



THE  
**le@rning**  
FEDERATION

schools online curriculum content initiative

# ACCESSIBILITY SPECIFICATION FOR CONTENT DEVELOPMENT

---

**VERSION: 2.1**

**DATE: MONDAY, 07 MAY 2007**

## Table of Contents

<b>1</b>	<b>INTRODUCTION</b> .....	<b>1</b>
1.1	Purpose.....	1
1.2	Leadership obligations of The Le@rning Federation .....	1
1.3	Application .....	1
1.4	Maintenance .....	2
1.5	Conformance.....	2
<b>2</b>	<b>PRINCIPLES</b> .....	<b>2</b>
2.1	Legislative compliance.....	2
2.2	Appropriate learning object design .....	2
2.3	Access device independence.....	3
2.4	Flexibility of operation and presentation .....	3
2.5	Communication of accessibility information with content .....	3
2.6	Equitable user system requirements.....	3
<b>3</b>	<b>ACCESSIBILITY USER PROFILES</b> .....	<b>3</b>
3.1	Vision impairment.....	3
3.2	Hearing impairment .....	4
3.3	Physical impairment .....	4
3.4	Cognitive impairment .....	5
<b>4</b>	<b>DESIGNING FOR ACCESSIBILITY AND EDUCATIONAL SOUNDNESS</b> .....	<b>5</b>
4.1	Universal design process .....	5
<b>5</b>	<b>ACCESSIBILITY REQUIREMENTS</b> .....	<b>6</b>
5.1	General accessibility requirements .....	6
5.2	Supporting accessibility profiles .....	7
<b>6</b>	<b>ACCESSIBILITY METADATA</b> .....	<b>7</b>

## Disclaimer

The material contained in this specification is for general information purposes only. Any use of the material is at your own risk. To the extent permitted by law, Curriculum Corporation will not be liable for any loss or damage suffered as a result of any party relying upon this specification.

# 1 Introduction

The Le@rning Federation Accessibility Specification for Content Development describes accessibility principles, requirements and guidelines for creating accessible online curriculum content for The Le@rning Federation (an initiative of State and Federal governments of Australia and New Zealand).

The Accessibility Specification is part of the Initiative's suite of quality assurance specifications. These specifications are all embedded within the larger context of educational soundness. Educational soundness relates to providing online curriculum content in appropriate interactive multimedia formats to meet pedagogical aims. Educational soundness is the major design principle underlying the development of online curriculum content by the Initiative.

The Le@rning Federation is developing content that maximises learning opportunities for students in an online multimedia environment. Some of the learning opportunities build on the synergies of processing information presented in more than one medium. Therefore, the accessibility approach used by The Le@rning Federation is fundamentally different from that used for producing print materials in electronic formats. In particular, educational considerations limit the degree to which multimedia content can be tailored for all users. Through this accessibility specification, The Le@rning Federation aims to ensure learning outcomes are optimised for all students.

## 1.1 Purpose

This specification will guide the creation of accessible curriculum content for The Le@rning Federation. The specification helps The Le@rning Federation to fulfil commitments made in its *Disability Action Plan* and its obligations under *The Disability Discrimination Act (DDA) 1992*.

## 1.2 Leadership obligations of The Le@rning Federation

The joint venture companies and the shareholders will fulfil the following legislative and leadership obligations in undertaking and delivering The Le@rning Federation outcomes.

- To develop learning content that meets the relevant provisions of the *Disability Discrimination Act 1992*.
- To proactively review and, as appropriate, incorporate relevant accessibility guidelines not yet specified in legislation.
- To ensure that the Accessibility Specification meets the online communications obligations of the schools' sector under the *Disability Discrimination Act 1992* and that it improves the Australian education sector's capability in this area.
- To contribute to national and international standards development in the area of accessibility and educational multimedia through the evolving body of knowledge and practice generated under the auspices of the project.
- To consult with relevant organisations and user groups in establishing, implementing and reviewing this Accessibility Specification.
- To draw on accessibility expertise in the formulation and enactment of a content design methodology and quality assurance processes.

## 1.3 Application

The Accessibility Specification will be used to assess all content commissioned as part of the Initiative.

This specification will also be applied to non-commissioned content proposed for inclusion in the Exchange. The Le@rning Federation realises, however, that not all of this specification

may be applicable to non-commissioned content. The Le@rning Federation will not necessarily exclude non-commissioned content that deviates from this specification.

## 1.4 Maintenance

The specification will be updated and enhanced, based on experience gained during development, deployment and use of content. Updated specifications and related guidelines will be documented and published on the Initiative website:

<http://www.thelearningfederation.edu.au> and in the The Le@rning Federation knowledge base at <http://jira.thelearningfederation.edu.au/confluence/x/IAE>

## 1.5 Conformance

The Accessibility Specification is embedded within the larger context of *educational soundness*. Educational soundness relates to providing online curriculum content in appropriate interactive multimedia formats to meet pedagogical aims. Educational soundness is the major design principle underlying the development of online curriculum content by the Initiative.

It is not always possible to create a single piece of content that meets a particular educational objective and is universally accessible (see Section 4). For this reason, achievement of this specification will take into consideration the educational objectives of the learning content being assessed, as well as the accessibility of the overall pool of content being developed.

Conformance to this specification will be measured by adherence to the principles described in Section 2 of the specification, and the measures and requirements described in Section 5 of the specification.

## 2 Principles

The specification will be used to assess whether online curriculum content conforms to the following principles:

- Legislative compliance
- Appropriate learning object design
- Access device independence
- Flexibility of operation and presentation
- Communication of accessibility information with content
- Equitable user system requirements.

### 2.1 Legislative compliance

This principle aims to ensure that The Le@rning Federation complies with the *Disability Discrimination Act 1992*, and it supports education systems in complying with State and Territory laws pertaining to online content accessibility.

### 2.2 Appropriate learning object design

This principle enshrines the Initiative's commitment to providing exemplary online curriculum content in formats that meet both pedagogical and accessibility aims. This principle upholds the necessity of creating content that meets the needs of users with varying capabilities and individual learning differences. It also encompasses the need for all content produced by the Initiative to be designed for accessibility, including content that cannot itself be made to comply with universal accessibility standards. In such cases, equivalent or alternative curriculum content may be required.

## 2.3 Access device independence

This principle recognises that teachers and students will utilise a range of devices, in a range of situations to access online learning content. In particular, for some users with disabilities, it acknowledges their reliance on assistive devices to harness the capacity of computer technology in both educational and personal environments. Device independent content is designed to work effectively across the widest range of access devices.

## 2.4 Flexibility of operation and presentation

This principle optimises teacher and student interaction with online content through flexible operation and presentation, which accommodates diverse learning contexts and varying user constraints. It recognises the need for users, especially those with disabilities, to determine what will make their access easiest in a given set of circumstances. It also recognises that online content should allow graceful transformation of content into different renderings for different devices and easy re-purposing of content for different users.

## 2.5 Communication of accessibility information with content

This principle acknowledges the role of metadata in the communication of accessibility information. It requires the definition of accessibility metadata and incorporation of accessibility metadata into online content.

## 2.6 Equitable user system requirements

The final principle honours the range of users with either low-end machines and/or low bandwidth. It also provides for the determination of a minimum specification of user hardware and software for equitable and inclusive provision of project resources and services.

# 3 Accessibility user profiles

The Le@rning Federation has defined four high-level accessibility user profiles:

- vision impairment
- hearing impairment
- physical impairment
- cognitive impairment.

These accessibility profiles are high-level categorisations of groups of learners that are used within content design and development to guide appropriate learning object design. The profiles are used during content development in two ways:

- to determine whether a learning design can support a particular accessibility profile, or whether an equivalent or alternative realisation is required (see Section 4);
- to indicate the accessibility of content to the profiled group of users via metadata (see Section 6);

Additionally, technical and design requirements and guidelines for supporting these profiles are documented in the *Accessibility requirements for Content Development*. Creation of these requirements was informed by The Le@rning Federation's experience in the development of accessible and educationally sound learning content.

## 3.1 Vision impairment

Vision impairment includes tunnel vision, loss of vision in different parts of a person's visual field, colour blindness, poor acuity, loss of centralised vision and severe vision impairment. Complete blindness is not the most common vision impairment. Students may be born with vision impairment, or may become vision impaired through illness or accident.

Colour blindness is a common type of vision impairment. Approximately one in ten boys have some degree of colour blindness. Although there are various types of colour blindness, nearly all colour-blind people have difficulty distinguishing between red and green. Most colour-blind people can detect black and white accurately. The majority can also distinguish between shades of blue and yellow.

The range of assistive devices used and observed for by visually impaired students include:

- text-to-speech converters
- screen readers and talking browsers
- larger monitors (19-inch, 21-inch)
- use of existing settings on computer systems
- screen magnifiers
- optical character recognition programs
- refreshable Braille displays
- Braille embossers
- personal data assistants (Braille display).

## 3.2 Hearing impairment

Complete deafness is not a common impairment in the student population. It is rare to encounter a completely deaf student who cannot read or write, or communicate in English.

Students with a hearing impairment are often provided with headphones and devices that increase the volume of the teacher's voice to their ear (eg, RF Units). Other students have cochlea implants, or hearing aids with volume control. For hearing-impaired students, background noise encountered in mainstream schools can cause learning difficulty. They can become frustrated and distracted when they cannot hear clearly.

Hearing-impaired students may be born with a hearing impairment or become deaf through an accident or infection. Some hearing impaired students have Auslan (signing) as their first language. English (written) is their second language.

Many hearing-impaired people - particularly if they are sign-language users - do not have highly developed reading skills. Sign language is a different language from standard written English. Some people who use sign language therefore have a limited reading vocabulary.

## 3.3 Physical impairment

There are many different types of physical impairments. People can have more than one type of physical impairment. These may include fine and gross motor impairment, sporadic and intermittent movement, limited movement and limited motion, or the ability to manipulate objects and to interact with the physical world may be affected. People may have an acquired brain injury through accident or trauma, and may experience limited movement to the arms, legs or trunk. They may have conditions such as cerebral palsy, spina bifida, arthrogryposis or degenerative conditions such as muscular dystrophy, Batten-Mayou disease or Friedreich's ataxia.

People with these types of disabilities use computer systems with add-on assistive technologies. These technologies include switches, large mice or trackballs, speech recognition software, on-screen keyboards in combination with pointing devices, word prediction software, keyboard guards, programmable keyboards or overlays, and compact keyboards. Assistive devices are tailored to the unique needs of the user, as a combination of devices may be required. For example, the user may require speech recognition, in conjunction with an on-screen keyboard and head-pointing device.

### 3.4 Cognitive impairment

Cognitive impairments affect mental processing, reasoning, language and memory. These impairments may also exist in combination with other impairments.

Students may have been involved in an accident resulting in brain damage, or may have congenital learning problems. Those suffering severe cognitive impairment are less likely to be in mainstream schools and more likely to be found in the special school system.

## 4 Designing for accessibility and educational soundness

The Le@rning Federation commits to maximising the accessibility of all online content within the context of educational soundness. Educational soundness relates to providing online curriculum content in appropriate interactive multimedia formats to meet pedagogical aims. Educational soundness is the major design principle underlying the development of all online curriculum content by the Initiative. The Le@rning Federation balances educational soundness and accessibility requirements by taking a universal design approach to content development.

### 4.1 Universal design process

Universal design for learning<sup>1</sup> holds that content should be accessible and appropriate for individuals with different backgrounds, learning styles, abilities, and disabilities in widely varied learning contexts. It recognises that it is not always possible to create a single piece of interactive multimedia that meets a particular educational objective and is also universally accessible to all students. In such cases, equivalent or alternative curriculum content may be required. In other cases it may not even be possible to support a given accessibility profile for the given educational objective in the chosen interactive multimedia format.

The Le@rning Federation is developing content creation and quality assurance processes that ensure all learning objects are educationally sound and that within the total body of content learning objects are developed which respond to the differentiated profiles of learners, including profiles of learners with a disability. The content and quality assurance processes include a series of questions that direct content development to maximise accessibility without compromising educational soundness (see Figure 4-1). For a given educational objective, content developers are asked to consider the educational and technical implications of supporting each of the accessibility profiles.

These questions are used to determine the scope of accessibility support within a pool of curriculum content supporting a specific educational objective. The questions help define the collection of learning objects needed to support the combination of educational objectives and accessibility profiles. When an educational objective is unable to be represented adequately in all media modes within the same learning object, alternative representations of the learning object are developed. Where an alternative representation is not appropriate, either for reasons of educational soundness or unjustifiable hardship, these decisions are documented through the process of considering these questions.

---

<sup>1</sup> Universal Design for Learning <http://www.cast.org/udl>

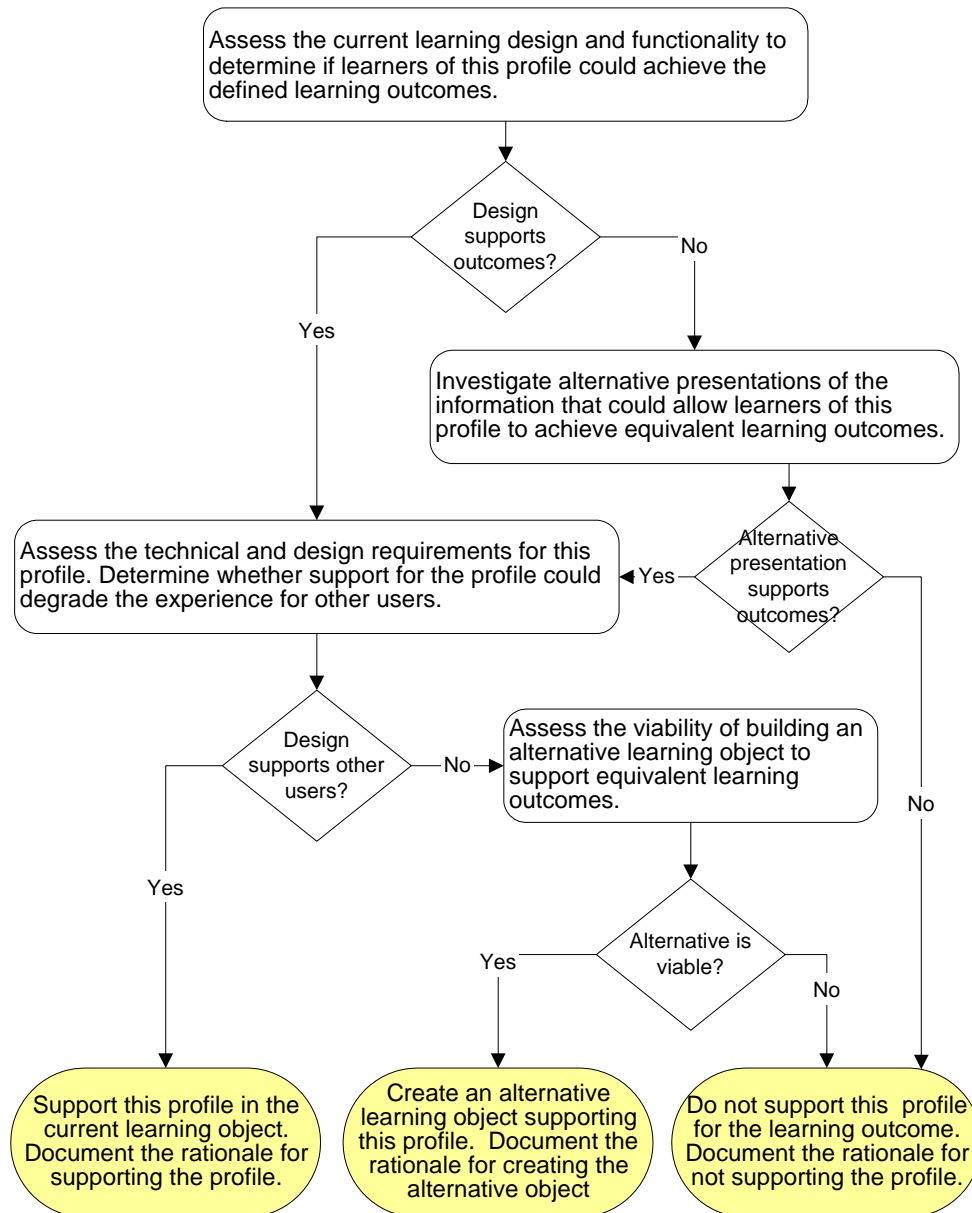


FIGURE 4-1 PROCESS FOR DETERMINING SUPPORT FOR A LEARNER PROFILE

## 5 Accessibility requirements

### 5.1 General accessibility requirements

The Initiative's general accessibility requirements for content development are defined in The Learning Federation *Technical Specification for Content Development*. That specification defines accessibility requirements that have been adapted from guidelines developed by the W3C Web Content Accessibility Initiative<sup>2</sup>. In particular, the W3C Web Content Accessibility Guidelines (W3C WCAG 1.0) and W3C Authoring Tool Accessibility Guidelines (W3C ATAG) have been broadened to consider the accessibility requirements for interactive multimedia.

In summary, the *Technical Specification for Content Development* defines general accessibility requirements covering:

<sup>2</sup> W3C web accessibility initiative <http://www.w3.org/WAI/>

**Designing for accessibility and flexibility.** The universal design approach described in Section 4 may require development of alternative representations of content for different learner profiles. These alternative representations will often share common digital resources (such as instructional text). Creating alternatives requires that the common resources shared by the alternative representations are kept in synchronisation.

One technique for synchronising alternative content representations involves the separation of structure, presentation and functionality. The *Technical Specification for Content Development* describes technologies that support separation of structure, presentation and functionality.

**Device independence.** All content procured by The Le@rning Federation should be designed to be device independent.

**Colour independence.** All content procured by The Le@rning Federation must be accessible to learners who are colour-blind.

## 5.2 Supporting accessibility profiles

Developers engaged by The Le@rning Federation will be provided with further accessibility guidance and feedback during content development and quality assurance. In particular, developers will be provided with guidance on supporting The Le@rning Federation accessibility profiles in the context of the educational goals of the development project.

Based on this experience, The Le@rning Federation is developing design requirements that support each of the accessibility profiles. These requirements will be incorporated into future versions of this specification.

## 6 Accessibility metadata

The Le@rning Federation adds standards-based metadata to all learning resources distributed online. Definitions for all metadata elements are published in The Le@rning Federation *Metadata Application Profile*. The metadata includes an *Access profile* element used to indicate which accessibility profiles have been considered in the design of the content.

An access profile is assigned within the metadata where content has been specifically designed to facilitate the learning experience for users who match that profile and all of the technical requirements outlined in the *Accessibility requirements for Content Development* for that profile have been met. On that basis it can be assumed that the content provides some help to users typical of the profile. The content is not, however, guaranteed to be suitable for all learners in the designated profile.