



HOW TO BUILD OPEN EDUCATIONAL RESOURCES¹

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He was the founder of the world's first e-learning website for TeleEducation NB and one of the world's first metadata learning object repositories, the TeleCampus. He has been the leader in the development of the CanCore metadata implementation profile for implementing the IEEE LOM international standard for learning objects. In the past, he has worked in Canada as a teacher and teacher representative, and abroad in the Seychelles, the Middle East and Europe in various capacities as a teacher, union president, ESL technological training co-ordinator, instructional designer, language and computer laboratory co-ordinator, and educational advisor. He has served on the Board of the TeleLearning Research Network of Centres of Excellence, the Commonwealth of Learning's Knowledge Management Group and the Education Steering Committee for CANARIE, Canada's broadband research network.

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Summary

Open Educational Resources (OER) development is becoming more sophisticated as instructors and course specialists become more familiar with the environment. Most approaches to OER creation have been developed from those that were appropriate in the face-to-face context. However, the online environment opens up new possibilities for learning and particular limitations. This paper presents several approaches, attempting to build on the knowledge base of distance education and traditional learning, adapting to the online environment and the strengths and weaknesses of software applications. Course developers can bear these in mind when initiating and supporting OER development projects.

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Introduction

I can suggest a “baker’s dozen” of methods and approaches in the course development process, including borrowing courseware, using what exists and avoiding the “not invented here” syndrome. Knowing your subject area is always important in selecting quality content. Working to deadlines is also a means of ensuring that “feature creep” does not set in doubling costs and extending scope to unrealistic dimensions. All too many projects make a plan and then stick to it. This is often a mistake as flexibility in the process is needed to allow for needed changes as they arise. In creating OER, the developers should remember that it may be used in a wide variety of contexts, so keeping an eye on generalizability is important. Can it be reused or repurposed easily? And, of course the tasks embedded in the content should be meaningful to the learners as much as possible in order to promote interest in real learning and the development of real skills. Learners learn in many different ways, so as much as possible we should aim to provide different pathways to learning. Diagrams and graphs should help clarify the concepts being taught rather than obfuscate. Finally and most importantly attention to international standards for interoperability will ensure that the OER created will be used, reused and repurposed by many others.

1. Beg, borrow, (steal!) courseware. Don’t reinvent the wheel.

Using previously created materials is almost always more efficient than creating your own. There is a growing body of freely accessible OERs, accessible online. Take advantage of them. It is almost always easier to adapt existing materials to your needs than to develop them yourselves. If course materials you like are not available as OERs, you can always take the idea and create your own content using the basic idea in neat courseware. You can make an OER. Remember, ideas are not copyrightable, only the specific expression of an idea is protected by copyright.

2. Take what exists and build the course around it.

This is one approach to course development that is tried and true. Early universities developed around monasteries or religious study groups, where teachers based their lessons on the Bible or other holy texts, that is, the content determined the learning. Now, most instructional design manuals insist that you not start with the content, but rather start with a needs analysis and build your course materials based on the specific learner needs that are identified in the analysis. Without undermining this approach, one can agree that the more traditional approach also has value and can be effective in promoting learning. Instructors can construct relevant courses, or at least relevant sections of courses based on materials that are already available. For example, a

Geography instructor could design specific relevant tasks around a computer game, a computer simulation on running a city. Computer programming instructors could refer students to specific free courses on Java programming that are available online. How about a history teaching module based on the ancient history game “O. A.D.”? Christiansen & Anderson (2004) reported on three courses at Athabasca University that employed this approach, building their courses around available materials. Courses in English and Nursing found this approach useful, finding OERs easy to come by. Mixing and matching modules from different sources can be highly effective using a course assembly approach rather than a creating one or spending too much time on adapting materials to make it “just right”. “Good enough” is often preferable if it saves time and resources.

3. Avoid the “not invented here” syndrome.

Curriculum specialists, instructional designers, and individual teachers can find fault with any course materials. Turf protection is alive and kicking in most learning institutions. Nash (n. d.) refers to it also as the “let’s re-invent the wheel” syndrome claiming that quite often “there are no other factors that dictate an internally developed solution would be

superior". Material developed or chosen by someone else is commonly judged to be inferior. Sometimes settling for someone else's course material that is "good enough" is better than going to the expense and effort of creating your own "perfect" materials. Quebec "protestant" physics is not that different from Ontario "catholic" physics or Arizona public school physics. Quite often the only people who care are the curriculum specialists themselves, who can spend years arguing over the relative merits of different approaches, techniques, and content.

It may very well be appropriate to adapt an entire course produced by other institutions, but more likely, specific modules on relevant course topics will be more suitable. Externally produced learning objects can form the component parts of specific modules or larger courses. Often they can serve as alternate pathways to accommodate differing learning styles among the students or facilitate students using different software/hardware configurations or serve the special needs of learners with disabilities (Leeder, Davies, & Hall, n. d.).

4. Know the content – garbage in and garbage out.

When you choose or create content, make sure that a real content expert is fully involved. Do not depend on non-specialists for the content. At the same time, the content specialists should be paired with instructional designers, because good subject-specific content does not necessarily translate into good learning content. Adaptation is necessary. This marriage of the content expertise with instructional design know-how forms the primary strength of distance education course development. Add a good web designer to this team and you have the makings of a solid web course.

5. Establish deadlines. Work to deadlines, but don't be unrealistic.

Procrastination is a common human trait. Time limits, whether externally or internally imposed are essential for the completion of course development projects. Deadlines should be established in consultation with the course development/assembly team. The tasks assigned must be seen to be realistic by those who have to complete them. Have people agree on the task deadlines and then see that they adhere to them. Written expectations for all team members are crucial. Beck

(2000) in his approach to software projects recommends that short cycles with real deliverables are best. It is too easy to get bogged down in details and never finish unless real achievable short-term goals with realistic deadlines are in place.

6. Estimate your costs and then double them. Double them again.

The budget established must be adequate for the tasks to be achieved. If a course has a very limited budget, then course creation and adaptation tasks must be controlled more than if a substantial budget is available. With limited funds, it is always more realistic to take OERs as is and avoid any significant development work (This also can be prudent even when you have significant funding!). The scope of a course development project must be controlled in order to keep costs down. "Must have" features should be incorporated in the course before the "bells and whistle" are added. This helps to keep a project on track and within budget.

7. Be realistic in scheduling and scoping.

Remember that nine women cannot produce a baby in one month. Hiring three more people never triples productivity (Brooks, 1995, p. 159). Use the agile, extreme programming approach in building courses: Have short iterations of at most two weeks in which a module is completed. Reduce the scope of the project if necessary, but do not compromise by extending the time or reducing quality. Make clear priorities. And make them REAL priorities. If everything is a

priority, then nothing is. Clarify the relative importance of each task into three categories: Necessary, Desirable, Optional or use a scale.

Get a basic usable module up and running online. Remember that the first automobiles broke down every few hundred meters. The first airplanes were not considered air worthy. Getting a basic prototype up-and-running, no matter how faulty should be a top priority. Then test it. With this approach, if the module is not initially successful, you have not lost as much as you would have by waiting until a full multimedia product had been developed before launch.

Once you have the basic modules of a course available, use them as scaffolding to expand, building features into them, and then building around the newer features, like the layers of an onion. This lowers the costs of entry and lowers the risks. The course developers can learn from mistakes made in one layer before a new layer is built. Like in the automobile and airplane examples, the experience gained in building the first prototype is valuable in making subsequent builds better.

Assemble or build one course module at a time and then deliver them independently, before continuing on other modules. In any event, don't create the idea of a perfect course and then try to implement it - the "cathedral" approach. Ideas and features should be formulated as part of the experiences gained during delivery - the "bazaar" approach (Raymond, n. d.). As more courses are delivered, and experience is built up, the development team can afford to take more risks and increase the scope if it is warranted.

8. A course development project plan must be flexible. Be prepared for major shifts.

It is trite but true, to note that the world is rapidly changing. Course content that was valid yesterday can be outdated tomorrow. In many fields, new knowledge is being published on a monthly and even weekly basis. Any plan must take this into account. Courses must be constructed flexibly so as to allow for constant changes. Fortunately, the World Wide Web environment and the OER concept allowing for adaptations are ideally suited for altering content on a regular basis. New relevant course materials covering the same content can also be obtained after a particular learning unit has been completed. Any plan must be flexible enough to allow for significant ongoing changes. Course materials must be reusable and adaptable for repurposing. To facilitate this, organize lessons as modules and construct learning objects. Learning objects are reusable digital resource encapsulated in a lesson or assemblage of lessons grouped in units, modules, courses and even programmes (McGreal, 2004).

9. Build flexibly for reuse and repurposing - generalizability reduces costs.

Learning objects facilitate change in the type and amount of content, features and functionality of your course materials. Learning objects are self-contained and portable to different environments. Costs of overall development are reduced significantly when materials are generic, available for use in multiple content areas and formats. For example, an interactive ASCII conversion scale could be designed for use in various, introduction to information technology, mathematics, and computer programming courses if it is designed from the beginning to be adaptable and editable. This approach also makes ongoing maintenance and error correction much easier. Too many designers do not allow for multilingual capacity in their course structures. Many materials could be easily translated, if the course structure is open. For example, if text is not used inside graphics, translation into other languages is easier.

10. Elearning should involve the completion of meaningful tasks.

It is no secret that people learn by doing. ElBushra (1979) suggested that a set of related tasks make up a lesson. These tasks are the lesson. They are not extras. The tasks are not the text and presentation. They are practical activities

undertaken by the students. They can include copying, note taking, and calculating as well as more specialized activities. Their purpose is to reinforce concepts being studied and aid the memory with appropriate practice. The tasks together serve to achieve specific lesson goals. Course designers and teachers are responsible for ensuring that the learning tasks are sufficiently generalizable so that the knowledge acquired and the skills used can be applied in a wide variety of contexts.

11. Provide different routes to learning.

We know that different people, learn in different ways in different situations, at different rates, at different times of the day, week, month, year and life, based on different experiences, attitudes, and talents. Contrary to what all too many professionals believe, learning styles research does NOT support the view that individuals have a preferred learning style in ALL situations. The complexity of the concept being learned, the time of day, the comfort level of the learner with the material, the quality of the presentation format, the level of interactivity and many other factors can have a significant impact on the preferred individual learning style of a learner, which can change from time to time and situation to situation. Learners, who show a preference for “visual” learning in a standardized test, may find that in many other situations, they prefer a “kinetic” or “audio” style.

Nevertheless, if a choice of approaches and techniques are available to learners, they will be able to choose for themselves their preferred format and also be able to study the concept in a different format if they do not understand it the first time. When a concept is experienced in a variety of independent ways, learning is improved. Learners develop skills by using or working on the concepts being taught. Different media and techniques match the way people need to think better than others (Bates, 1992).

12. The diagrams and charts included in the lessons should clarify the text.

Quite often graphics are superfluous and can actually detract from the learning experience (Mayer, 1989). Real-life images often contain too much information. Simple diagrams are usually superior, eliminating visual “noise” and focusing on the features that are critical to the understanding of the concept being taught. The designer should also consider the goal of the message and the level of the learners. Gilbert (1995, pp. 25-26) lists several approaches for the use of images to promote learning. Images should focus only on features that are critical to the concept being taught and be used for one or more of the following reasons:

1. prepare the learner;
2. attract and direct attention;
3. guide the learner through successive steps of complexity;
4. present the content repeatedly in a variety of contexts;
5. provide a vehicle for practice with immediate feedback; or
6. make connections.

An online course should at a minimum have these basic features:

- A title page;
- An introduction to the course;
- A course schedule, and a list of objectives and requirements;
- The course content arranged into modules;
- A Frequently Asked Questions (FAQ) file;



- A glossary of terms used in the course;
- A table of contents, a search engine and/or index with a roadmap to the course;
- A resources page with links to useful external course related information; and,
- A credits page listing the sponsors and the people who have developed the course along with an open access copyright statement (Creative Commons, GNU or public domain).

13. Build to standards.

Course materials that are built to commonly accepted standards are easier to assemble, adapt and repurpose. As well as institutional standards for interface design and quality, developers must also ensure that their products conform to the emerging international metadata standards for learning objects (IEEE LOM, SCORM, IMS Common Cartridge). Use CanCore to facilitate the implementation of these standards (See: <http://www.cancore.ca>).

Create a standard procedure and “look” for course development in your institution and follow it intelligently. Be consistent in instructions, icons, etc. The finished product should look like one person did it. Cyrs (1990) reminded us that ego gratification is not as important as consistency.

Conclusion

Most importantly, when assembling or building courses: Keep it Simple. Do not make the interface difficult to navigate. Use simple commands and easily understandable icons. Simple clean interfaces with no glitz are preferable to overly complex designs with bells and whistles. All too often the glitz detracts from the learning. Make it easy for the learner. Use plain, simple language. Explicitly state the course objectives on a separate course objectives page. Make the link between the assignments and the course materials clear. Let students clearly know what is expected of them for each individual assignment or test, and for the entire course and examinations. Clearly describe the resources that will be needed and the learning activities that will be undertaken (Eastmond & Ziegahn, 1995). In that the way, both the instructors and the learners can be confidently aware of the requirements of the course. And lastly, it is important not to procrastinate. Just do it.

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