



### Educational design teams

The Le@rning Federation (TLF) engages multimedia developers to develop online interactive content for primary and secondary students in Australian and New Zealand schools. TLF determines and makes available subject matter experts (SMEs) and content writers to work with successful tenderers to develop content for the projects.

The activity of the educational team (including TLF Project Manager, subject matter expert/s and educational specialist/s) during the design phase is coordinated directly by TLF. In the latter stages of this first phase, and following the production of the Design Brief by the educational team, the selected developer's Instructional Designer/Creative Director will be responsible for the production of the Learning Object Design Specification (LODS).

The following provides an overview of contribution of the respective members to content development cycle.

### Phase 1: Design

<b>Educational design team members</b>	<b>Capability and expertise</b>	<b>Role</b>
TLF Project Manager	Project management, learning design, leadership and direction	Lead and direct content development Resource management Ensure quality and best practice learning design
Subject matter experts	Domain, discipline knowledge, research/pedagogy	<b>Production of design briefs</b> Research data and information Pedagogical approach
Educational specialist	Domain, discipline knowledge, research/pedagogy	Educational soundness reviews
Instructional designer	Learning and instructional design	<b>Production of learning object design specifications</b> Production of illustrative storyboards Refinement of pedagogical approach Liaison with SME
Creative director/Interface designer	Interface design	Participates in learning object design specifications Visual design
Multimedia development team	Software authoring and graphic design	Authoring and programming
Developer Project Manager	Project management	Contract and resource management, plus quality assurance (QA)
Teacher Focus Group (TFG)	Pedagogy: in practice use and application	Feedback on work in progress



**Phase 2: Development**

<b>Educational design team members</b>	<b>Capability and expertise</b>	<b>Role</b>
TLF Project Manager	Project management, learning design, leadership and direction	Lead and direct content development Resource management Ensure quality and best practice learning design
Writers	Writing for educational multimedia/pedagogy	Create content for functional specifications Metadata finalisation
Subject matter experts	Domain, discipline knowledge, research/pedagogy	Input to content for functional specifications and QA Metadata finalisation
Educational specialist	Domain, discipline knowledge, research/pedagogy	Educational soundness reviews Metadata review as appropriate
Instructional designer	Learning design and instructional design	Production of functional specifications Intellectual property permissions
Creative director/Interface designer	Interface design	Visual and interface design
Technical writer	Technical writing and documentation	Production and delivery of functional specifications
Multimedia development team	Software authoring and graphic design	Authoring and programming
Developer Project Manager	Project management	Contract and resource management, plus QA
Teacher Focus Group	Pedagogy: in practice use and application	Feedback on work in progress
User Focus Groups (UFG)	In-school evaluation	Educational soundness in-school evaluation of proposed learning activity.
TLF editorial team	Multimedia editorial reviews	Work with functional specifications and multimedia to ensure clarity of learning



## Stage 1: Concept discovery and design

### Defining the project in relation to the Project Scoping Brief (PSB): produce Summary of scope

	Task	Description	Responsibility	Outcome	TLF activity
1	<b>Define key concepts and sub-concepts</b>	Brainstorm the key educational concepts for the project. The learning objects will be designed to develop student understanding of these key concepts, or big ideas. These concepts should directly reflect the project's scope and objectives outlined in the request for tender and project scoping brief documentation.	<ul style="list-style-type: none"> <li>• TLF Project Manager</li> <li>• Educational specialist</li> <li>• SMEs</li> </ul>	Key concepts & sub-concepts defined and documented	PM conducts Scoping workshop to introduce new team members to TLF and determine key concepts in relation to PSB.  The workshop is held over two days. PM organises for notes to be taken, which form the basis of the Summary of scope.
2	<b>Describe learning outcomes</b>	Unpack each sub-concept and derive learning outcomes. Consider the targeted learner groups/focus. Learning outcomes should be written in the present tense. They should detail what the student will know, understand, do and value as a result of using the learning object. The learning outcomes must be achievable by the learner profile. Part of quality assurance will assess whether students can achieve these specific learning outcomes.	<ul style="list-style-type: none"> <li>• TLF Project Manager</li> <li>• Educational specialist</li> <li>• SMEs</li> </ul>	Learning outcomes defined and documented	
3	<b>Produce Summary of scope</b>	What are the appropriate flow(s) between the activities? Are there relationships between sets of activities? If so, should these be combined as <b>one</b> learning experience / learning object? Review the flow between the resultant learning objects. Are there any sequences that can now be identified?	<ul style="list-style-type: none"> <li>• Project managers</li> <li>• SMEs</li> <li>• Educational specialist</li> <li>• Send to WParty–CARG for feedback</li> </ul>	Summary of scope document	



## Stage 2: Learning Object Design Brief

	Task	Description	Responsibility	Outcome	TLF activity
4	<b>Prepare design briefs, defining learning outcomes and learning activity</b>	<p>From the Summary of scope, concept design briefs are developed. They define the key idea/s derived from the sub-concepts, the learning outcomes specific to the individual learning object and the learning activities (core educational experiences) proposed for the learning object.</p> <p>A project map may be developed to assist PM to ensure coverage across the PSB and allocate brief writing.</p>	<ul style="list-style-type: none"> <li>SMEs</li> </ul>	Draft design briefs	<p>PM allocates brief writing to SMEs, provides timelines and guidance on brief writing.</p> <p>PM reviews or organises reviews (reviewers may include educational specialists, SMEs and QA) to ensure briefs:</p>
5	<b>Describe learning activity (core educational experiences) to support learning outcomes</b>	<p>For each concept, describe learning activities and experiences that assist students to achieve the intended learning outcomes. Consider the following:</p> <ul style="list-style-type: none"> <li>What is the learning purpose?</li> <li>What is the student going to know and be able to do?</li> <li>Describe active learning processes in relation, knowledge, skills and understandings.</li> <li>Which (if any) approaches are best for particular learner profiles? (Refer to the Learning Activity Framework (LAF).)</li> <li>How can multimedia provide <b>new</b> opportunities for this learning to occur?</li> </ul>	<ul style="list-style-type: none"> <li>TLF Project Manager</li> <li>SMEs</li> </ul>	Learning outcomes defined and documented in relation to learning activity	<ul style="list-style-type: none"> <li>are consistent with scope from PSB</li> <li>are appropriate for intended age group</li> <li>give coverage across scope and year levels</li> <li>are technically possible given TLF's requirements.</li> </ul>
6	<b>Finalise and sign off briefs</b>	Finalise learning object design briefs	<ul style="list-style-type: none"> <li>TLF Project Manager</li> <li>Educational specialist</li> <li>SMEs</li> </ul>	<p>Finalised briefs for LODS</p> <p>Allocate briefs to developers</p>	PM selects briefs to be developed into LODS and allocates these to developers.



### Stage 3 Learning Object Design Specification

	Task	Description	Responsibility	Outcome	Event
9	<b>Develop learning object design specifications (developers)</b>	Using the design briefs, develop learning object design specifications for each learning object. Include accessibility and technical approach, revised interaction map, storyboard of key screens and intellectual property statement.	<ul style="list-style-type: none"> <li>• Dev. Project Manager</li> <li>• Instructional designer</li> <li>• SMEs</li> </ul>	Learning object design specifications drafted	PM organises and conducts a design brief hand-over workshop with SMEs and developers (1–2 days).
10	<b>Review learning object design specifications</b>	Review each learning object design specification and provide written feedback.	<ul style="list-style-type: none"> <li>• TLF Project Manager</li> <li>• Educational specialist</li> <li>• SMEs</li> <li>• TLF QA team</li> <li>• TLF Permissions Coordinator</li> <li>• TFG</li> <li>• Send to WParty–CARG (Working Party–Curriculum Area Reference Group)</li> </ul>	Learning object design specifications feedback	<p>PM organises meetings with development teams and SME to workshop ideas for LODS. (1–2 days for each developer).</p> <p><b>Note: These two workshops may be combined for small batches.</b></p>
11	<b>Update learning object design specifications</b>	Review and finalise learning object design specifications incorporating feedback from learning object review workshop and other written feedback, where appropriate. Tasks 11 and 12 may need to be repeated several times prior to approval.	<ul style="list-style-type: none"> <li>• Dev. Project Manager</li> <li>• Instructional designer</li> <li>• SMEs</li> </ul>	Updated/final learning object design specifications	PM organises and conducts TFG workshop to gain feedback of appropriateness of intended LOs.
12	<b>Accept and sign off learning object design specifications</b>	Accept and sign off final learning object design specifications.	<ul style="list-style-type: none"> <li>• TLF Project Manager</li> <li>• Educational specialist</li> </ul> TLF Director Online Initiatives	Approvals documented	PM reviews or organises reviews (reviewers may include educational specialists, SMEs, CARG / Advisory group and QA) of
13	<b>Develop content in development plan</b>	Select learning objects to be moved into production and develop the content in development plan. This should detail proposed costings for the development of learning objects, schedules and deliverables for the content in development phase.	<ul style="list-style-type: none"> <li>• TLF/dev. project managers</li> <li>• TLF <a href="#">Senior Manager, Online Content Development</a></li> </ul>	Content in development plan, schedule and contract	



## Content development

					<p>LODS to ensure they:</p> <ul style="list-style-type: none"><li>• reflect the intent of the brief</li><li>• are appropriate for intended age group</li><li>• are technically possible given TLF's requirements.</li></ul> <p>PM reviews costings and LODS coverage with <a href="#">Senior Manager, Online Content Development</a> to select LOs to move into development.</p>
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Development

	Task	Description	Responsibility	Outcome	Event
14	<b>Prototype</b>	The prototype should contain at least one pathway of learning (illustrative of the whole), including the intended feedback mechanism, sample content, an indication of interface design including proposed fonts, and placeholder graphics and artwork to indicate style.	<ul style="list-style-type: none"> <li>• Dev. Project Manager</li> <li>• Instructional designer</li> <li>• SMEs</li> <li>• Creative lead</li> <li>• Writer</li> </ul>	Prototype	Meetings with development teams
15	<b>Review prototype</b>	<p>The prototype is evaluated in schools with students (UFG) and Teacher Focus Group (TFG). The prototype must:</p> <ul style="list-style-type: none"> <li>• assist student understanding and achievement of learning outcomes</li> <li>• be appropriate for the specified age and stage of schooling</li> <li>• be suitable for a diversity of students.</li> </ul> <p>Feedback and data collated by ISE team for TLF PM. TLF PM reports and communicates results to developers.</p>	<ul style="list-style-type: none"> <li>• TLF Project Manager</li> <li>• In-school evaluation</li> <li>• Educational specialist</li> <li>• SMEs</li> <li>• TFG</li> <li>• WParty–CARG</li> </ul>		In-school evaluation (User Focus Groups) and educational specialist, teacher TFG reviews
16	<b>Functional specifications</b>	<p>The functional specifications are developed by the instructional designer and the technical writer. The functional specifications must:</p> <ul style="list-style-type: none"> <li>• describe each on-screen event in terms of user action</li> <li>• identify accessibility requirements</li> <li>• include all on-screen content (screen text and audio) and describe the content in relation to all visual representation (images, animations, video etc)</li> <li>• include the proposed Inventory of third-party intellectual property.</li> </ul>	<ul style="list-style-type: none"> <li>• Dev. Project Manager</li> <li>• SMEs</li> <li>• Writer</li> <li>• Instructional designer</li> <li>• Programmer</li> <li>• Technical writer</li> </ul>	Functional specification	
17	<b>Review functional specifications</b>	A structural edit is undertaken by TLF.	<ul style="list-style-type: none"> <li>• TLF Project Manager</li> <li>• Educational specialist</li> </ul>	Functional specification	



## Content development

			<ul style="list-style-type: none"> <li>• SMEs</li> <li>• TLF QA: structural edit</li> </ul>	complete	
18	<b>Beta development</b>	The Beta version of learning object is produced with all content complete. All interaction, including navigation and feedback, should also be complete. All third-party intellectual property must be included and signed off. Audio is placeholder only.	<ul style="list-style-type: none"> <li>• Dev. Project Manager</li> <li>• Instructional designer</li> <li>• Programmer</li> <li>• Graphic designer</li> <li>• Technical writer</li> </ul>	Content complete version (with final placeholder audio)	
19	<b>Beta review</b>	The Beta version is submitted for the following reviews: technical (sample), editorial and educational soundness.	<ul style="list-style-type: none"> <li>• TLF/dev. project managers</li> <li>• TLF editor: multimedia copy-edit review</li> <li>• TLF technical analyst</li> <li>• SMEs</li> <li>• Educational specialists</li> <li>• WParty–CARG</li> </ul>	Final content for the functional specification Audio recording session takes place after this review	
20	<b>Conformance version</b>	The finalised learning object. All content, functionality and audio are complete.	<ul style="list-style-type: none"> <li>• Dev. Project Manager</li> <li>• Instructional designer</li> <li>• Programmer</li> </ul>	Content complete version (with final audio)	
21	<b>Conformance review</b>	The following reviews take place: technical, editorial and user acceptance testing.	<ul style="list-style-type: none"> <li>• TLF Project Manager and QA team</li> </ul>		
22	<b>Acceptance: final</b>	Publish	<ul style="list-style-type: none"> <li>• TLF</li> </ul>		



Brief development		
Description	Expertise	Product
<p><b>Design briefs</b> are developed by the TLF education design team. This team consists primarily of subject matter experts and educational specialists. The briefs are developed from the project scoping brief, which describes the focus for learning object development. Each brief should clearly:</p> <ul style="list-style-type: none"> <li>• define the learning objective and outcome</li> <li>• describe the nature of the learning activity and strategies for learning</li> <li>• describe the learning strategy in the context of the domain and discipline being targeted and in consideration of the attributes of the targeted age group.</li> </ul>	<p>Pedagogy Domain and discipline knowledge</p>	<p>The design brief should include:</p> <ul style="list-style-type: none"> <li>• learning objective and outcome</li> <li>• specific learning needs</li> <li>• learning strategy in relation to learner profile, age and cognitive ability</li> <li>• suggested context.</li> </ul> <p>The brief should be a maximum of 1–1.5 pages in length.</p>
<p><b>Learning object design specifications</b></p>		
<p>Learning object design specifications are developed by the instructional designer in conjunction with subject matter experts and others in development team. In relation to the design brief, the LODS should:</p> <ul style="list-style-type: none"> <li>• describe the flow of learning and interaction design via flow diagrams and wireframes</li> <li>• describe design in relation to content and context (integrated knowledge and instructional and learning strategies, scenarios, situations, etc)</li> <li>• describe key user interface requirements (considerations of age and culture and navigational requirements)</li> </ul>	<p>Pedagogy (learning theory: P–12) Domain and discipline knowledge Creative lead Programming Graphic design</p>	<p>The LODS should include:</p> <ul style="list-style-type: none"> <li>• learning outcome, purpose objective</li> <li>• learning activity/strategy</li> <li>• interaction design illustrated by a flow diagram, high level storyboards, or wireframes</li> <li>• examples or illustrations of the design approach/ style of interface, including proposed look and feel, navigation elements, use of audio, on-screen text, animation, video, images and graphics.</li> </ul> <p>If a LODS is for a number of learning objects in a series (interaction and learning design is the same for all), then variations of the treatment of content in relation to target audience or content differences should be described.</p>



<ul style="list-style-type: none"> <li>describe feedback mechanisms to be employed, as well as the levels and type of feedback to support the learning strategy and approach – interactivity</li> <li>provide an interaction design that focuses on active and critical learning (cognitive processes and feedback links).</li> </ul>		<p>Evidence of consideration of:</p> <ul style="list-style-type: none"> <li>accessibility requirements</li> <li>technical requirements</li> <li>educational soundness indicators</li> <li>proposed intellectual property requirements.</li> </ul>
<b>Prototype</b>		
<p>A prototype is developed from a LODS. Team members involved at this stage are: the instructional designer and subject matter expert, the writer if required, graphic artist, creative lead and programmer.</p> <p>The prototype should contain at least one pathway of learning (illustrative of the whole), including the intended feedback mechanism, sample content, an indication of interface design, placeholder graphics and artwork to indicate style.</p>	<p>Learning design/instructional design Domain and discipline knowledge Programming Graphic design</p>	<p>The prototype should:</p> <ul style="list-style-type: none"> <li>illustrate a learning pathway (semi-functional interactivity)</li> <li>illustrate style in terms of look and feel</li> <li>illustrate use of and type of feedback</li> <li>contain sample content</li> <li>contain placeholder graphics</li> <li>contain notes to the student regarding non-active elements.</li> </ul>
<b>Functional specification (scripts)</b>		
<p>Functional specifications are developed by the instructional designer and the technical writer.</p> <p>Each functional specification must:</p> <ul style="list-style-type: none"> <li>describe each on-screen event in terms of user action</li> <li>delineate accessibility requirements</li> <li>contain the complete script.</li> </ul> <p>The script contains all on-screen content (screen text and audio) and describes content in relation to all visual representation (images, animations, video etc).</p>	<p>Learning design/instructional design Domain and discipline knowledge Writing for multimedia Programming Technical writing</p>	<p>The functional specification should include:</p> <ul style="list-style-type: none"> <li>the learning outcome/objective</li> <li>a synopsis of the learning activity, purpose and context</li> <li>a description of all on-screen user events and system response</li> <li>the logic in the presentation of content.</li> <li>all on-screen text and audio, describe any animation, video etc</li> <li>feedback</li> <li>element IDs.</li> </ul>



## Content development

<p>A structural edit of the content is undertaken by TLF. To complete their tasks effectively, the writer and editor must refer to all elements within the functional specification.</p>		
<p><b>Beta</b></p>		
<p>The Beta version of learning object should be content complete, except for final audio. All interaction, including navigation and feedback, should also be complete. All third-party intellectual property must be included and signed off. Audio should be placeholder only.</p> <p>The Beta version is reviewed technically, editorially and educationally.</p>	<p>Learning design/instructional design            Domain and discipline knowledge            Programming            Graphic design            Technical writing</p>	<p>A content complete learning object with placeholder audio. The functional specification is finalised by TLF.</p>
<p><b>Conformance</b></p>		
<p>Final content complete version of the learning object</p>	<p>Programming            Audio production</p>	<p>A content complete learning object with the final audio.</p>
<p><b>Publish</b></p>	<p>TLF</p>	<p>The learning object is published in the Exchange for release to jurisdictions.</p>



### Learning design considerations

#### Consider the following when designing learning objects and learning activities:

- What will be active about the learning role of the user in the context?
- What are they going to know and be able to do, and how?
- Why do they need to do it?
- What learning opportunity is the user afforded as a consequence of using this LO rather than undertaking an offline activity? (Consider use of video, audio, animation, text, graphics = making meaning.)
- Is there opportunity for active participation of the user in constructing 'new knowledge, understanding and skills'?
- Does the level of intellectual challenge vary?
- How does the intended interaction design actively involve the user in the learning process?

#### Will the proposed learning objects and experiences:

- Support student learning of ideas that are difficult to teach using traditional resources?
- Provide experiences not immediately or usually available to students?
- Fill gaps in existing educational resources?
- Address emerging issues and bodies of knowledge for these educational concepts?
- Be available for individual learners or small groups?
- Cater for variable learning environments, eg online and distance education settings?
- Enable students to interact with and control their learning experience, eg generate data, change the behaviour of the learning object, and/or choose strategies and pathways?
- Value human interaction and communication?



### Further reading

Atkins, Susan 2003 'Achieving educational soundness in the digital age', The Le@rning Federation website

[http://www.thelearningfederation.edu.au/tlf2/sitefiles/images/brochures/achievingedsoundnesspaper\\_0903.pdf](http://www.thelearningfederation.edu.au/tlf2/sitefiles/images/brochures/achievingedsoundnesspaper_0903.pdf)

McLoughlin, C and Oliver, R 2000, 'Designing learning environments for cultural inclusivity: A case study of indigenous online learning at tertiary level', *Australian Journal of Educational Technology*, vol 16, no 1, pp 58–72.

<http://www.ascilite.org.au/ajet/ajet16/mcloughlin.html>

McRae, D 2001 'What to make, and why: Principles for the design and development of online curriculum content', The Le@rning Federation website

<http://www.thelearningfederation.edu.au/tlf2/sitefiles/images/brochures/principles.pdf>

Sims, Rod 1999 'Interactivity on stage: Strategies for learner-designer communication', *Australian Journal of Educational Technology*, vol 15, no 3, pp 257–272.

<http://www.ascilite.org.au/ajet/ajet15/ajet15.html>

Sims, Rod 2000 'An interactive conundrum: Constructs of interactivity and learning theory', *Australian Journal of Educational Technology*, vol 16, no 1, pp 45–57.

<http://www.ascilite.org.au/ajet/ajet16/ajet16.html>