Standards for
Digital Learning Content
in British Columbia

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BRITISH COLUMBIA
The Best Place on Earth

Ministry of Education

Preface

The proliferation of emerging electronic technologies and internet use has led to tremendous growth in online, electronic learning (e-learning) as an integral part of British Columbia's K-12 Distributed Learning (DL), and an increasingly important element of regular classroom instruction. The Vision for DL is to create a quality, dynamic and engaging learning environment that all students in the province can access. Instruction through e-learning methodologies offers possibilities for sophisticated, interactive, and engaging learning options that address the ideals for a BC Graduate, and shifts the classroom and learning beyond brick walls and fixed schedules.

The standards in this document are intended to support educators n achieving these visions and ideals for students taking some, or all, of their learning online. A second document, *Standards for K-12 Distributed Learning in British Columbia*, provides detail on instructional and leadership practices for e-learning. This document is intended to guide educators in the development, selection, and evaluation of quality digital learning content for the online, e-learning environment.

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Standards for Digital Learning Content in British Columbia

Introduction

Distributed Learning (DL)[1] makes use of educational technologies and the online or e-learning environment, and e-learning practices are rapidly finding their way into instruction in traditional as well as online schools. Digital learning content encompasses electronic learning resources developed for use in both distributed and classroom e-learning environments. Content is comprised of individual "learning assets" combined as learning objects that are linked to specific learning outcomes in the curriculum.

The *Standards for Digital Learning Content in British Columbia* are intended to serve as a guide for the development or procurement of new content, and the evaluation of existing content suitable for distributed and online learning. The intended audience includes:

- Educators – to assist with the selection, adoption and use of the most appropriate digital learning content to meet student needs;
- Digital learning content providers (e.g., commercial and non-commercial publishers) – to guide the development of digital content;
- Digital learning content developers (e.g., publishers, institutions and educators) – to ensure that products developed meet digital learning content standards and requirements;
- Distributors (e.g., course management software companies) – to ensure digital learning content provided conforms to the standards and requirements; and
- Procurement officials – to ensure the efficient and cost-effective acquisition of digital learning content for use in teaching and learning.

Development of the standards began with an environmental scan of published documents describing online learning quality and content development. Two working groups were created, one to develop standards for quality in a distributed learning program and one to develop standards for digital learning content. Both working groups researched global standards and then chose a 'made in BC' approach that included involvement from DL school educators, education content providers, the post-secondary sector, and industry. Standards were then vetted through distributed learning practitioners, focus groups, and posted publicly for review and feedback.

The first "Distributed Learning Standards" were published in June 2006 and became part of the 2006/07 Distributed Learning Agreements signed between the BC Ministry of Education and Boards of Education offering DL programs. Refinements to the original document were made in spring 2007, and continued review was undertaken in 2008 and 2009 after the launch of the Ministry's Quality Review for Distributed Learning schools. The development of this document

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[1] See Glossary for definition of terms used in this document.

came through alignment of the existing DL Standards, the BCEd Online Content Review Rubric, and new international online learning standards.

A review team was formed in May 2009 that included representatives from public and independent online schools, and BC content developers. Feedback was solicited from a broad audience of educators who were invited to discuss and post comments on a private wiki dedicated to the standards revision.

Changes in this document, version 3.0, include:
- Removal of statements relating to operations and governance as they now exist in government policy, legislation, or in the DL Agreement;
- Creation of new standards adopted from other standards documents ;
- Removal of e-learning instructional and leadership practices and placement of those standards in a separate document; and
- Expansion of the audience for the standards beyond DL educators to include regular school-based educators providing instruction in an online learning environment.

The standards in this document are based on the literature available at the time of publication, and existing practice in the province. The standards form a baseline and foundation within an evolving and changing digital learning environment in British Columbia, Canada and internationally. Accordingly, the standards will be subject to review and refinement.

Digital learning content standards have been organized into four categories:
1. Technical
2. Layout (Visual Design)
3. Instructional Design & Pedagogy
4. Assessment

1.   Technical Standards

The technical standards below represent the technical considerations for the digital learning object to function reliably, effectively and transparently to the users.

1.1   Third party software used within the learning object is common and easily accessible to all users.

1.2   The learning object is formatted so that it is accessible to learners from home or school at both low and high bandwidths.

1.3   The learning object can be used on both PC and Mac operating systems with common operating platforms.

1.4   The learning object is designed to be used in a variety of learning management systems as applicable.

1.5   Learning object multimedia has been optimized for size and use with standard computer graphics and systems (i.e. compressed files; MP3 files, JPEG or TIFF for photos, and GIF or PNG for computer graphics).

1.6   Video animation and sound file formats can be played on freely available and commonly used plug-ins or players.

1.7   If video or sound files are larger than 8MB, alternate low-bandwidth versions are provided.

1.8   Text material is provided in standard formats accessible to learners.

1.9   Text based material is embedded within the content and can be presented to learners on local computers so that the content may be printed or saved for future reference should licensing permit (HTML, XHTML, RTF, and/or PDF format).

1.10   The learning object provides learner control of audio (i.e. learner can turn on/off audio files) and alternate tags or script of the audio is provided.

1.11   The learning object provides learner control of video (i.e. learner can start, stop, and pause video clips) and alternate tags or script of the video is provided.

1.12   Metadata tagging standards and specifications are used in labelling so that content is searchable from learning management systems, learning object repositories, and learning content management systems.

1.13   Content is tested to W3C accessibility as required.

1.14   Content licensing details are stated in easily understood wording, including a description of when the license expires, where it may be used and by whom.

1.15   Content includes complete information about the rights that the copyright owner has assigned in regards to the content, and the content contains complete information on the author(s) of the content, respecting the right of authors to use a pseudonym or remain anonymous.

1.16   Content includes information about the location and nature of source code required to modify it.

1.17   Licensing uses appropriate structures such as Creative Commons[2], BCcampus' BC Commons[3], or other licensing models.

1.18   Users have the right to modify the content to meet individual learner and educator needs, except where third party agreements restrict this.

1.19   BC educators and students have the right to use the content in the classroom or at home.

1.20   Users have the right to make one copy of the content in any medium such as print or CD for the purposes of research or private study.

1.21   A User License to explain how the content may be used and any restrictions that might apply in its use is provided.

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[2] http://www.creativecommons.org
[3] http://www.bccampus.ca/Page333.aspx

2. Layout (Visual Design) Standards

The learning object layout standards below represent the layout and navigation considerations required to ensure a consistent look and feel.

2.1 The learning object uses consistent navigational menus, icons or cues (i.e. readings icon, audio file, video, etc.) and is consistent in style and function.

2.2 The learning object explains each icon function (i.e. mouse over tag appears describing button), and graphics are relevant, consistently identified, labelled and described.

2.3 All clickable objects in the content are identified through the use of labels, borders, or instruction in text as appropriate.

2.4 The learning object appears to use a standard web viewable font for the material (i.e. Arial, Times New Roman, Verdana).

2.5 A simple, consistent and accessible structure for the navigation of learning object materials is provided.

2.6 A "back" button is provided.

2.7 The beginning or start of the learning object is accessible from all areas within the learning object.

2.8 Spelling and terminology used is accurate and consistent throughout the learning object and abbreviations are defined in full.

2.9 The learning object uses numbers in a consistent manner to identify steps in a process.

2.10 Key terms are highlighted on screen and are in the glossary.

2.11 Format is uncluttered, includes white space, effective use of colour, and graphics where appropriate, and text colours are clearly legible over background colours.

2.12 Text is organized into readable paragraphs for presenting on a computer screen.

2.13 The learning object provides learners the opportunity to proceed at their own pace and revisit sections as required.

2.14 The learning object has a consistent tone, readability, look and feel.

2.15 An efficient and comfortable learning interface that provides a minimum of fatigue is employed (i.e. is visually appealing without being over stimulating).

3.   Instructional Design and Pedagogy Standards

The instructional design and pedagogical standards below represent design considerations for the learning object to be interactive, motivating, and effective at fostering and supporting learning.

3.1   The learning object meets universal design principles.

3.2   Ongoing interaction between learner(s) and content is fostered.

3.3   Learning object activities require students to manipulate information and ideas to comprehend, apply, analyze, synthesize and evaluate new knowledge, and provide opportunity for practice and transfer of learning in a variety of ways.

3.4   A wide range of learner choice is accommodated (for example: multiple methods of completing assignments or progressing through the content).

3.5   A wide range of learning styles is supported (i.e. visual, auditory, kinaesthetic).

3.6   The learning object provides examples of activities, assignments and reflections.

3.7   Different modes (pictorial, verbal) for presentation of essential information are incorporated.

3.8   Facts and ideas are applicable to the real world and are authentic for students.

3.9   Information presented in the learning object is accurate.

3.10   High level questioning strategies are evident in the interactions set up in the learning object.

3.11   Students are given opportunities to apply knowledge to meaningful and authentic problems.

3.12   The learning object clearly identifies the relevant learning outcomes

3.13   Content is presented in a logical sequence based on the learning outcomes. s

3.14   The learning object provides summaries of key information as learners navigate content.

3.15   The learning object organizes and sequences content in a way that is appropriate for the subject matter and age of the intended audience, and uses age/grade appropriate language.

3.16   The learning object indicates suggested time required to complete it and clear and accurate directions for all activities and/or assignments are provided.

3.17   The learning object is socially, culturally, and age appropriate for the intended audience (i.e. is representative of a range of gender, age, cultural, ethnicity and religious diversity as well as family situations and socio-economic status in its examples, activities and multimedia elements).

3.18   Design elements contribute to efficient learning without unnecessary or redundant content.

4.   Assessment Standards

The assessment standards below represent evaluation considerations for measuring progress and achievement in a manner consistent with the British Columbia Provincial K – 12 curriculum.

4.1   The learning object specifies pre-requisite knowledge required by the learner for successful completion.

4.2   Learner assessment is linked to learning outcomes, associated content, and learning object activities.

4.3   Content activates prior knowledge of the learner (using advance organizers).

4.4   Assessment methods are constructed to measure learning on a variety of levels (i.e. fact, concept, process, critical thinking, problem solving).

4.5   The learning object incorporates a variety of methods of learner assessment (i.e. quizzes, matching activities, reflection, discussion questions, on-the-job activities, etc.) that can be both formative and summative.

4.6   The learning object provides opportunities for learner practice and transfer.

4.7   Meaningful, useful and relevant feedback is provided to the learner if electronic quizzes or tests are used (i.e. not just saying "incorrect").

4.8   The learning object includes grading rubrics and models for partially to fully completed assignments.

Appendix One: Glossary of Terms

For the purposes of this document, the following definitions are provided:

1. *Cognitive Load*: The mental work imposed by a learning environment or object. Since we have limited mental capacity, content needs to be designed so as not to overload our cognitive processes nor impose mental work that is irrelevant to the learning goals. For more information on cognitive load see *Efficiency in Learning* by R.Clark, F Nguyen and J. Sweller.

2. *Course*: An accredited unit of curriculum.

3. *Curriculum*: Covering an overall concept, curriculum is approved and specific content that covers knowledge, skills, and attitudes as prescribed learning outcomes, generally offered by an institution such as a school or university as a course.

4. *Digital Learning Content:* Assembly and aggregation of discreet, digital (or electronic for display on a computing device) learning objects designed to meet intended learning outcomes. Content is a specific package of material for use in an overall curriculum.

5. *Distributed Learning:* Distributed Learning (DL) takes place when a student is primarily at a distance from the teacher, whether he/she is at home; or connected to teachers from another learning facility[4].

6. *E-Learning:* The use of educational technologies to support distributed, or online learning.

7. *Guidelines*: Suggested or recommended approaches. Guidelines are speculative and assume certain conditions that may not apply in all situations. A guideline is a "suggest".

8. *Instructional Design*: Systematic method of planning, developing, evaluating and managing instruction to ensure competent performance by the learner.

9. *Learning Architecture:* Learning architecture refers to the technical structure of a learning system that enables the exchange of data with other data systems (interoperability).

10. *Learning Asset*: A reusable digital entity accessible to a learner

11. *Learning Content*: Assembly and aggregation of discreet learning objects designed to meet intended learning outcomes. Content is a specific package of material for use in an overall curriculum.

12. *Learning Object*: A learning asset or assets designed to address an intended learning outcome(s).

13. *Learning Outcomes:* The prescribed learning outcomes set the learning standards for the provincial K-12 education system and form the prescribed curriculum for British Columbia. They are statements of what learners are expected to know and do at the end of an indicated grade or course.

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[4] http://www.bced.gov.bc.ca/dist_learning/

14. *Performance Standards:* A set of provincially-approved classroom assessment resources developed and tested by educators, which describe levels of achievement in key areas of learning. The standards focus exclusively on performance assessment. In performance assessment learners are asked to apply the skills and concepts they have learned to complete complex, realistic tasks. This type of assessment supports a criterion-referenced approach to evaluation and enables educators, students, and parents to compare student performance to provincial standards.

15. *Metadata:* Metadata is a set of words or phrases that summarizes the 'who, what, where, when and why' of a learning object (content). Metadata keywords label the ideas that are implicit in the learning object, much like a library classification system. Metadata information is not visible to a person looking at the learning object, but is to an LMS or LCMS. For example, the name of this document file 'e-Learning Content Standards Environmental Scan.doc' is visible as a file name within a word processing program, but does not appear on any pages of this learning object.

16. *Modalities*: There are three basic modalities to process information to memory: visual (learning by seeing), auditory (learning by hearing), and kinesthetic (learning by doing). Most people have one predominant modality, but some have a balance between two or even all three. Many learners are aware of their preference, which helps them approach their own learning more efficiently. Effective teaching requires a variety of teaching methods which cover all three learning modalities. No matter what their preference, learners should have equal opportunities to learn in a way that is effective for them.

17. *Standards*: Document descriptions that have received a stamp of approval or accreditation from an authorized body. Standards tend to go through a relatively slow evolution, are conclusive and complete, and are criteria specific. A standard is a "must".

18. *Synchronous/Asynchronous:* Learners can collaborate through a variety of communication and conferencing tools in real time allowing them to connect at a single point in time, at the same time (synchronously), or in a series of independent exchanges over a period of time allowing them to connect together at each other's own convenience and own schedule (asynchronously).

    Communication tools are used to send messages[5], files[6], data[7], or documents[8] between people and hence facilitate the sharing of information.
    Examples include:

    a. e-mail (asynchronous)
    b. instant messaging (synchronous)
    c. faxing (asynchronous)
    d. voice mail (synchronous)
    e. Web publishing[9] (asynchronous)

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[5] http://en.wikipedia.org/wiki/Message
[6] http://en.wikipedia.org/wiki/Computer_file
[7] http://en.wikipedia.org/wiki/Data
[8] http://en.wikipedia.org/wiki/Document
[9] http://en.wikipedia.org/wiki/Web_publishing

Conferencing tools are used to facilitate the sharing of information, but in a more interactive way. Examples include:

- data conferencing — networked PCs share a common "whiteboard"[10] that each user can modify (synchronous)
- voice conferencing — telephones[11] allow users to interact (synchronous)
- video conferencing (and audio conferencing) — networked PCs share video or audio signals (synchronous)
- Internet forums[12] (also known as message boards or discussion boards) — a virtual discussion platform to facilitate and manage online text messages (asynchronous)
- chat rooms — a virtual discussion platform to facilitate and manage real-time text messages (synchronous)
- electronic meeting systems (EMS) — a conferencing system built into a room. The special purpose room will usually contain a large screen projector[13] interlinked with numerous PCs. (synchronous)

19. *Visual Design*: Visual design of the user interface and layout of the content.

20. *Universal Design Principles:* Refers to a broad-spectrum solution that produces products and environments that are usable and effective for everyone – are equitable and flexible in use, and simple and intuitive in design. Examples include "undo" command, icons and text labels in software programs[14]

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[10] http://en.wikipedia.org/wiki/Whiteboard

[11] http://en.wikipedia.org/wiki/Telephone

[12] http://en.wikipedia.org/wiki/Internet_forum

[13] http://en.wikipedia.org/w/index.php?title=Screen_projector&action=edit

[14] http://en.wikipedia.org/wiki/Universal_design#The_Principles_of_Universal_Design

Appendix Two: Working Groups and Reviewers

Digital Learning Content Working Group (2006)
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    Mary Stobbe, Vice-Principal, AVS (SD34)
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