

AN ISSUES PAPER

THE LE@RNING FEDERATION STEERING GROUP

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Executive Summary

The Le@rning Federation is a kick-start initiative to develop and make available online curriculum content to all Australian and New Zealand schools. It was designed to generate demand for online content in our schools, to supply an initial repository of quality online curriculum content and to encourage the development of a market. It was premised on the need to make quality online curriculum content available to complement the large-scale provision of computers in schools and a significant investment in teacher professional development.

This paper is a first look at what is required to sustain the supply and use of online curriculum content beyond 2005. It draws on two external reviews (Convergent Consulting 2003, Muirhead & Haughey 2003) commissioned by the Australian Education Systems Officials Committee (AESOC) Le@rning Federation Steering Group¹. Both reports emphasise the international importance of The Le@rning Federation on two fronts: to a schools online curriculum content market and to emerging pedagogies that use online curriculum content.

AESOC needs to consider, well in advance of 2005, appropriate arrangements for continuity of online curriculum content provision for schools. This paper argues that there are four broad requirements for sustainability of online content and its use:

- ❑ Continuing online curriculum content procurement and distribution
- ❑ Embedding online content in the practices of schools
- ❑ A national vision about schooling for the future
- ❑ Commitment to a range of policies and programs to support the vision

It further argues that there is advantage in collaborative effort in relation to all of these requirements. The minimum collaboration required to sustain the use of online content in our schools is collaboration to achieve interoperability and the capacity to share a single market. While this could be achieved without commitment to collaboration on content development, there are cost-efficiencies, trade advantages, educational change management and leadership reasons for continuing a greater level of collaboration. The Le@rning Federation model of using product development to achieve agreements on a range of difficult issues has delivered well and could be beneficially sustained.

Judicious use of The Le@rning Federation intellectual property may produce returns that can be reinvested in more content. Adaptations by teachers or systems shared locally will add to the pool. These activities alone, however, are unlikely to be sufficient to meet the demand for online content. It is likely that our governments, consistent with all other schooling system providers in the world, will need to continue to prudently fund content to meet the explicit needs of schools. The arguments for sharing these costs are still sound, so the paper argues for continuing collaboration in the sharing of intellectual property and procurement of online content.

It is further argued that in order to maximise benefit to students, attention should be paid to pedagogies, networks and support for the use of online curriculum content and that there is some benefit from collaboration to kick-start this work. Online assessment is also identified as an area where collaboration would be beneficial.

The Le@rning Federation is a major achievement in collaboration between 10 governments in Australia and New Zealand, resulting in tangible products that will enhance schooling in practical ways and make more resources available in each of those jurisdictions than would be possible without the collaboration.

¹ Available on the Initiative website, www.thelearningfederation.edu.au .
SUSTAINABLE PROVISION OF ONLINE CURRICULUM CONTENT BEYOND 2005
The Le@rning Federation Steering Group November 2003

This paper is designed to gauge the interest in particular areas of further collaboration beyond 2005. To assist discussion, thirteen propositions are presented. The thirteen propositions will be used in the development of a paper for AESOC and MCEETYA consideration in 2004.

It should be noted that the Steering Group has not discussed or recommended models for governance. Proposals on this will be made following AESOC discussion and further consultation.

Propositions for further development

Proposition One

AESOC continue collaborative work in online curriculum content procurement beyond 2005.

Proposition Two

Online content procurement beyond 2005 be based on a mix of models to achieve cost-effective support for schools.

Proposition Three

Beyond 2005, AESOC continue to work towards open, transparent and standard agreements for sharing educational content and materials developed with public money in Australia and New Zealand along with the associated intellectual property and agree to invest any returns on the work of The Learning Federation into future online content and its use.

Proposition Four

Collaborative work beyond 2005 include research and development on a range of web services including linkages to external resources and identity management, grouped into a shared layer, and assessment of the extent to which collaboration in this area would be beneficial.

Proposition Five

Beyond 2005, a digital rights management system be developed collaboratively to accommodate the range of online content procurement models agreed by AESOC.

Proposition Six

AESOC continue to pursue improvements in the availability and affordability of high bandwidth and connectivity for all Australian schools.

Proposition Seven

AESOC continue to collaborate on standards and interoperability beyond 2005 through content procurement and distribution projects.

Proposition Eight

AESOC collaborate in projects to demonstrate good practice in the use of learning objects, research the wider implications of their use, provide incentives to their introduction and link communities of practice. These measures should build on The Learning Federation trial schools and create networks that will become mainstream by 2009.

Proposition Nine

AESOC support a project to develop online, low-stakes assessment objects.

Proposition Ten

AESOC support two projects to adapt and extend Learning Federation learning objects for use in particular special needs communities, namely remote indigenous communities and students who are disengaged from mainstream schooling.

Proposition Eleven

AESOC endorse a project to use, adapt and extend Learning Federation learning objects specifically for distance education delivery to remote and isolated students, within a national collaborative framework beyond 2005.

Proposition Twelve

As part of their concern for sustainability, Ministers release a statement of commitment to transform education, including schooling, to support the future of Australia and New Zealand as innovative, knowledge-generating societies.

Proposition Thirteen

As part of the concern for sustainability, AESOC link to *Learning in an Online World* documentation of national schooling projects, programs and initiatives that support Australian and New Zealand becoming digital, networked, innovative societies and promote this package within Australia and New Zealand as well as overseas.

SUSTAINABLE PROVISION OF ONLINE CURRICULUM CONTENT BEYOND 2005

1. Focus

Sustainability in this paper refers to strategies, actions and agreements required in order to continue the supply and take-up of online curriculum content for Australian and New Zealand schools beyond the end of the current set of agreements (that is, beyond 2005). The current investment by governments in Australia and New Zealand stops at the end of the 2005 financial year. All participating governments will need to consider whether we need a continuing supply of online curriculum content and any consequent arrangements that need to be put in place.

2. Background

The Le@rning Federation (Schools Online Curriculum Content Initiative) is part of a strategy to ensure schools accomplish the changes required to support the transition of Australia and New Zealand to digital, information-dependent societies with economies increasingly fuelled by knowledge generation (see Appendix 1). This strategy is articulated in *Learning in an Online World*. The elements of the strategy are being implemented in all jurisdictions.

The Initiative is a collaboration to develop suitable high quality Australian and New Zealand resources for use in all schools in the two countries while generating competition and attracting new developers to a competitive educational online content market.

In addition to the internal reviews reported in *Readiness is All*, and an in-progress cost-effectiveness analysis that will be used to inform the strategy paper, the Steering Group has commissioned two external reviews, one on Content, by Muirhead & Haughey, and one on Market Linkages by Convergent Consulting (Executive Summaries provided in Appendices 2 & 3). Both reviews indicate that the Initiative goals are being met.

The Convergent Consulting Review summarises thus:

Overall, while TLF has managed to achieve most of the market linkage objectives, as defined in the Trinitas Market Framework and the public funding kick-start program, we believe that there is significantly more that can be done to support Australian industry development, beyond these original objectives. Such a development could be expected to significantly benefit both industry development and the education sector.

This suggestion should not be taken to mean that TLF has failed in key areas, when in fact, it is quite the contrary case. It is actually because of the relative success of the project in developing quality content under methodologies and standards that appear to be gaining rapid global acceptance, and for the fact that TLF appears to be 'leading the world' in this regard, that there would now appear to be an excellent opportunity for TLF and Suppliers to capitalise on this position, through the development of an expanded set of market linkage objectives. While more detailed analysis and consultation will be required to develop these market linkage strategies and, we acknowledge, many of them would currently, most likely, reside outside of TLF's charter, we believe some areas for consideration are emerging, including how to:

- stimulate greater 'grassroots' interest in online educational content amongst Australian teachers;*
- distribute and integrate this content into the school classrooms and workflow processes;*
- encourage greater investment and risk-taking by the private sector in the development of content;*
- identify and package the intellectual property developed; and*

- *develop strategic partnerships and organisational structures that will facilitate the best access to international markets.*

The more pedagogically oriented Muirhead and Haughey report summarises:

- *Without exception, learning objects displayed accurate information and they reflected specific criteria described in the Educational Soundness Specifications regarding “Integrity” or “the ways in which knowledge is conceptualized within specific domains;”*
- *While learning objects incorporated specific learning objectives in their design, they would benefit from additional linkages to external curricular resources available to both teachers and learners;*
- *All learning objects required user familiarity with computers as well as with input devices (e.g., keyboard, mouse, tab key functions and space bars). For learners who are less experienced with computer technology, it is recommended that a learning object be created to assist learners in acquiring requisite knowledge and skills to utilize learning objects effectively;*
- *Through the content development initiative, the Le@rning Federation has shown exceptional leadership in assisting learners to engage effectively with online resources while acquiring knowledge, skills and attitude through the use of information and communication technology;*
- *In designing the learning objects, developers were highly cognizant of the need to sensitively address community and cultural membership, including written and spoken language.*
- *The design of the 22 learning objects demonstrates great potential in their application to school-age children and for their use in a wide variety of instructional environments. Overall, developers were highly successful in their abilities to address the issues that have been identified in the literature on learning objects (e.g., size, aggregation, flexibility, localization, and customization).*

In summary, the expert assessment of the 22 learning objects, together with a review of the supporting documentation, demonstrated the developing national infrastructure and emerging sector strength among both public and private sector organizations in developing learning objects that enhance educational attainment in Australia and New Zealand. The findings underscore the significant potential that these objects have for use across the globe and for the role that Australian companies have in establishing leadership in the field of learning objects.

In *Readiness is All* the Steering Group articulated its belief that sustainability of online content is to some extent dependent on change factors outside the control (but not the influence) of The Le@rning Federation. The digital world is networked and content is one component of a strategy for an online world. Ministers now have a substantial collective asset in online curriculum content to match the jurisdictions’ investments in computers, networks and teacher development. They must consider how to both sustain and exploit this for the best return to our societies.

In the light of this, Steering Group discussion has identified four broad requirements for sustainability:

- ❑ continuing online curriculum content procurement and distribution
- ❑ embedding online content in the practices of schools
- ❑ a national vision about schooling for the future and
- ❑ commitment to a range of policies and programs to support the vision.

While the Steering Group is most focused on the first two, brief comment will be made about the others.

3. Online curriculum content procurement and distribution

The originators of The Le@rning Federation outlined a four-part strategy that remains sound². The first two parts are well on the way to being achieved. The third component of the strategy is currently under development within the joint venture and will be achieved within the timeframe. The fourth, as was predicted in 2000, will take longer. It is the third and fourth components of the original strategy that are the focus of this paper.

3.1. Demand

In establishing the Initiative, Ministers were providing leadership about the direction of mainstream schooling, rather than responding to demand for online content. The Initiative was to meet Ministers' demands for a schooling sector more oriented to a digital, innovation-directed future. The Le@rning Federation was to provide high quality online content that schools would find so useful that teachers would demand more³.

The Le@rning Federation content will be substantial in quantity and will meet the high quality standards established by AESOC. It will be in the required 'distributed standards-based environment'. It is being received with enthusiasm in the trialling schools. It will, however, be some time before use of the content is ubiquitous in our schools, and take-up rates will vary across geographic areas and jurisdictions for some time. As students, teachers and the community routinely use The Le@rning Federation content, they will look for more and demand will be generated. Towards the end of the Initiative period (2005) we could expect to see some teachers developing and sharing their own learning objects. We are also likely to see products emerging from state and territory systems, commercial vendors and cultural agencies (TLFJV 2003). These developments are all dependent on reaching sophisticated intellectual property agreements amongst jurisdictions and between the joint venture and developers (see section 3.5). It is unlikely that, by 2005, these products would sustain either the Initiative or content demand in individual jurisdictions. A sustainable supply of content will depend on a mix of quality products being nurtured and efficiently and equitably distributed.

Even allowing for local adaptations and additions to The Le@rning Federation content, jurisdictions will continue to face the need for further high quality content for schools. This need will take the form of demand from schools as well as broader political and social demand. In addition, from 2006, The Le@rning Federation content will progressively require updating and supplementing.

At the end of The Le@rning Federation kick-start period (June 2006) all jurisdictions will face the need for more online content funded by government. A question to be faced by all jurisdictions, therefore, is the extent to which they wish to approach the future collaboratively and which approach will be the most cost-effective.

² TLF (2000), p 1.

- Develop a body of nationally funded content.
- Develop the nationally funded material within a framework that supports both distributed access and distributed development by member jurisdictions.
- Use the framework and the base of nationally funded material to stimulate further contributions to a pool of nationally accessible material, meeting nationally agreed standards.
- Design the framework to be increasingly self-supporting once the initial nationally developed material is completed.

³ *The investment strategy will produce a pool of national material in areas of high priority and a framework for additional contributions. These materials may be supported by and integrated with a range of open platform communication and management tools, to assist teachers and students in using, customising and integrating the online content into the curriculum to achieve specified curriculum outcomes. A key principle, therefore, of online curriculum content in this initiative is the provision of a distributed standards-based environment into which materials can be plugged and which will facilitate the distribution of materials and Intellectual Property from system to system and eventually, teacher to teacher.* TLF (2000), p24

3.2 Cost effectiveness of sharing

Whether online content beyond 2005 is created along the same lines as The Le@rning Federation outsourced development, or through an alternative model or models, it is likely that collaborative effort by all states, territories and New Zealand will be more cost-effective than would be the aggregate cost of independent efforts.

While further analysis is required in writing the strategy paper to determine the most effective model, there are three generic reasons why a collaborative effort would be more cost-effective than “go it alone” alternatives.

First, a collaborative approach fosters economies of scale and supports market efficiencies. It does this by maximising collective bargaining power (for instance, in the case where content is procured from third parties) and by co-ordinating administration and project management services (in the case where content is developed through outsourcing arrangements).

Secondly, it eliminates the risk and additional cost of content duplication that could occur if jurisdictions were to act independently.

Finally, by focusing activity on achieving set objectives, (such as an accepted interoperability framework, or a certain amount or quality of content), within a specific timeframe, a collective effort is key to maximising, as early as possible, the educational, social and economic benefits that Australia and New Zealand can derive from opportunities presented by the e-learning revolution. This is pivotal to maintaining international competitiveness, and placing Australia and New Zealand at the forefront of e-learning.

3.3 The case for public funding

One projection of the CESCEO originators of the Initiative has not been borne out. The original Directions paper was hopeful *that it is possible to move from full public funding of online curriculum content to a commercial market, that is, it increases the proportion of private rather than public funding over time*(TLF 2000).

The Steering Group has been unable to find anywhere in the world where this proposition is true, or close to true. Whether directly, through central development, central purchase or indirectly through grants to schools, regions or local communities, Australian and New Zealand governments will continue to fund content for schools, as do governments in the rest of the world.

This is not to diminish the role of the market. The Le@rning Federation has been successful in engaging developers and helping to build a local market (Convergent Consultants, 2003). There is more to be done, but even two years into the Initiative, there are positive signs in the market. Further, there is a real possibility of an overseas market emerging for local developers in conjunction with The Le@rning Federation (Convergent Consultants, 2003).

Proposition One

AESOC continue collaborative work in online curriculum content procurement beyond 2005.

3.4 Content procurement models

The Steering Group has considered a number of models to ensure a supply of further contributions meeting national standards.

Australian and New Zealand curricula, for the most part, are more similar than they are different. This is the basis of the MCEETYA agreement to deliver consistent curriculum outcomes in all schools across Australia, in the four domains of English, Maths, Science and

Civics and Citizenship, building on the areas of commonality identified. In the light of this MCEETYA agreement, the original arguments for shared online content development and procurement still hold: namely, achievement of national goals, economies of scale, ensuring local content, re-use and minimisation of duplication.

The pursuit of nationally consistent curriculum outcomes is enhanced by continued commitment to a unified market for online curriculum content. This does not, however, commit us to a continuation of the current model of The Le@rning Federation content development. The third requirement of the original brief includes “further contributions meeting nationally agreed standards”. The Steering Group has identified a range of models, along with possible ways of focussing the content (see table 1) and requested that the joint venture examine each of them, along with any others that can be identified. It is to be noted that all models assume a degree of sharing. The joint venture is currently considering a mix of models for the next three years and will also look at the cost-effectiveness of various combinations of the models. The Steering Group has asked that this work be expanded to include all categories in Table 1 and the timeframe 2005 – 2009.

FOCUS MODELS	AESOC-identified broad priority areas	The areas of national consistency	Areas of scarcity.
Development via tender			
Seek extant content			
Partnerships with cultural agencies			
Partnerships with industry			
Share teacher developed content			
Share jurisdiction developed content			
Market decides – demand-side intervention only*			

* Includes e-credit, user-pays and price signalling.

Table 1

The cost-effectiveness of the Initiative will increase over time as systems and processes are standardised, as developers acquire more knowledge about re-usable learning object creation and as the shareholders and joint venture build on their experiences.

Proposition Two

Online content procurement beyond 2005 be based on a mix of models to achieve cost-effective support for schools.

3.5 Intellectual Property Sharing

Crown copyright is a problematic asset (in context of commercialisation) but a huge potential source of leverage in shaping content markets. Terry Cutler 2003

A basic requirement of The Le@rning Federation initiative was the formalising of agreements between jurisdictions for the sharing of the intellectual property associated with materials developed with public money. Negotiations on this are still proceeding. While it is inevitable

that negotiations involving ten governments and their lawyers will take time, leadership is required to ensure that the best outcomes are achieved for all students and the most appropriate use is made of public money. Continuing collaboration is required to achieve a point where:

- ❑ every student has open access to all publicly funded online curriculum content
- ❑ Australian and New Zealand developers can leverage viable businesses from public investments in educational content
- ❑ each jurisdiction is able to support its schools more effectively and with greater cost-efficiency.

There are tensions, and at times conflict, in the understandable desire of schooling arms of governments to gain immediate local financial return on money invested in content developed for their schools. At the same time other arms of the same governments are working to develop viable commercial industries in multi-media, with export potential, pursuing policies that restrict government activity to core business. This is made more complex by Australia's federal structure.

The Le@rning Federation has expended considerable time, energy and resources in brokering arrangements for the sharing of Crown copyright in order to enable free use by schools and responsible use of Ministers' assets through the companies they set up for this purpose while supporting the growth of an online content industry.

The rationale behind the establishment of ministerial companies and collaborative national initiatives like The Le@rning Federation remains one of pooling defined resources in order to achieve economies of scale and to enable research and development out of the reach of individual jurisdictions. For this reason, return on national investment in online content from any commercial sales or licenses should primarily be returned to the national Initiative for the procurement of further content.

This is a difficult area. The AShareNet model shows that open and efficient sharing of educational material through a managed intellectual property system can be achieved across jurisdictions in the VET sector. The schooling sector, however, will need to develop its own model. The Le@rning Federation model of ironing out a range of agreements (such as intellectual property sharing, standards, digital rights management and quality assurance) through a collaborative and scaleable product-oriented project has to date proved useful to schooling. However, it increases both cost and risk of the product-oriented project.

Developers, in particular, are critical of this expenditure on consultation and collaboration, which, in their view, would be better spent directly on content (Convergent Consulting 2003, p3). If, however, we are to develop a viable market within our small population base and ensure Australian and New Zealand children use local as well as overseas content, AESOC must build an intellectual property sharing regime that supports wide-ranging exchange and sharing of schooling sector materials in the public domain for generations to come. This will make a major contribution to the sustainability of content provision to schools in the long term. Developers will ultimately benefit from transparent agreements about public and private ownership of intellectual property.

Proposition Three

Beyond 2005, AESOC continue to work towards open, transparent and standard agreements for sharing educational content and materials developed with public money in Australia and New Zealand along with the associated intellectual property and agree to invest any returns on the work of The Le@rning Federation into future online content and its use.

3.6 Leveraging Services

The Muirhead & Haughey review of The Le@rning Federation content commented:

A logical extension of the Le@rning Federation learning objects would be to support linkages to external resources. If the metadata and searching functions prove to be robust in relation to accessibility and discovery of learning objects for classroom teachers, the Le@rning Federation could fruitfully explore the possibility of trying to link learning objects with other available quality resources and teacher-developed material.

This is one example of web services that occupy a layer shared between users and providers. This shared web services layer, based on common standards and interoperability, can support the extension, manipulation, integration and interoperability of products and services, building capability and maximising national effort and funds. There is potential to build on existing national web services for mutual benefit.

Proposition Four

Collaborative work beyond 2005 include research and development on a range of web services including linkages to external resources and identity management, grouped into a shared layer, and assessment of the extent to which collaboration in this area would be beneficial.

3.7 Digital Rights Management

Any model of content procurement that involves more than directly commissioned development will require a robust electronic use digital rights management system to ensure both developers' and users' rights are respected, costs are contained and a market is nurtured.

Jurisdictions may wish to extend the digital rights management system (DRM) developed for The Le@rning Federation even further to encompass all electronic use of digital materials used within a jurisdiction so that all digital rights information can be owned by jurisdictions rather than by a collection agency.

Extensions of the DRM to encompass all digital materials aside, any sustainable system of content provision, whether for an individual jurisdiction or a collaborative venture must balance the complexity of the content procurement model with the complexity of the digital rights management system employed. The more complex the procurement model (i.e. the more varied the sources of content) the more sophisticated the DRM required. As DRM is expensive, there is considerable advantage in collaboration and sharing.

Proposition Five

Beyond 2005, a digital rights management system be developed collaboratively to accommodate the range of online content procurement models agreed by AESOC.

3.8 Bandwidth & Connectivity

Although the joint venture is managing the development of content for Australia and New Zealand within the anticipated bandwidth limits of the next two to three years, and discussing with jurisdictions a number of creative ways of managing within these limits, bandwidth remains an issue in terms of bringing all the power of multi-media to bear on educational outcomes and developers being able to export online content based on their Le@rning Federation experience.

Long-term sustainability of online curriculum content will be influenced by bandwidth and connectivity, to the extent to which students and teachers are able to: (1) access and use fully interactive learning objects just in time and with a speed that fits with their crowded timetables and locations; and (2) remain competitive within an increasingly global education market.

The sustainability of an online content market in Australia and New Zealand is intimately linked to the overseas market for learning objects, which mostly operates with higher bandwidth than Australia and New Zealand.

Proposition Six

AESOC continue to pursue improvements in the availability and affordability of high bandwidth and connectivity for all Australian schools.

3.9 Distribution

Although work will need to continue and expand, good progress is being made within jurisdictions in terms of processes for the distribution of learning objects to schools. Solutions vary from jurisdiction to jurisdiction. While this is an issue for individual jurisdictions rather than a collaborative venture, the Exchange repository and the Basic e-Learning Tool Set (BELTS) are assisting jurisdictions envisage and test the needs of teachers and students in relation to the receipt and manipulation of learning objects.

Robust, increasingly efficient and seamless distribution systems and infrastructure for schools are critical to sustainability. While propositions in this paper focus on collaborative activities, the work within jurisdictions remains critical.

4. Embedding online content in the practices of schools

The Steering Group considers that in addition to content procurement issues, there are four key considerations in ensuring the sustainability of online content for our schools: standards; support for teachers; assessment; and use by specific groups of students. These four areas are discussed below in terms of their importance for sustainability and the extent to which collaboration would be of benefit.

4.1 Standards and Interoperability

The Australia and New Zealand market is a small one for K-12 curriculum content, whether online or not. Disaggregation into 10 jurisdictionally-based markets fragments both supply and demand in an increasingly networked and connected economy, leaving small local producers to invest in considerable back-office knowledge assets and risk management in order to maintain interoperability and local users to make high-risk decisions about off-the-shelf or locally developed products. The argument for collaborative work to determine standards (both technical and educational) in the Australasian market for online curriculum content is very strong, both from an educational delivery and a business development perspective. This is reflected in the review commissioned from Convergent Consulting (p3).

In particular, TLF has created a solid and robust Market Framework that clearly defines, to both the Supplier and User communities, the expectations for the development of quality online curriculum resources. Key aspects of this Market Framework, include:

- *setting technical standards and frameworks (e.g. interoperability, accessibility, meta-tagging, etc.);*
- *setting instructional design standards and methodologies (e.g. defining learning objects, pedagogy design, etc.)*
- *specifying developmental and QA procedures (e.g. production management processes, user testing, etc.); and*
- *establishing a systems environment*

A mark of how successful TLF has been in establishing the Market Framework, is that it is now widely considered a global leader in developing these standards and frameworks. As a

result, it is worth noting that there would appear to be as much international interest in the intellectual property that TLF has developed in this regard, as there is for the 'content' itself.

The minimum required to sustain a reliable cost-effective supply of online curriculum content is collaboration on the market framework, namely standards and interoperability. To retreat from this would severely weaken the market and expose individual jurisdictions to high-risk decisions regarding content, at the same time reducing our countries' capacity to compete in the global K-12 online content market. Regardless of decisions about national content development, collaboration on standards is of benefit to both users and producers.

Proposition Seven

AESOC continue to collaborate on standards and interoperability beyond 2005 through content procurement and distribution projects.

4.2 Support for teachers

...at this stage of adoption of information and communication technology teachers require support and guidance concerning how best to use learning objects and computer technology in their teaching practice. (Muirhead and Haughey 2003)

Scottish teachers and school students mostly have access to computers in their homes and classrooms. The home computers appear to be frequently used. Students, however, encounter the classroom computers only seldom and when students do use computers in the classroom the activity is often peripheral to the learning process, (such as word processing of essays). Such evidence underscores the need to provide appropriate professional development opportunities for mainstream teachers (Eklund, Kay et al. 2003)

It is clear that a successful implementation of e-learning depends on the competence of the teaching practitioner to access and select quality content and then integrate this into the teaching context. This hypothesis assumes that teachers mediate ICT applications when they are successful, and that ICT's academic value relates positively to teacher competence...(Eklund, Kay et al. 2003).

Direct teacher support is predominantly a jurisdiction responsibility. However, a characteristic of contemporary curriculum frameworks, as well as technologies, is their interconnectedness. Networks across jurisdictions could benefit everyone.

The Muirhead & Haughey review (Recommendations 1 & 2) argues strongly for extension of online content development to include communities of practice and support for teachers as they begin to use learning objects. It is therefore reasonable to consider what benefits might be derived from national collaboration to develop products, networks and service models for teacher support. A number of officers in jurisdictions have suggested The Le@rning Federation take some leadership in this area, building on the existing trial schools to develop some precedent, documentation and structures in partnership with individual jurisdictions. University education faculties and professional associations could also be involved.

There is precedent for this approach in both the Curriculum Communities and Asia EdNet projects, managed by Curriculum Corporation, one funded by the Commonwealth and the other collaboratively.

Just as The Le@rning Federation provided a 'kick start' for content, a collaborative project on teacher support for learning object use could 'kick start' the shift to a networked teacher

support structure in relation to online learning. In the light of the Muirhead & Haughey report, such a network could also provide international leadership.

Activities that could be nationally feasible and useful include:

- help desk for learning object use
- online tutorials, courses (and if required, accreditation) that draw on case studies
- online user groups
- formal clusters of user schools with coordinator support, each one focused on specific issues of their own choosing and committed to sharing their work
- scholarships for teachers
- conferences
- commissioned and documented research in the use of learning objects in school settings, to include pedagogical issues, physical issues, classroom management, home-school linkages
- publications, brochures and articles.

Activities endorsed and supported nationally could act as a baseline for future support and provide a buffer of time for states and territories to develop networks and support structures for a future more reliant on digital resources. These activities would also provide several entry points for teacher education providers to engage pre-service students in e-pedagogies and online content and could be linked to the outcomes of the Review of Teaching and Teacher Education.

Focus of these activities would need to cover pedagogy, basic organisation of space and logistics, mixing digital with non-digital resources, classroom management, home-school links, assessment and leadership.

Proposition Eight

AESOC collaborate in projects to demonstrate good practice in the use of learning objects, research the wider implications of their use, provide incentives to their introduction and link communities of practice. These measures should build on The Le@rning Federation trial schools and create networks that will become mainstream by 2009.

4.3 Assessment

The CESCEO originators of The Le@rning Federation avoided the issue of online assessment. It is clear, however, that teachers, students and parents are interested in tools that enable both formative and summative assessment related to the use of learning objects and the topics they cover. Low-stakes assessment is an integral part of schooling and once The Le@rning Federation content is widely available demand will build for related assessment tools and materials. This is already evident in the trial schools.

Therefore, to be sustainable in the longer term, online assessment objects will need to be built. Given the capacity of technology to generate random changes, there is sufficient variation possible to support collaborative work without fear of repetition and ‘copying’ by students. Results of low-stakes assessment can be contained by school policies rather than interfacing with system or government level data collection. The collaboratively funded Curriculum Corporation project Assessment for Learning is already working in this area.

There is opportunity here to engage with a growing discussion about online, multi-use, student-directed and teacher-directed assessments and to engage assessment agencies and other in valuable research and development in the context of a user-tested product-oriented initiative.

This area has potential to make real gains in learning productivity, but needs further work. It is work much better done in a collaborative, rather than a piecemeal or repetitive manner.

Proposition Nine

AESOC support a project to develop online, low-stakes assessment objects.

4.4 Specific Groups

The trial schools for The Le@rning Federation initial content include a range of students, geographic locations and technology readiness. Testing has involved distance education students, indigenous students and students with a range of disabilities as well as students from a range of socio-economic circumstances. It has not been a goal of The Le@rning Federation to directly address the inequalities potentially exacerbated by the widespread introduction of digital technologies.

However, for the long-term sustainability of the Initiative, we need to take steps to ensure that online curriculum content is not only available to, but specifically serving the needs of, groups in Australia who could be disadvantaged by inadequate or ill-adapted application of content. Given research that indicates the importance of local adaptation of and decision making about content in bridging the 'digital divide'(Hoffman; Breeden., Cisler et al. 1998; Hoffman & Schlosser, 2000), some specific projects should be established to work with specific communities in local use, adaptation and development of learning objects.

Two groups are of particular priority at this time, indigenous communities, especially those in remote areas and students who are disengaged from mainstream schooling.

Proposition Ten

AESOC support two projects to adapt and extend Le@rning Federation learning objects for use in particular special needs communities, namely remote indigenous communities and students who are disengaged from mainstream schooling.

In addition to these three groups, it is timely to focus on the adaptation of The Le@rning Federation learning objects for use in distance education. The national materials development network has been collaborating for nearly a decade on distance education materials and a recent paper from Queensland to AESOC (AESOC 2003) picked up on the use of learning objects in distance education, especially in relation to the relatively small group of remote and isolated students.

There are a number of ways in which this issue is significant. As the Queensland paper points out, it would be productive to leverage The Le@rning Federation work very specifically into the distance education field, beginning with the identifiable and cross-jurisdiction group of remote and isolated students. Distance education also offers an important opportunity to examine a pedagogy in which the resources are focused directly on the student, rather than on the teacher's use with a student. The last may provide break-through insights in the design and application of learning object technology. Independent learning as well as collaborative learning can be facilitated by online curriculum content.

Additionally, as the boundaries between distance and virtual education are disappearing, with virtual schooling emerging in both Canada and the USA as a popular, cost-efficient and seemingly effective schooling option for some people, work in a contained area of distance education would provide a manageable base for exploring the wider area of virtual education.

Proposition Eleven

AESOC endorse a project to use, adapt and extend Le@rning Federation learning objects specifically for distance education delivery to remote and isolated students, within a national collaborative framework beyond 2003.

5. Collective vision and will

AESOC's predecessor, CESCEO, set The Learning Federation in the context of change and educational transformation⁴.

Early indications from The Learning Federation field trials support their vision. In addition, results from schools in Australia and elsewhere suggest efficiencies in administrative applications, home-school connectedness, motivation, conceptual development, and in some instances, assessment results.

Just as pertinent are the increasing demands for schooling to play a role in creating an innovative, knowledge-dependent society. Andrews and Crowther (2003) propose that teaching in a knowledge society will be a highly sophisticated, complex construct that can be viewed as three-dimensional. When the three dimensions come together, the net effect is new knowledge that has the power to transform communities.

Other writers suggest need for education to create a 'critical knowledge culture' (Chapman 2001). This may prove a more useful concept in managing changes to school organisation, business models and pedagogy than more technically framed notions⁵.

Proposition Twelve

As part of their concern for sustainability, Ministers release a statement of commitment to transform schooling to support the future of Australia and New Zealand as innovative, knowledge-generating societies.

6. Integrating Policies and programs to support the vision

Every one of the macro trends identified for 2003 is integrally tied to the others. To address any without regard for the others would be folly. In 2003 the key challenge will be integration, and how you as an educational leader are able to start bringing the parts together. The task will be immense (Lee 2003).

Australia, like Finland (Ministry of Education 2000), could articulate and promulgate a plan to shape the culture of schooling to ensure a continuous commitment to new learning possibilities and knowledge growth from K-12 onward. In the schooling sector this would involve linking online curriculum content, curriculum frameworks, 'new basics', 'essential learnings', 'multiliteracies', equity policies, student performance standards, teaching standards, pedagogies, national curriculum consistency, learning architectures, research services and bandwidth measures to a range of intellectual, human and social capital initiatives in VET and Higher Education, such as research efforts, intellectual property management and flexible delivery. Online content provides some leverage for the schooling sector – but the vision needs to be more broadly articulated and sustained.

Through the taskforce structure of MCEETYA a great deal is being achieved. Even more is being achieved in the aggregation of the work of jurisdictions. There is a need, however, to ensure the integration of these efforts and, just as importantly, the public awareness of this integration and 'big picture'. While online curriculum content will be of some use to teachers and students even if delivered in isolation, benefits will be most sustained if online content provision is 'wrapped' within supporting policies and programs. In other words, return on

⁴ A fundamental premise of the initiative is the capacity of ICT to significantly change educational delivery and to create new learning possibilities Ibid.

⁵ See also DEST, (2003).

investment is tied to organisational goals and business planning. The suite of documents emerging under the banner of *Learning in an Online World* point in this direction, but there is scope for greater linkages to teacher education, professional development, resourcing models and curriculum articulation.

"... the ultimate purpose of e-learning is not to reduce the cost ..., but to drive business results"(Eklund, Kay et al. 2003)

Proposition Thirteen

As part of the concern for sustainability, AESOC link to *Learning in an Online World* documentation of national schooling projects, programs and initiatives that support Australian and New Zealand becoming digital, networked, innovative societies and promote this package within Australia and New Zealand as well as overseas.

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* These reports are available on the stakeholders' closed section of The Le@rning Federation website. Registration is free, and available to stakeholders. To register and access the closed section, send an email requesting registration to stuart.tait@thelearningfederation.edu.au.

Appendix 1 A Brief History of The Le@rning Federation

In September 1999, a CESCEO paper successfully argued the case for a *Strategy For Generating On Line Curriculum Content For Australian Schools*. The argument was based on:

- Achieving National Goals
- Enhancing teaching and learning
- Maximising the benefits of ICT investment
- Preparing young Australians to participate in the digital world and the information economy
- Developing an Australian industry in on line content
- Increasing access to and use of existing curriculum content
- Ensuring Australian content
- The need for a national effort

A premise of the paper was:

While the long term impact on schools of this series of changes is uncertain, three things can be said with confidence:

- *the change will provide radical new challenges to conventional processes of schooling;*
- *new technologies hold out a realistic hope for a significant improvement in learning outcomes for all Australian students; and*
- *the effective adoption and exploitation of new technologies within education offer substantial economic and social opportunities to the nation.*

Chief Executives and Ministers understood at the time that:

Digital content is not the only element required to support the transition in education. Access to equitable provision of high bandwidth services and effective professional development are matters of equivalent significance, without which the potential benefits of the digital curriculum will not be realised.

The Le@rning Federation initiative, begun in 2000, is the result of two sets of discussions coming together. On the one hand, the CEOs of Australian education systems had been discussing for some time the need for schools to support a society that is increasingly ICT enhanced and knowledge dependent. While individual jurisdictions had invested significant amounts in equipment, wiring and professional development, it was evident that the task was beyond any one jurisdiction and involved issues that would be better addressed collaboratively.

Simultaneously, the National Office for the Information Economy was putting together a number of policy documents, and looking at what was needed in public sectors (including health and education) to underpin Australia's future as an 'information economy'. The bringing together of these two discussions resulted in the publication of *Learning in an Online World* which identified that the sector needed to do work in relation to 'Infrastructure', 'People', 'Content' and 'Policy and Regulation' in order to ensure the schooling sector was preparing students to take their place in a society in which both jobs and social life were more dependent on knowledge generation and use than on industrial processes.

MCEETYA endorsed *Learning in an Online World* in 2000 and a suite of supporting documents in 2003.

The *Readiness is All* paper to MCEETYA in July 2003 evaluated progress of The Le@rning Federation against original goals, and identified areas to be addressed if the Initiative is to play its part in the transition of schooling to a digital environment.

Appendix 2 Convergent Consulting Review of Market Linkages

Executive Summary⁶

By most measures, TLF has met, or exceeded, in developing the market linkages it set out to achieve during Phase 1. These expectations were based mainly around the two key strategic interventions required to overcome market failure, in the schools sector, and to assist the future development of the industry. These were:

1. Establishing a Market Framework
2. Kick-starting curriculum development through public funding

In particular, TLF has created a solid and robust Market Framework that clearly defines, to both the Supplier and User communities, the expectations for the development of quality online curriculum resources. Key aspects of this Market Framework include:

- setting technical standards and frameworks (e.g. interoperability, accessibility, meta-tagging, etc.);
- setting instructional design standards and methodologies (e.g. defining learning objects, pedagogy design, etc.)
- specifying developmental and QA procedures (e.g. production management processes, user testing, etc.); and
- establishing a systems environment

A mark of how successful TLF has been in establishing the Market Framework, is that it is now widely considered a global leader in developing these standards and frameworks. As a result, it is worth noting that there would appear to be as much international interest in the intellectual property that TLF has developed in this regard, as there is for the 'content' itself.

The one area of the Market Framework that still needs development, is the management of intellectual property rights (IPR). It is apparent that work still needs to be completed around:

- identifying and defining the key components of IP that have been developed (e.g. content, systems and , processes) and how they should be packaged together;
- identifying the 'natural owner' best positioned to exploit these various IP packages;
- developing agreements on licensing, pricing and payment mechanisms; and
- Developing and implementing strategies to extract value from this IP.

More complex has been TLF's management of the 'kick start' program. On the positive side, all Suppliers feel that TLF's uncompromising stance on adhering to IMS standards, learning objects, educational integrity, useability, accessibility, and QA means that the content produced will be 'world class'. Further, each believes that their exposure to producing multimedia educational product, in accordance with such stringent standards and advanced methodologies, has been a very valuable learning experience which can be, and has been, used to win non-TLF development work, both domestically and overseas.

Another area of major achievement has been the success of the TLF consortium model in aggregating the demand-side needs of the Educational Authorities (EAs). According to one international expert, no other group of separate Educational jurisdictions has been able to overcome the significant political, technical and logistical barriers that TLF has managed to

⁶ The full report is available on the stakeholders' closed section of The Le@rning Federation website. Registration is free, and available to stakeholders. To register and access the closed section, send an email requesting registration to stuart.tait@thelearningfederation.edu.au.

achieve with this project. He believes this co-operation provides TLF a significant scale advantages over most other international projects.

Notwithstanding these very positive outcomes, Suppliers expressed a number of concerns, including:

- their inability to achieve globally competitive ‘economies of scale’, as a result of development contracts being spread too thinly over too many Suppliers;
- their view that only the proportion of TLF funding directly spent with multimedia Suppliers, on developing content, is too small compared with funding for other tasks such as TLF’s internal governance, project management, administration, and consultation processes amongst the EAs
- TLF’s procurement and production management processes are inefficient and costly (although, Suppliers now express optimism that these have been improved);
- IP ownership arrangements are unclear and cumbersome; and
- competition between the public and private sectors for TLF contracts, distorts an ‘efficient market’.

While we can understand these Supplier concerns, we are encouraged that TLF appears to have consulted with Suppliers and taken corrective action that should address a good proportion of these issues. Having said that, we also recognise that TLF needs to balance the needs and desires of Suppliers with other competing objectives and issues, which potentially means that healthy tensions with Suppliers will continue to persist to some degree.

Overall, while TLF has managed to achieve most of the market linkages objectives, as defined in the Trinitas Market Framework and the public funding kick-start program, we believe that there is significantly more that can be done to support Australian industry development, beyond these original objectives. Such a development could be expected to significantly benefit both industry development and the education sector.

This suggestion should not be taken to mean that TLF has failed in key areas, when in fact, it is quite the contrary case. It is actually because of the relative success of the project in developing quality content under methodologies and standards that appear to be gaining rapid global acceptance, and for the fact that TLF appears to be ‘leading the world’ in this regard, that there would now appear to be an excellent opportunity for TLF and Suppliers to capitalise on this position, through the development of an expanded set of market linkage objectives. While more detailed analysis and consultation will be required to develop these market linkage strategies and, we acknowledge, many of them would currently, most likely, reside outside of TLF’s charter, we believe some areas for consideration are emerging, including how to:

- stimulate greater ‘grassroots’ interest in online educational content amongst Australian teachers;
- distribute and integrate this content into the school classrooms and workflow processes;
- encourage greater investment and risk-taking by the private sector in the development of content;
- identify and package the intellectual property developed; and
- develop strategic partnerships and organisational structures that will facilitate the best access to international markets.

In particular, we believe some of the international models and feedback, outlined in Section 5.2, provide a useful starting point for exploring these issues.

Appendix 3 Muirhead and Haughey Review of Content

Executive Summary⁷

This report is in response to a Request for Proposals from the Le@rning Federation, Australia. The work was completed between July 22 and September 30, 2003. The project was limited to the current content development initiative of the Le@rning Federation. The specific goals of the project were to

- Review and assess a subset of 22 learning objects developed through the Initiative from a variety of perspectives namely, usability within a variety of instructional settings and across national boundaries, exchangeability and re-usability;
- Situate the work of the Le@rning Federation within international development, design and pedagogical contexts in relation to the development of K-12 online learning materials, the instructional design of learning objects for children, and the pedagogical use of learning objects to support enhanced student outcomes.

A literature review on learning objects was conducted. The review focused on the international context for learning object design and development and placed the Le@rning Federation's work within that context. The authors addressed the challenges associated with the development of learning objects and they reviewed differing instructional design and learning theories that informed early versions of learning objects. Recommendations pertained to future directions, desirable learning object characteristics, and possible changes to the development model. The 22 learning objects were expertly reviewed and assessed to

- (a) gain a better understanding of their overall pedagogical design,
- (b) articulate the assumptions used by the developers in designing the learning objects
- (c) ascertain the extent to which learning objects met the Educational Soundness Specification developed by the Le@rning Federation, and
- (d) make recommendations regarding criteria to be considered in the development of the next generation of learning objects. To complete the assessment, a 14-point instrument was developed (i.e., Learning Object Evaluation Instrument), incorporating features of other instruments, together with criteria supplied by the Le@rning Federation.

Assessment of the Learning Objects, Models and Frameworks

A summary of the findings from the comprehensive assessment of the 22 objects follows. Detailed findings and specific recommendations for each learning object are included in Appendix 2.

- Without exception, learning objects displayed accurate information and they reflected specific criteria described in the Educational Soundness Specifications regarding "Integrity" or "the ways in which knowledge is conceptualized within specific domains;"
- While learning objects incorporated specific learning objectives in their design, they would benefit from additional linkages to external curricular resources available to both teachers and learners;

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- All learning objects required user familiarity with computers as well as with input devices (e.g., keyboard, mouse, tab key functions and space bars). For learners who are less experienced with computer technology, it is recommended that a learning object be created to assist learners in acquiring requisite knowledge and skills to utilize learning objects effectively;
- Through the content development initiative, the Le@rning Federation has shown exceptional leadership in assisting learners to engage effectively with online resources while acquiring knowledge, skills and attitudes through the use of information and communication technology;
- In designing the learning objects, developers were highly cognizant of the need to sensitively address community and cultural membership, including written and spoken language.
- The design of the 22 learning objects demonstrates great potential in their application to school age children and for their use in a wide variety of instructional environments. Overall, developers were highly successful in their abilities to address the issues that have been identified in the literature on learning objects (e.g., size, aggregation, flexibility, localization, and customization).

Report recommendations concerned future directions of the Le@rning Federation to build on the success of the content development initiative, namely

1. The Le@rning Federation should take immediate steps to expand its current mandate to develop communities of practice among learners and instructors involved with the content development initiative. The network could easily be strengthened by developing linkages with schools in Canada and the United Kingdom;
2. The content development of the Le@rning Federation should be expanded to include responsibility for supporting the use of online curricular materials (e.g., learning objects) across its member jurisdictions;
3. The Le@rning Federation should consider initiating or partnering with others with respect to further research in cross-cultural transfer, examining such issues as values, disciplinary structures, competition for students and legislation. Appropriate information exchanges could be considered with potential partners in Canada and the United Kingdom;
4. The Le@rning Federation is in a very strategic position to monitor shifts in learning object use, the usefulness of various granularities, and contextualisation. This could be done through supporting communities of practice in Australia/New Zealand and establishing linkages to major international projects such as CurriculumOnline, LearnAlberta.ca, and the emerging Canadian CMEC national portal project.
5. A logical extension of the Le@rning Federation learning objects would be to support linkages to external resources. If the metadata and searching functions prove to be robust in relation to accessibility and discovery of learning objects for classroom teachers, the Le@rning Federation could fruitfully explore the possibility of trying to link learning objects with other available quality resources and teacher-developed material.

In summary, the expert assessment of the 22 learning objects, together with a review of the supporting documentation, demonstrated the developing national, infrastructure and emerging sector strength among both public and private sector organizations in developing learning objects that enhance educational attainment in Australia and New Zealand. The findings underscore the significant potential that these objects have for use across the globe and for the role that Australian companies have in establishing leadership in the field of learning objects.