box" initiative, they examined and contrasted design metaphors along with pedagogical and communication models that helped them find guidance as they set out on an uncharted course. Among the issues these researchers addressed, they highlighted how gathering and integrating learning objects in a course design is an activity that is intrinsically linked to assessing learning objects' relevance to students' online learning experience. These two researchers discussed the nature of compromises they had to make when they acquired a ready-made Internet curriculum assembled in a ready-made on-line learning environment. In the end, by relying on a publisher to produce this curriculum, they espoused a traditional approach to course development rather than attempt to assemble freely available learning objects. These researchers also reviewed the nature of the tasks they carried out and discussed working in an uncertain climate of institutional change, beginning as "gatherers, assessors, repair persons, and assemblers" of learning objects. Their tasks eventually changed to "guiding and advising" learners about ways to use learning objects in a novel on-line learning environment.

Introduction

Research Question

Does the process of transferring interoperable learning objects from on-line repositories facilitate course production, both pedagogically and economically?

Research Objectives

The present study set out to investigate and describe from project participants' viewpoints the process involved in designing a course at Athabasca University around learning objects freely obtained over the Internet. A university professor and his research assistant investigated and described the complex and immediate challenges they faced. As part of Athabasca University's "Learning Objects in a Box" initiative, this team gathered freely available learning objects from the Internet, journal databases, and learning objects repositories.

In order to redevelop an established university course during a time period representative of what most instructors require to complete such a task, the two-person research team decided to spend no more than a year searching for learning objects, assessing these, and assembling them into a university course. Moreover, to produce this course using simple and available instructional and production means typical of what most instructors rely on, these two individuals set out to redevelop a course for online delivery without the help of course production specialists and any significant funding.

Context of the Study

In conjunction with Industry Canada, a Federal government department, Athabasca University sponsored a research project in 2003 under the "SchoolNet" initiative. Research directors at Canada's Online and Distance Education University challenged three teams of professors to embark on a one-year project. Team participants

were to assess the effectiveness of employing learning objects from a variety of sources to produce cohesive and pedagogically sound learning environments (SchoolNet Funding, 2002). The two course developers from Athabasca University's School of Business attempted to redevelop an existing paper-based course for online delivery. "Writing for Organizations" is a self-paced second-year level business-writing course.

Investigating an Assumption

The concept of using and reusing digital, self-contained "chunks" of learning in different contexts and gathering these in a coherent course structure is intriguing. This process contradicts conventional instructional design practices that are generally guided by learning objectives, following a pre-established conceptual framework. According to Hodgins, (2000) learning objects require a completely new instructional approach to course design. This researcher predicted that the object-assembly method is destined to forever change the shape and form of learning by ushering in an unprecedented efficiency of learning content design, development, and delivery (Hodgins, 2000). What educators refer to as educational objects are software components joined together as a part of a larger system or architecture (Friesen, 2001). In research literature (Gibbons, Nelson, & Richards, 2000), a learning object is variously termed instructional object, educational object, knowledge object, intelligent object, or data object.

The learning object-oriented course development approach is characterized by the belief that all instructors and course developers create independent segments of educational content that may provide a variety of educational experiences for multiple pedagogical purposes (Quinn & Hobbs, 2002). An object-oriented approach to course design also assumes that an instructor can effectively employ learning objects from a

variety of sources to produce a sound curriculum (Polsani, 2003). Thus, the production ideal underlying the learning objects initiative is that a learning object designed by a course production assistant or instructor can easily be made available to others over the Internet. In turn, it can be used for different educational purposes once certain aspects of these objects and even the entire object are transferred to a new course (Wiley, 2002).

Course design based on learning objects is rapidly emerging as a major topic of debate among instructional designers in higher education. Government institutions, universities, and researchers are committing time, money, and effort to building on-line learning repositories. Yet, little practical advice exists to support the claim that using learning objects improves the conditions facing instructors or course developers. In fact, Acker, Pearl, & Rissing (2003) caution that opinions about the relevance of the learning objects approach differ sharply between enthusiasts and sceptics. These researchers indicate that the success of the learning objects approach may rely as much on the abilities and the motivation of key institutional players, policies, and protocols, as on the objects assembly process.

Method

The present study followed a developmental research design (Van den Akker, 1999), assessing the process as well as the outcome of a pedagogical intervention. The two-person research team at the School of Business reflected critically on problems associated with program design, implementation, and evaluation in a natural setting. It examined ways that learning objects and the building block approach to course design is experienced by individuals and can be practically put to use. In the present research project, the lead researcher and research assistant gathered information in the form of

personal journals. Together, they discussed collecting and assessing learning objects and contrasted all instructional decisions they took relative to using such objects as their course's central building blocks. As collaborators, moreover, they documented and assessed the types of learning experiences these objects favoured or hindered. They hoped that the richness of the experience they recorded and the comments they wrote under pressure would enhance the validity of their findings.

Results of their investigation should be applicable to other course developments at the college and university level. Their findings may also be important to universities and to different governmental bodies supporting the development of learning object repositories. These results should also help broaden discussions in this field of research held at the practical and conceptual levels.

Results and Discussion

An Events-driven Retrospective

The changing nature of our search for learning objects

As we began to explore the various possibilities for developing an online course using learning objects, we were initially unsure as to the best approach to follow. Our main focus during this phase of the project was to search for available learning objects relevant to our course. This process turned out to inspire us with enthusiastic, pioneer-like zeal. However, events also frustrated and confounded us. Such contradictory feelings characterized our course production and the development process we followed from one stage to another.

The "Learning Objects in a Box" initiative challenged us to embark on an unknown journey. The exact direction our research would take was unclear from the start.

We knew that there existed great potential in following a learning objects approach but we also realized that the time frame we had agreed to in order to produce our course was very short and the challenge enormous. Trusting as we did that we would eventually find a clear logic through this process, we were nevertheless aware that our search for objects lacked focus.

Stage one - The influence of learning objects repositories

Early in this research stage, we felt it important to identify relevant learning objects and to describe their potential use and usefulness. We emulated the system of classification we observed online at Canada's objects' repositories. In turn, we devised our own classification of objects based on examples we viewed at CAREO, SPLASH, and EDUSOURCE Internet sites and on the international MERLOT website. What inspired our desire to classify the learning objects we gathered was the assumption that we would find more learning objects than we actually required. We would then sort through our collection to find those most appropriate to our course.

The initial search for learning objects in on-line repositories lasted one month. The learning objects we gathered provided general information about writing that could be used in developing a course focusing on general issues. By consulting Athabasca University's electronic journal holdings in its virtual library, moreover, we also succeeded in finding interesting journal articles. However, readings amounted to supplementary learning material that did not match our definition of learning objects central to our course. This type of information could not easily be integrated into lessons relevant to a second-year business-writing course.

Working to collect and categorize learning objects proved to be a very large and time-consuming task. We soon determined that any search incorporating metadata, that is to say an assessment and classification of educational objects, would take too much time. We moved more rapidly to meet our deadline and set a sixth-month time limit to complete a more refined search.

Stage two – A refined search guided by a course “blueprint”

Before we could effectively search for relevant learning objects, we realized that one of our major challenges would simply be finding content that corresponded to our definition of learning objects and the course’s pedagogical objectives. To guide our search, we designed a generic structure of the course we imagined consisting of a series of electronic folders, similar to collection envelopes. Quite unexpectedly, we managed to conceive a practical research instrument for structuring our curriculum by embedding folders within folders and linking electronic files one to another. Early in the search for objects, we still imagined that we would eventually fill every electronic folder with course-relevant information.

Initially, we hoped to take advantage of the Internet’s ability to provide rich learning resources in a single website. We planned a course that would require students to progress from writing simple informative texts such as memos, to more demanding descriptive, argumentative or persuasive letters, summaries, and reports. We imagined that lessons would consist of an assembly of lesson chunks similar in their types of educational content. Lessons would also require that a student practice planning, assessing, and editing texts. We imagined finding a variety of electronic formats including text, images, slides, sound, and video that would eventually enable students to

select the information they found relevant to their lesson from an assortment of optional learning activities.

In the second stage of our search, we located learning resources consisting of text-based general information bound to foreign course material located on numerous websites. Information regarding business writing was written in a variety of styles, for a variety of readers and learning needs. As in stage one, the information we collected did not transfer easily to a skills-based business-writing course. We saw that we needed to commit much time and effort to adapt such learning objects to our students' needs.

Stage three – Our search for “copyrighted” learning objects

We faced the sobering reality that freely available, high-quality learning objects were not sufficiently abundant on the Internet to create a complete course, let alone a series of lessons. Freely available learning objects were in fact not readily available for our course topic, nor for the learning activities we planned to provide our students in this course.

As the deadline for completing our search for learning objects drew nearer, another issue stood to block our progress. Gaining copyright clearance for available learning objects controlled by third parties began to weigh heavily on the course-design process. While we contemplated modifying some learning material to construct part of our course, this task generally required obtaining permission from web site owners.

As we entered into the fifth month of course development, we determined that we had to reconsider our course development objectives and our process of exploration. We tried alternating approaches, searching for internal resources at Athabasca University and

also examining the possibility of creating our own set of learning objects, a time-consuming task. In desperation, we sought help from publishers of electronic course material, a source of institutional support that instructors have generally relied on in the pre-Internet era.

Stage four – Our search for alternative sources of learning objects

One of the major challenges we faced up until this stage was to avoid structuring a course following a patchwork process. We feared that lessons we created from freely available content would invariably appear loosely connected and incoherent to business students. Individuals who register at Athabasca University's School of Business represent a cross-section of business employees and administrators from many Canadian and international organizations. Business students appear to be quite familiar with the Internet and seemingly know how to distinguish between a well designed website enabling a high-quality online course experience and a poorly designed online course. Given the likelihood that the course we could create based on learning objects would appear amateurish in content and appearance, we had no choice it seemed but to reconsider the nature of our course design based on an assembly of learning objects.

Stage five – Our course development

We eventually acquired a "ready-made" commercial website featuring learning objects and electronic material embedded in a comprehensive course website. We were impressed with an "Interactive text" version of *Business Communication: Process and Product* (2003, 4th Ed.) by M. E. Guffey published by Thompson/South-Western Publishers. For a relatively low fee, the interactive text enables students to view and review key course-related information on an information-rich website, information that is

also summarized in a relatively compact companion textbook. The website is the central aspect in the course curriculum. It brings together interesting and engaging multimedia features enabling students to find their way through learning content, along with interactive self-testing features and a rich collection of remedial work. The online learning environment provided by this publisher acts as a resourceful collection of purposely designed learning objects. Acquiring a ready-made curriculum for online delivery proved to be an inexpensive and time-efficient way to provide our students with a coherent course rather than “reinventing the wheel.” More importantly, our decision afforded us precious time to design novel instructional and diagnostic features on our companion university course site.

An Issue-driven Retrospective

Designing a course in an uncertain institutional climate

From the onset, the two-person development team at the School of Business faced uncertain institutional practices and policies regarding file sharing over the Internet. Rules and practices regarding the ownership and sharing of intellectual content on websites appear vague and contradictory. Securing copyrights, and linking a course website to other sites seems problematic, more than we had initially thought. The free transfer of files for example, has recently been challenged in the courts of several countries (Sharp Decline in Music File Swapping, 2003). Although the Internet, with its vast and varied content, may seem like a collection of boundless resources from which to locate course-relevant material, the copyright issue complicates the objects assembly approach. Unbundling object content from a specific website and transferring electronic course segments from one course context to another is no simple matter either. All

intellectual creations, whether print or electronic, are copyrighted by default and thus require permission from the rights holder(s) before they can be reused on another website. Website institutions act at times very harshly and emphatically to secure or protect rights to Internet domains, content, and links (Cybergrippers lose web protest sites, 2000). Moreover, linking learning objects to or from third-party web sites presents potentially significant drawbacks for course designers. Even though it is legal to link one's site to websites owned by third parties, this practice allows no control over changes in web content. Linked resources may disappear altogether from one day to the next, leaving a void in an online course. In short, the Internet as we understand it, is not generally composed of free content nor does it easily provide it.

By selecting a ready-made solution from a publisher, a traditional source of course material, we manifested a choice that other instructors are likely to make in increasing numbers. Although publishers of electronic learning material presently tend to practice bundling electronic support material with textbooks, a practice that limits their ability to sell electronic learning objects as transferable educational material, they are nevertheless investing heavily in on-line course material development. Moreover, they are likely learning Internet-related business lessons as other sectors of mass publication are quickly adopting the concept of commercial objects' repositories. The success of recent file-sharing ventures on the Internet such as "iTunes" and the newly commercial version of "Napster" signal the coming of age of distributed commercial learning objects. Website companies are successfully selling consumers "a song for a fee" online in comparison to the traditional practice of selling "a song in a record." We may soon see a day when students register for online courses featuring popular electronic lesson material

such as educational scenarios, games, and simulations. As with other emerging systems of communication, radio, the press, and television for example (Innis, 1964; McLuhan, 1964), new institutional and commercial models may be slowly replacing the free-for-all communication practices and the pioneering attitudes manifested by communities of users and consumers on the Internet.

Designing a course in an uncertain organizational climate

Like many established distance education providers, Athabasca University is working to convert its organization from a paper-based production and delivery model to an electronic system. In order to provide efficient services online, it is transforming its infrastructure, culture, and mindset to embrace on-line course development and distribution to a networked audience worldwide. Some researchers, instructors, and production staff in this institution of distance education are voicing their interest and support for a learning objects approach to course design. Yet, our experience demonstrated that this development approach can presently only succeed on a very limited scale. We realized that production technicians were in fact not willing or unable to adopt a full-scale course production requiring great numbers of learning objects to be transferred, repaired, or created in a short period of time. More importantly, production staff and instructional designers perceived that the risk of creating a poorly designed or unsuccessful course based on available learning objects was high.

Because our course was being developed for the Athabasca University School of Business, it had to meet the rigorous production and pedagogical standards of Canada's Open University. Working independently from course development specialists, the lead research and his assistant, both instructional design generalists, wondered whether their

course design would ever meet the institutions' course specialists' approval. The present institutional mindset and infrastructure in our institution of higher learning did not enable us to develop a complex on-line learning environment equivalent to that of a publisher's interactive text. Interestingly, the conclusion we reached regarding our university's inability to adopt large-scale learning objects' approach is similar to opinions written by Acker, Pearl, and Rissings' (2003) concerning the state of readiness of other institutions of higher learning.

A Concept-driven Retrospective

In retrospect, it is interesting to note that our two-person research and development team at The School of Business adopted the concept of learning objects and referred to this object-assembly analogy repeatedly over the course of a year. The learning objects' analogy influenced our team's perception of educational material and enabled us to conceptualize an entire course curriculum based on units of lesson-relevant information. We spoke about lessons, assignments, and learning activities in terms of educational segments clustered, structured, and linked together. Although we began our course development process by alluding to a block-building metaphor, we eventually referred to other familiar imagery as well, notably when the initial block-building analogy failed to guide or inspire our work anymore. This and various other metaphors provided us guidance as we struggled to find clarity in a sometimes erratic and often unpredictable process.

Along with the learning object analogy, another metaphor we came to refer to is the learning objects' "box." The box became a powerful symbol and point of reference to counter-balance the learning object concept. We needed to imagine our course as a

coherent totality from a conceptual perspective, even if this concept was often hard to envision. At times, the box metaphor seemed analogous to a conceptual blueprint guiding our search for objects. It also helped us imagine our course from a functional point of view as we discussed the importance of creating a coherent and predictable learning environment much like a dynamic system of information. At other times, the box metaphor also helped us imagine what the objects should look and feel like as elements of a large website that a student could freely explore, search, navigate, and manage.

Like all pioneers that preceded us in the evolving history of communication, we relied on analogies linking old and new media practices to make sense and give purpose to our actions (Stansberry, 1997) as we proceeded to explore a new method of course development.

A Practice-driven Retrospective

Lesson one: Follow one of two objects-assembly approaches

Both the block-assembly and box metaphors helped us envision a course design and gave meaning to learning objects we searched for and assessed in the face of uncertainty. The former inspired us to be creative and audacious in our course design. The latter reassured us in view of uncertainty and incoherence. Both models provided us a set of values and arguments enabling us to select, assess, and assemble learning objects. Contravening design metaphors (see Figures 1 and 2) at times appeared to exist in tension, and at times appeared to complement each other in a learning objects in a box duality.

Envisaging a course design from an objects assembly perspective helped us clarify our course of action and justify the decisions we took. Our decision to change

design orientation in midstream owes essentially to our inability to find suitable learning objects for a second-year, self-paced, skills-based writing course. Had we found

Figure 1: Dual design perspectives

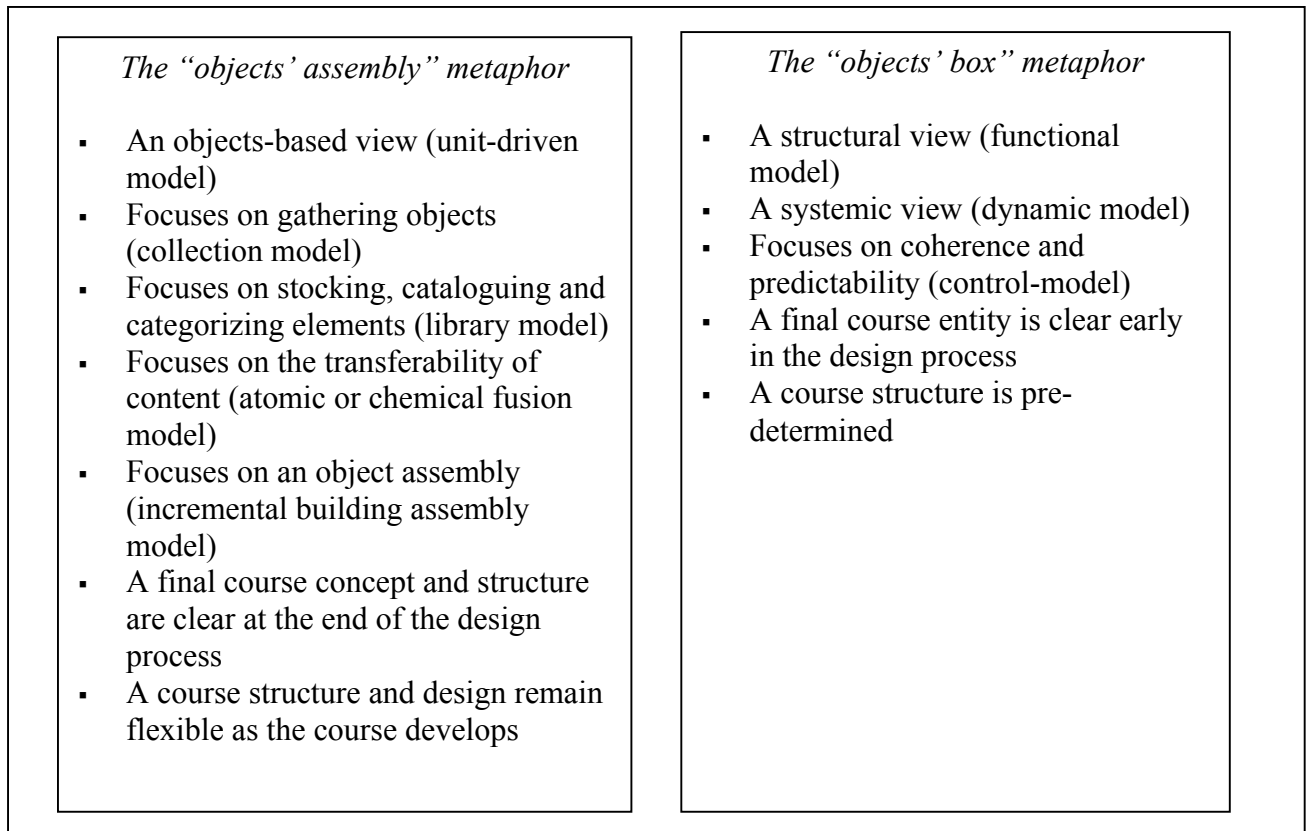
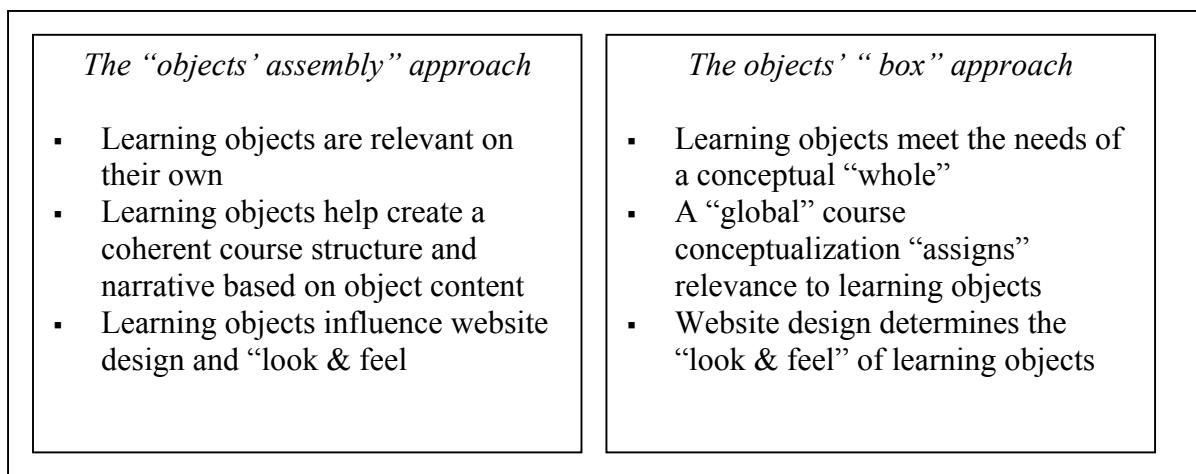


Figure 2: Learning objects viewed from contravening design perspectives



these objects, much of the present discussion about design perspectives and the relevance of design models and analogies would likely not have mattered as much.

Lesson two: Search for course specific, level specific, and learner specific learning objects

Ideas and issues-orientated learning objects are presently available from online journal databases. Such objects can help an instructor design lessons requiring limited resources, time, and cost to assemble a course similar to a traditional group seminar. Such a course design, we suggest, is suitable for a group of mature students whose learning experience focuses more on the exchange of ideas and on reflective thinking than on the course content appearance and course continuity. On the other hand, we also suggest, students who learn to write in a skills-based course like ours require that lessons be coherently structured in a comprehensive, coherent learning environment. Lesson segments should repeatedly and predictably highlight rules of writing, definitions of concepts, scenarios, tasks, or self-assessment.

Designing a course with skills-oriented learning objects, we suggest, demands that a university instructor structure multiple learning objects into lessons, and multiple lessons into course units. Developing a business-writing course based on multiple learning activities and information segments is similar to organizing a cinema production or publishing a large course text. Such a task cannot be completed without the help of a

team of production specialists funded by a sizeable budget. They must also be allowed extensive time to accomplish this task.

Distinguishing between issues-oriented or skills-oriented learning objects and between objects suitable for a self-paced or group-paced course was central in our search for and assessment of learning objects.

Figure 3: Course specific learning objects

<i>Ideas-oriented learning objects</i>	<i>Skills-oriented learning objects</i>
<ul style="list-style-type: none"> ▪ Good for group-paced course design ▪ Good for group discussions ▪ Good for ideas & issues-orientated learning ▪ Good for lessons requiring readings (akin to a traditional seminar design) ▪ Good for peer-to-peer interactions ▪ Good for 3rd or 4th year course levels ▪ Content may count more than course appearance & delivery ▪ Content focuses primarily on ideas 	<ul style="list-style-type: none"> ▪ Good for self-paced course design ▪ Good for skills-based learning ▪ Good for lessons requiring multiple learning activities and multiple-purpose information (akin to traditional book and kit designs) ▪ Good for student-to-content interactions ▪ Good for introductory 1st and 2nd course levels ▪ Course appearance & delivery may count as much as text-based information

Lesson three: Know what development tasks you can handle

Following an object-assembly approach to course development required that we clarify the tasks we undertook as gatherers, assessors, repairpersons, and assemblers of learning objects. Acquiring a ready-made curriculum for a cohesive online learning environment changed our task to that of advising, guiding, and assessing students.

Knowing what course development tasks and roles we were comfortable with and what

production aid we could obtain to produce a pedagogically sound on-line curriculum helped us decide which course-development approach to adopt.

Figure 4: Course development tasks and levels of difficulty

<p><i>The instructor's role in an object assembly perspective</i></p> <ul style="list-style-type: none"> ▪ Gatherer, assessor, repair person, and assembler of learning objects ▪ A non-traditional educational role best suited to pioneering free-minded designers 	<p><i>The instructor's role in a "ready made" assembly perspective</i></p> <ul style="list-style-type: none"> ▪ Student guide, adviser, and assessor in an objects-rich learning environment ▪ A role suited for instructors who are comfortable designing a course with content produced by a publisher
<p><i>Ideas-oriented course design tasks</i></p> <ul style="list-style-type: none"> ▪ Easiest for an instructor to design ▪ Can be handled by a design generalist ▪ Can be handled by a small production team 	<p><i>Skills-oriented course design tasks</i></p> <ul style="list-style-type: none"> ▪ Hardest for an instructor to design ▪ Should be handled by design specialists ▪ Should be handled by a large production team

Lesson four: Find enough lesson-relevant learning objects

In order to facilitate our course production economically, we discovered that the learning objects we sought must not only be easily accessible and content-relevant, but also easy to transfer from one course context to another. In time, it is probable that new Internet search engines will more easily help locate course-relevant learning objects. Correspondingly, learning objects repositories may increasingly gather context-free learning objects that are easier to transfer from one course to another. Once the exchange of educational software becomes technically and legally easier to undertake, the prospect

for an instructor to assemble a course simply and efficiently relying on freely available learning objects may improve.

At present, however, copyright, web-access, and production issues remain problematic. Compensating for a lack of topic-relevant learning objects can be costly and difficult if such objects have to be created “from scratch.” The low availability of learning objects impeded our course development and forced us to seek a compromise solution between design approaches.

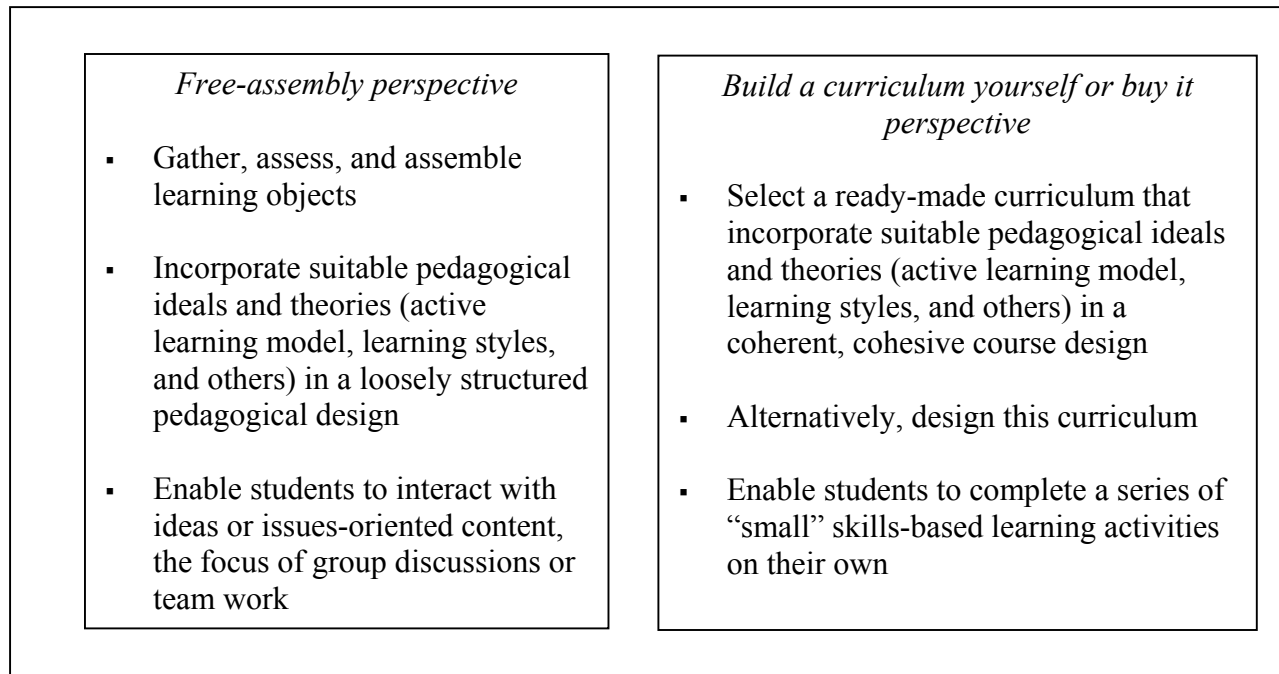
Figure 5: Issues influencing cost efficiency

<p><i>A free file-exchange and assembly approach to objects</i></p> <ul style="list-style-type: none"> ▪ Copyright, web-access, and production issues are problematic ▪ Locating topic-relevant learning objects can be difficult ▪ Adapting learning objects’ content to a course website is very demanding 	<p><i>A “ready-made” approach to learning objects</i></p> <ul style="list-style-type: none"> ▪ Copyright, web-access, and production are non-issues ▪ Developing topic-relevant learning objects is a non-issue ▪ Adapting course content on a course website to a publisher’s curriculum is less demanding
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Lesson five: Compromise over learning objects, not pedagogical objectives

Given the course production constraints we faced, our decision to acquire a publisher’s online curriculum represents what we estimated to be a sound pedagogical compromise. While the cost of the online curriculum charged to students registered in this course is low, as are production demands on the course instructor and designer, the on-line learning experience we offer students appears rich in possibilities. Compromising between course design options, we suggest, did not undermine the strength of our pedagogical objectives.

Figure 6: Issues influencing pedagogical efficiency



Conclusion

In order to evaluate the economics of efficiency in relation to the learning objects approach, the School of Business team reflected on ways that the learning objects and the building block approach to course design is experienced by individuals and can be put to use in a practical way. The challenges and difficulties we faced in this development research project led us to conclude that the prevalent building blocks metaphor was not very helpful, given the low availability of topic-specific learning objects. Nevertheless, assuming that enough course-relevant learning objects can be found, the object-assembly model may some day become useful in designing specific types of courses. However, we suggest that the object-assembly approach to course design may not be pedagogically and economically efficient for all types of courses.

The present study questioned the relevance of the dominant instructional design metaphor to facilitate a course design based on learning objects for an entry-level, self-paced, and skills-based curriculum. We conclude that transferring certain qualities and features from learning objects to a new course context remains difficult, costly, time-consuming, and technically demanding for a university instructor to undertake. In our case, the strength of the building-block approach was generally undermined by compromises we needed to make, as more pressing concerns arose that required our immediate attention. More importantly, the block assembly metaphor and the production ideals it evoked forced us to assume responsibilities beyond the range of our capabilities.

Like Weller, Pegler, & Mason (2003), we felt the attraction to design course-relevant learning objects following a master plan, while working under controlled and predictable conditions. We realize that such an approach is costly and labour intensive. Yet, we suggest, conceptualizing the structure of a learning environment in its totality, as opposed to a unit-driven metaphor, is important to guide an instructor's search for learning objects, notably if one of the two course-development models fails to provide a reassuring conceptual bearing.

By adopting an interactive text as the basis of its course design, our research team may appear to have compromised the pioneering spirit inherent in the learning object's gathering and block assembly approach. However, the pioneering approach was itself compromised, we believe, by a lack of small, topic-relevant, and copyright-cleared objects in online repositories. Acquiring a ready-made learning environment for our students is a choice that arose from the pressure to make do with very limited resources in a limited time frame.

Our final course design may disappoint the government agency that sponsored our research and our university leaders who have invested in the development of online repositories. These persons likely hoped that our team would make good use of online educational resources and learning objects. Yet, we argue, we have not compromised the pioneering spirit associated with the learning objects approach because we are as enthusiastic as ever to help our students learn to use the rich resources we provided for them. We strive to use interactive technologies to enable, as Rogers (1986) describes it, a democratization of communication means to motivate students to learn in an online environment. This process of democratization, we argue, must be fair to course designers and instructors, so that course production responsibilities do not become more important than educational responsibilities.

An Assumption Tested

Hodgins (2000) predicted that learning objects would usher in an unprecedented efficiency of course development. This assertion may yet turn out to be true. However, results of the present investigation indicate that learning objects readily available at the present time are disparate, rather than course-specific, level specific, or learner-specific. Given the lack of skills-oriented learning objects freely available online, designing a course for a skills-based self-paced university course remains problematic, time-consuming, expensive, and likely unproductive. Moreover, complex design requirements for a skills-based course and the slow adaptation of institutions of higher education to a learning-assembly production model make it unlikely that an instructor working alone can undertake such a task. On the other hand, we suggest, designing a discussion-based

and ideas-oriented group-paced course may more readily be accomplished using available learning objects and low-cost production means.

Assumptions Yet to be Tested: The Student as a User of Learning Objects

The experience we lived and its outcome were influenced by our team's perception of how a self-paced, second-year business-writing university course could, or should be structured. From the outset, we imagined using learning objects that would prove of strong pedagogical value so as not to simply serve as yet another ornamental offering to the demands of technology in education (Williams, 2003). Our course design and development approach were predicated on a view of the 21st century student being able and willing to learn independently online. The vision of the course we embraced is popularly referred to as the "virtual classroom" (Hiltz, S. R., 1994). This concept describes an institution of higher education as a dynamic entity not bound to a physical location or to a pre-determined system of information (Greenhill, 1998). A classroom can consist of virtual spaces such as electronic chat rooms or electronic information warehouses, the latter being the model most closely associated with our project. The virtual classroom is a concept that historically arose from computerized communication systems enabling group-work and group participation. Our particular vision of the virtual classroom, on the other hand, is based on recent advances in interactive multimedia course delivery over the Internet. Incorporating multimedia in online curricula is challenging because the Internet is evolving from a supplemental source of course content into a powerful course delivery and presentation device (Stansberry, 1997). Nevertheless, emphasizing the interaction that takes place between a student and content

in a virtual classroom requires careful consideration (Gnisci, Papa, & Spedaletti, 1999; Parlangi, Marchigiani, & Bagnara, 1999, Bolling & Robinson,1999).

The challenge that lies ahead for our research team is to test the quality of students' online experience and their ability to use a variety of learning objects effectively. Whether our students can learn to write following the learning path we designated for them through a rich collection of learning objects, or whether they manifest a more singular learning style is still not clear. Nor do we know whether our students can learn to write effectively by interacting with so many learning objects online, rather than with an instructor and peers. We plan to examine these and other related questions in the future, as part of a pilot research project of our course.

References

- Acker, S., Pearl, D. K., & Rissing, S. (2003). Is the academy ready for learning objects?
In C. M. Gynn, and S. Acker (Eds.). *Learning objects: Contexts and connections*
(pp. 83-89). Ohio: Ohio State University.
- Apple Learning Interchange (2003). Retrieved February 2, 2004 from
<http://www.educationworld.com/awards/past/r0699-01.shtml>
- Anderson, T. (2003). A Model of E-Learning. Retrieved February 2, 2004 from
http://www.athabascau.ca/html/staff/academic/terrya/A_Model_of_E-Learning_short_for_SFU_files/frame.htm
- Bolling N.C., & Robinson, D. H.(1999). Individual study, interactive multimedia, or cooperative learning: Which activity best supplements lecture-based distance education. *Journal of Educational Psychology*, 91, 1, 169-174.
- Brody, H. (1966). Great Expectations – why technology predications go awry. In Albert H. Teich (ed.). *Technology and the future*, 6, 39-44. New York: St. Martin's
- Chickering, A.W., & Gamson, Z. (1987). Seven principles for good practice in undergraduate education. *AAHE Bulletin*, 39, 7, 3-7.
- Chickering, A. W., & Ehrmann, S. C. (1996). Implementing the seven principles: Technology as lever. *AAHE Bulletin*, October 2003.
- Christiansen, J. A., & Anderson T.(2003). Feasibility of Course Development Based on Learning Objects: Analysis of Three Case Studies. Retrieved February 29, 2004 from <http://www.athabascau.ca/schoolnetProject04/reports.php>

Cybergrippers lose Web protest sites (August, 2000). *The Globe and Mail*.

Desmond, R. (2002). *A History of Educational Technology*. Retrieved February 2, 2004 from http://cyberlearn.fau.edu/drodney/intro_to_edtech.htm.

Dixon, G. (July, 2001). More Canadians venture on-line at home. *The Globe and Mail*.

Downes, S. (2001, July). Learning Objects: Resources For Distance Education Worldwide. *International Review of Research in Open and Distance Learning*.

Drucker, P. F.(1966). The First Technological Revolution and Its Lessons. *Technology and Culture*.

Felder R. M., & Soloman, B. A. (date unspecified). Learning Styles and Strategies. Retrieved February 2, 2004 from <http://telr-research.osu.edu/Template/LearningStyles/LearningStyles.htm>

Friesen, R. (2001). What are learning objects? *Interactive Learning Environments*, 9, 3. Retrieved February 2, 2004 from <http://www.extenza-eps.com/extenza/contentviewing/viewJournalIssueTOC.do?issueId=405>

Gershuny, J. (1994). Revolutionary Technologies and Technological Revolutions. In Roger Silverstone and Eric Hirsh (Eds.) *Consuming Technologies: Media and Information in Domestic Spaces*. London: Routledge.

Gibbons, A. S., Nelson, J., & Richards, R. (2000). The nature and origin of instructional objects. In D.A. Wiley (Ed.) *The Instructional Use of Learning Objects*. Bloomington: Association for Educational Communications and Technology.

- Gibbons, A. S., Nelson, J., & Richards, R. (2000). The nature and origin of instructional objects. In D.A. Wiley (Ed.), *The Instructional Use of Learning Objects*. Bloomington, IN: Association for Educational Communications and Technology. reclt.usu.edu/research.html
- Gnisci, A., Papa, R., & Spedaletti S. (1999). Usability aspects, socio-relational context and learning performance in the virtual classroom: a laboratory experiment. *Behaviour and Information Technology*, 18, 6, 431-443.
- Greenhill, A. G. (1998). Commodifying virtual education. Virtual classrooms: Universities and virtual organisational existence. Paper presented to Commodification Conference, Woolongon.
- Hiltz, S. R. (1986). The Virtual Classroom. Using computer-mediated communication for university teaching. *Journal of Communication*, 36, 2, 95-104.
- Hiltz, S. R. (1994). *The Virtual Classroom: Learning Without Limits via Computer Networks*. Norwood, NJ: Ablex.
- Hiltz, S. R. (1997). Impacts of college-level courses via asynchronous learning networks: Some preliminary results. *Journal of Asynchronous Learning Networks*.
- Hodgins, H. W. *The Future of Learning Objects*. Retrieved February 2, 2004 from <http://www.reusability.org/blogs/david/archives/000361.html>
- Innis, H. (1964). *The Bias of Communication*. Toronto, ON: University of Toronto.
- Kolb, D. A. (1976). *The Learning Style Inventory: Technical Manual*, Boston, MA: McBer.

Leiner, B. M., Cerf, V.G., Clark, D. D., Kahn, R. E., Kleinrock, L. Daniel C., Lynch, J. P., Roberts, L. G., & Wolff, S. *A Brief History of the Internet*. Retrieved February 2, 2004 from <http://www.isoc.org/internet/history/brief.html>

McLuhan, M. (1964) *Understanding Media: The Extensions of Man*. New York: NY: McGraw-Hill.

Napster and Gnutella. Retrieved February 2, 2004 from http://www.austinchronicle.com/issues/dispatch/2000-05-05/pols_feature2.html

Quinn, C., & Hobbs, S. (2002). Learning Objects and Instruction Components. *Educational Technology & Society* 3, 2.

Parlangeli, O., Marchigiani, E., & Bagnara, S. (1999). Multimedia systems in distance education: Effects of usability on learning. *Interacting with Computers*, 12,1, 37-49. Retrieved February 2, 2004 from <http://www.informatik.uni-trier.de/~ley/db/journals/iwc/iwc12.html>

Peterson, M., Morrison, D., Cram, K., & Misanchuck, E. (1996). CMC: An Agent for Active Learning. 12th Annual Conference on Distance Teaching & Learning: Designing for Active Learning. Madison, WI. Retrieved February 2, 2004 from <http://www.extension.usask.ca/ExtensionDivision/papers/Misanchuk/WISC96?wwwCMCA>.

Polsani, P. R. (2003). Use and Abuse of Reusable Learning Objects. *Journal of Digital Information*, 3, 4. 164.

Richey R.C. (1996). Research On Instructional Development. Retrieved February 2, 2004 from <http://www.geocities.com/ResearchTriangle/8788/DR.html>

Rogers, E. M. (1986). *Communication technology: The new media in society*. New York: Free Press. Sharp Decline in Music File Swapping: Data Memo from Pew Internet Project and comScore Media Metrix. Retrieved February 2, 2004 from <http://www.comscore.com/press/release.asp?id=395>

SchoolNet – Athabasca University Project – Learning Objects in a Box (2002). Athabasca, AB: Athabasca University.

Silverstone, R. & Hirsch, E. (1994). *Consuming Technologies, Media and Information in Domestic Spaces*, 227-233. London and New York, Routledge.

Stansberry, D. (1997). *Labyrinths: The Art of Interactive Writing and Design*. San Francisco: Wadsworth.

Van Den Akker, J. (1999) Principles and Methods of Development Research. In J. Van den Akker, R. M. Branch, K. Gustafson, N. Nieveen, & T. Plomp (Eds.). *Principles and Methods of Development Research*. Dordrecht: Kluwer Academic Publishers. Retrieved February 2, 2004 from <http://kapis.www.wkap.nl/prod/b/0-7923-6139-3?a=1>

Wayne, H. *Learning Object Metadata*. Retrieved February 2, 2004 from <http://www.academiccolab.org/resources/UFE%20Future%20of%20Learning%20Objects.doc>

Weller, M. Pegler C., & Mason, R. (2003). *What working with learning objects means for the educator*. The Open University: Milton Keynes Institute of Educational Technology.

Wiley, D. A. (1999). The post-LEGO Learning object. Retrieved February 2, 2004 from <http://wiley.byu.edu/post-lego/post/lego/pdf>

Wiley, D. A. (2002). Connecting Learning Objects to Instructional Design Theory: A Definition, a Metaphor, and a Taxonomy. *The Instructional Use of Learning Objects* . Bloomington, IN: Agency for Instructional Technology.

Williams, D. (2001). The Virtual Classroom in Relation to Educational Models. *International Journal of Educational Telecommunications* 7(1), 23-32. [Online]. Retrieved February 2, 2004 from: <http://dl.aace.org/6406>

Williams, V. (2000). Designing Simulations for Learning. Retrieved February 2, 2004 from <http://www.usq.edu.au/electpub/e-jist/index.htm>

Women Outpace Men Online in Number and Growth Rate. Retrieved February 2, 2004 from <http://www.comscore.com/press/release.asp?id=199>