



# finalreport

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# eLearning strategy research project

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# **Executive Summary**

Meat and Livestock Australia (MLA) invests in high quality learning and extension activities to ensure producers are aware of and have the opportunity to adopt the outcomes of research and development (R&D) within their farm businesses. MLA develops, sometimes in conjunction with other industry organisations, information and training resources that are utilised in awareness events, workshops and farmer-directed group activities. The modes of delivery are face-to-face, mentoring and self-directed learning.



eLearning clearly has the potential to provide

another mode of delivery and deliver benefits over and above some of the current delivery models. Its effectiveness as an approach will depend on target audience demographics, such as how they like to learn and their information technology and communications (IT&C) infrastructure, and the marketing effort to make them aware of the learning resources. It is the purpose of the proposed eLearning Strategy Research Project to undertake research to determine a future strategy for MLA's eLearning activities so that the farmers are better equipped to perform their activities in line with the research and development outcomes.

### **ELearning Definition**

eLearning is the use of electronic media to deliver flexible education and training. It can manifest as (but is not limited to) a learning environment, online educational materials (knowledge and skills), knowledgebases, multimedia (like vodcasts<sup>1</sup>, podcasts), digital libraries, virtual classroom, tools, online communities (communities of practice) and/or a mixture of all of these.

The eLearning Strategy is informed by an examination of the issues related to people, platforms and processes in MLA (and its stakeholders) and addresses the key areas of business context, learning culture, technical infrastructure and implementation. Our research methodology uses a qualitative approach, involves a mix of face-to-face and phone meetings with key internal stakeholders; a phone survey of MLA-nominated external stakeholders and desktop research on MLA current training options and proposed content.

### How farmers learn

Farmers choose their sources of information according to need. They consult with other farmers (normally proximal to them) for practical issues related to farming, and credible sources like extension officers/consultants for more detailed advice, and both of these sources when implementing change.

Informal learning is distinctly favoured over *formal accredited* courses, and is particularly the case once they commence farming practice. Informal learning is defined as individual learning from experience or observation, peers or extension officers, farmer-directed groups, the media, field days and *non-accredited workshops or short course events*.

### Barriers

Barriers to participation in Agricultural extension programs are similar to most sectors that operate in regional and remote parts of Australia. For example, the most important factors that influence participation in the agricultural sector are:

• ease of access to learning activities (the tyranny of distance)

<sup>&</sup>lt;sup>1</sup> A *vodcast* is a video podcast, a video broadcast over the internet.

- the time-poor nature of small producers throughout their production cycle
- the older age range of producers (age ranges are different between sheep and beef producers)
- whether farming is a lifestyle choice (family lifestyle vs for profit companies)
- the nature the learning opportunities (the learning content) and the perception of relevance to their farming situation (generic information vs regionally and locally specific information)
- a preference for more informal learning rather than formal accredited training opportunities
- where the information comes from (credibility of source particularly from fellow producers)
- the social nature of the learning opportunity (the more social the better).

While the sample size was small, our interviews with State Coordinators, local facilitators and producers were uniformly positive about eLearning, both as a way of reaching deeper into the industry and as a resource for the Type B and Type C extension activities delivered by local coordinators/deliverers.

The historical technical limitation of bandwidth and speed of internet connections for rural and remote producers seems to have been minimised by Government sponsored rural internet subsidies over the last decade and the current National Broadband Network, with close to 70% of producers accessing broadband networks (17% dialup).

On the face of it, eLearning may be able to provide optimal and effective training to rural and remote producers because it can be delivered to the producer's desktop or mobile device at a convenient time and at any location served via the internet. Additionally, MLA represents a credible source of information to producers.

### **MLA Member Producers**

MLA members are drawn from a diverse range of settings that includes location (variations in climate, soil, etc.), product type, product mix, position in supply chain, farm size, business focus, and human factors such as lifestyle and age. Meeting all of the needs of these diverse populations is certainly a challenge.

Our small telephone survey of members indicated that the following issues are key factors with respect to extension and adoption activities:

- A large proportion of the available content in its present web-based form (the manuals) is overwhelming to some members that who are not comfortable with web-based navigation and searching.
- Members are not motivated to attend training because they do not understand the benefit (to them), are time poor or located at some distance to the training opportunity.
- There are information gaps in the manuals that relate to some sub-regional climate/pasture types that, if present, would attract more members to investigate/utilise the content.
- Facilitated extension activities targeting adoption of R&D-validated approaches to production are not generally available outside NSW and Victoria.
- Current training opportunities are primarily delivered as Type B activities one or two day workshops.
- Most workshops (Type B activities) and facilitated groups (Type C activities) utilise small portions of the main manuals.
- Novice producers have different informational needs than lifestyle producers and 'Expert' producers.

• Searching for MLA-funded R&D information (reports etc.) is difficult online (an advanced search is available but not highly visible).

### eLearning strategy

In MLA's situation an eLearning Strategy will add value to the organisation if it aids adoption of MLA-sponsored R&D and improves production, productivity and quality of the products its members produce. To add value to members we must address the characteristics and needs of the target audiences, to provide access learning and development opportunities to as many members as possible in a sustainable and cost effective way.

Learning approaches are undergoing significant transformation, largely driven by technological advances in communication, such as broadband and mobile communications. In the old paradigm, the instructor is seen as the centre of all knowledge and the classroom the place where all knowledge is disseminated. In the contemporary/future paradigm the learner is viewed as a knowledge seeker with constantly changing needs and timeframes. This transformation can increase the strategic value of the eLearning Strategy to the organisation and to the end users by moving beyond knowledge and awareness to performance and, in MLA's case, adoption.



There are differences in the learning value of formal<sup>2</sup> and informal learning methods between novice, practitioner and expert learners. More formal learning opportunities are appropriate for novices and some practitioners, while experts prefer informal learning opportunities.

The eLearning Strategy defines a learning architecture across formal and informal learning domains that incorporate learning approaches, disciplines, and tools and technologies.

The Australian Flexible Learning Framework Strategy (as part of its eLearning for Industry Program) demonstrated that eLearning can make a significant, positive difference to workforce development. It can improve access, motivation and experience factors that can facilitate participation in and distribution of training.

### Vision for eLearning Strategy

The vision for the eLearning Strategy is to provide a set of three complementary services in support of extension and training activities with the goal of facilitating practice change. These are training/instructional services, performance support services and social collaboration services.

<sup>&</sup>lt;sup>2</sup> In this case 'formal' means structured but not accredited training.



In order to facilitate and increase learning and adoption practices in the membership, we highlight a number of gaps in MLA's learning and knowledge landscape (formal and informal training events; access to non-training related information; and collaborative technologies) that can be filled with eLearning approaches. This also includes different approaches to access and delivery of knowledge-based events and across knowledge domains. Thus, the envisaged future state of MLA's Learning landscape is illustrated in the following diagram.

	FORMAL	INFORMAL		
CHES	ILT Virtual Classroom	On Demand	Performance Support	Social
APPROA	Webinars Online Learning Online Group Testing Evaluation	Manuals Online Learning Vodcasts Podcasts Tools	Faceted Search Learning Objects Knowledgebase Tools	Community of Practice Wikis Blogs Forums
CULTURE	FACILITATED		SELF-DIRECTED	
TECHNOLOGY TOOLS	Virtual Classroom Groupware CMS LMS	Collaboration Platform   Web 2.0   Social Tools		

### MLA Learning Portal

The proposed eLearning Strategy is centred on the development of a MLA learning portal where extension and other resources are consolidated into one web location that's accessible to all

stakeholders. In this strategy we are targeting 'experts' (innovators/early adopters), lifestyle practitioners, and novices (those relatively new to farming or diversifying their product range). The learning portal concept reflects the maturing of distributed learning from stand-alone efforts and multiple locations to a more coordinated and strategic approach. The portal concept links together formal non-accredited learning that the current extension programs deliver and informal learning opportunities and knowledge sharing that covers knowledge management domains.

In our view the Extension and Adoption area of the website (the learning portal) should be raised to a component level of the main MLA homepage to increase awareness.

The learning portal will provide members with a self-service option and can additionally be used by coordinators and facilitators to offer blended learning opportunities, including the use of webinar technologies and groupware (virtual adoption groups). The learning portal offers the MLA member multiple pathways to gaining new knowledge and skills leading to higher levels of performance.

Depending on the target audience and whether the learning is blended or self-initiated online, a learning pathway for a producer will make use of some or all of the following learning resources types.



### Engaging the target audience

The target audience is large and geographical widespread across Australia and their engagement is a challenge. Obviously, detailed change management and communications and marketing plans for this eLearning initiative would need to be developed and implemented.

MLA already has a sophisticated network to promote adoption involving Type A (conferences, field days etc.), Type B (workshops) and Type C (farmer-led groups) activities. Promotion by MLA senior leadership team at conferences would be essential. Coordinators and Facilitators have expressed an interest in being involved in trials, so some professional development around the eLearning initiative could create champions who would, in turn, promote the initiative with members through Type B and C events. The groupware option would allow virtual farmer-led groups to be conducted in regions where distance is otherwise a barrier to participation in adoption activities.

### **Content and Pilot Projects**

As most, if not all, of the majority market programs focus on attainment of knowledge, they fall within the Cognitive Learning Domain. The Cognitive Learning Domain relates to knowledge and intellectual skills, such as understanding, organising, analysing, applying, synthesizing, evaluation and decision making. The Cognitive Learning Domain is particularly amendable to an eLearning delivery format.

The eLearning Strategy represents a significant challenge in terms of the level of commitment it requires to repurpose content and to introduce new technologies in pursuit of quality training outcomes. Such commitment has the capacity to impose a significant strain on organisational

resources. For this reason, a transitional approach to the strategy's implementation is probably the most cost-effective way to achieve long-term quality outcomes.

Early transitional stages could focus on the development of the technical framework for the learning portal and some pilot 'courses' that provide examples of eLearning for each of the suggested target audiences.

Suggested pilot activities for the eLearning Strategy would include:

- some self-directed learning options for novice and practitioner members (e.g. healthy soils and pasture improvement focus)
- a facilitated blended learning course involving virtual classrooms/webinars to promote adoption in the practitioner target audience
- a community of practice for feedlot producers.
- These pilot activities would be trialled and modified based on feedback with rollout of other eLearning 'products' and the learning portal in agreed stage within an agreed time frame.

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### 1 Introduction

It is the purpose of the proposed eLearning Strategy Research Project to undertake research to determine a strategy for Meat & Livestock Australia (MLA) eLearning activities so that the farmers are equipped to perform their activities in line with research and development (R&D) outcomes.

The outcomes required by MLA include:

- a strategic framework and implementation plan for achieving MLA's eLearning vision of delivering a cohesive and intuitive learning experience
- focus areas for future eLearning content development, including scope, purpose, target audience
- guidelines and recommendations for the design and development of eLearning content
- eLearning delivery methodologies (including type of eLearning, instructional methods, technologies and media used)
- appropriate platforms to manage, host, track and deliver eLearning modules a set of guidelines for future eLearning development
- a monitoring and evaluation framework that will enable tracking of the eLearning impact, including building knowledge, skills and confidence, as well as supporting practice change and continuous improvement.

### 1.1 eLearning Definition

eLearning is the use of electronic media to deliver flexible education and training. It includes:

- access to, downloading, and use of web or computer-based learning resources in the classroom, workplace or home
- online access to and participation in course activities (e.g. online simulations, online group discussions)
- directed use of the internet, mobile and voice technologies for learning and research purposes
- structured learning-based email communication
- online assessment activities.<sup>3</sup>

It can manifest as (but is not limited to) a learning environment, online educational materials (knowledge and skills), digital libraries, knowledge databases, multimedia, virtual classroom, tools, online communities (communities of practice) and/or a mixture of all of these.

<sup>&</sup>lt;sup>3</sup> Definition from the Australian Flexible Learning Framework 2010.

### 1.2 Research Methodology

The eLearning Strategy is informed by an examination of the issues related to people, platforms and processes in MLA (and its stakeholders) and addresses the key areas of business context, learning culture, technical infrastructure and implementation.

Our research methodology is necessarily *qualitative* in nature and involves a mix of face-to-face and phone meetings with key internal stakeholders, a phone survey of MLA-nominated external stakeholders and desktop research on current MLA training options and proposed content.

In contrast to *quantitative* research, where the results are statistical and provide generalised descriptions, explanations and predictions, *qualitative* research is an inductive method where researchers explore and gain an understanding of how people think and experience their lives, and examine patterns, themes and holistic features. A narrative report is presented and generalization is usually not a goal because the focus is on the local, the personal and the subjective.

This report and a presentation will be delivered to MLA at the conclusion of the consultancy.

# 2 Background

### 2.1 Meat & Livestock Australia Limited

Meat & Livestock Australia (MLA) delivers marketing and research programs for Australia's cattle, sheep and goat producers. MLA has over 47,500 livestock producer members who have stakeholder entitlements in the company.

MLA invests more than \$165<sup>4</sup> million in marketing and R&D programs each year (approximately equal amounts), with much of this funding coming from transaction levies placed on the sale of livestock. The Australian Government provides matched funding for levy investments in the R&D program.

MLA invests in on-farm and off-farm R&D relevant to the cattle, sheep and goat sectors of the red meat industry. The aim is to boost both productivity and demand within the red meat supply chain to help the industry produce more red meat with fewer inputs and extract additional value for the global marketplace. MLA provides services, tools and information to add value to member's businesses.

MLA's R&D program<sup>5</sup> is focused on:

- improving reproduction efficiency in northern beef and maternal sheep breeds
- improving pasture and forage crop productivity, quality and persistence
- introducing new practices and technologies to improve labour efficiency and lower greenhouse gas emissions
- protecting Australia's biodiversity through minimizing the threat and impact of exotic, emerging and endemic diseases, improving disease management and diagnostic techniques
- improving animal welfare.

By not playing any role in regulation of the industry, nor representing industry or lobbying government, MLA positions itself as a credible and unbiased industry partner. This position is leveraged in its vertically integrated extension programs, aimed at exposing producers to the beneficial results of industry-related R&D and their adoption.

MLA collaborates with a wide range of research, commercial and government partners (such as state agencies, Cooperative Research Centres (CRCs), CSIRO and international research agencies) to deliver programs that benefit industry. MLA also has a strong record of collaboration with other R&D corporations, such as Australian Meat Processor Corporation (AMPC), Livecorp, Australian Wool Innovation (AWI), Grains Research and Development Corporation (GRDC) and Dairy Australia (DA), to successfully deliver industry programs, such as extension and training programs.

### 2.2 MLA Extension and Training Activities

MLA assists the livestock industry to increase the adoption of innovation, attract and retain a high quality workforce and build innovation capability. MLA undertakes an extensive adoption program that delivers information and tools that help individual producers, processors and supply chains to take advantage of the latest R&D findings to improve their profitability. This is driven through an extension network coordinated by MLA extension managers, national coordinators, state coordinators and local deliverers (DPI advisors, private consultants, specialists etc.) who engage with groups of producers in sub-regional areas.

<sup>&</sup>lt;sup>4</sup> MLA Corporate Plan (2010-2015)

<sup>&</sup>lt;sup>5</sup> MLA Corporate Plan (2010-2015)

The link between research – development – extension – adoption – evaluation is based on practice change theories, (Bennett 1979)<sup>6</sup>, adult learning principles and new product development methodologies of other industries (e.g. ADDIE – analysis, design, develop, implement, evaluate).

A research report on the role of extension in building capacity (Coutts et al. 2005)<sup>7</sup> identified several general extension models that are reflected in MLA's extension/adoption strategy. These models are relevant to developing the eLearning strategy as they provide a basis for already proven forms of learning that the strategy should leverage to build skills and knowledge capacity.

MLA examples are discussed in further detail in the following section 'Major MLA Extension Programs'.

EXTENSION MODEL	DESCRIPTION	MLA EXAMPLES	DESCRIPTION
TECHNOLOGY DEVELOPMENT/PROB LEM SOLVING	Linked to R&D cycle – producers linked to researchers to develop technologies or other instruments/ practices to solve producer problems. (subsequently made available to industry as a whole)	NABRC / SABRC	Farmer-based committees to discuss and prioritise research directions and activities and select R&D proposals from researchers
PROGRAMMED LEARNING/ TRAINING MODEL	Delivering specifically designed training programs/workshops to increase understanding/skills in defined areas	EdgeNetwork – Type B activities	Formal workshops in farm management, breeding programs, grazing and nutrition
GROUP FACILITATION	Group of producers and facilitator meet over time period to address common agreed goals and learning needs (local – sub-regional coverage)	Farmer–led IGroups – Type C activities	10-15 producers form a facilitated group and meet on six occasions over 12 months with the goal to learn about and trial new on-farm practices
INFORMATION ACCESS	Providing a range of individuals and groups training materials that can be accessed at any time from an accessible central location	MMfS / MBfP	Online manuals/websites

### Table 1: Extension Models and MLA Examples

 <sup>&</sup>lt;sup>6</sup> Bennett C F. 1979. Analysing impacts of Extension Programs Washington DC, US Department of Agriculture
 <sup>7</sup> Coutts, J, Roberts K, Frost F, and Coutts A, 2005. The role of extension in Building Capacity. A Report for the Cooperative Venture for Capacity Building (RIRDC).

These extension models fit within an adoption funnel (equivalent to a marketing & sales funnel) where MLA provides, participates or promotes:

1. awareness activities (Type A – Inform) such as conferences and major field days to build and maintain broad industry awareness of the outcomes of R&D and associated resources

2. interest-building activities (Type B – Influence) like the provision of and access to information and educational materials (the principles, practices and tools ) including online and printed materials and face-to-face workshops



Figure 1: MLA extension adoption funnel

3. practice change activities (Type C –

Involve) such as participatory learning initiatives aimed at generating practice change and then recording the impact of change.

The latter are locally focused, applying and modifying the principles, practices and tools to the local situation (climate, landscape etc.) of the producers involved. Our comparison of the adoption funnel with a sales funnel is deliberate as this is definite a "selling" process.

### 2.3 Major MLA Extension Programs

Currently the extension and training activities are focused around the following programs:

- More Beef from Pastures (MBfP) provides a vehicle for delivery of outputs from R&D activities in southern beef production systems. The goal is to achieve a sustainable (economic and environmental) increase in kilograms of beef produced per hectare through optimal management of the feed base. A manual has been provided with an online version available for the workshops.
- Making More from Sheep (MMfS) (a partnership between MLA and Australian Wool Innovation) provides Australian lamb and wool producers with a best practice package of information and management tools. An 11-module information manual captures best practice from producers and technical experts and is also available as an online package. The package provides a learning pathway for the producers to apply the practices and principle.
- Going into Goats (GiG) draws on the knowledge, skills and expertise of 40 goat producers and provides an information package designed to explain the essential processes for a successful goat production system. It provides tools and information to help goat producers increase productivity while minimising risk.
- Beefup Forums targets northern beef producers and brings together the expertise of local producers with industry experts to provide clear and practical information and tools that producers can put into practice on-farm immediately.
- EDGEnetwork is a formalised workshop program delivered by industry experts and designed to
  provide practical learning opportunities that allow both southern and northern beef producers to
  increase their knowledge and skills in financial and business management, development of
  breeding programs, grazing management and ruminant nutrition.
- Future Beef is a collaborative program for the northern Australia beef industry involving DAFF QLD, NT DPIF, DAFWA and MLA with a focus to bring the latest research technologies and

production best practice to northern beef producers. The program is centred around a website (<u>www.futurebeef.com.au</u>) and delivers training workshops, producer demonstration sites, field days, RD&E projects, forums, facilitated producer groups, webinars (online seminars), YouTube videos, newsletters and publications.

 Following completion of a major program of research on reducing emissions from livestock, MLA has jointly launched (in partnership with the Australian Farm Institute, Australian Wool Innovation and Dairy Australia) a new Sustainability extension program called Farm300. It aims to train cattle and sheep advisors (and subsequently their producer clients) on practical knowledge and skills that can boost on-farm production and profitability by reducing greenhouse gas emissions from livestock. A Sustainability Manual is being developed for MLA's website to support advisors and producers.

# **3 Organisational Context**

The previous section described the current situation with regard to MLA's existing extension and training activities, which will form part of the eLearning Strategy. The strategy also needs to consider the bigger picture within which the eLearning will sit as means of achieving MLA's vision of a cohesive and intuitive learning experience.

An eLearning strategy sits within an overall business strategy and context, and is impacted by its information technology and communication strategies. An eLearning strategy will only be successful if a company has appropriate resources – human, financial and technological – to support and sustain the initiative. An equally important component of the eLearning strategy is an accurate understanding of target audience needs and capability and the best way(s) of engaging them in a change and communication process. This section examines these 'readiness' factors for both MLA and the target audience.

### 3.1 Business Objectives

A principal strategic focus of MLA is to invest in R&D that produces new knowledge, tools and technologies that create opportunities for producers to become more productive and efficient. To ensure that the benefits in R&D are realised, MLA invests in high quality learning and extensions activities to ensure producers are aware of and have the opportunity to adopt the outcomes of the R&D within their farm businesses. MLA develops, at times in conjunction with other like-minded industry organisations, information and training resources that are utilised in awareness events, workshops and farmer-directed group activities, using face-to-face, mentored and self-directed learning modes of delivery.

eLearning clearly has the potential to provide another mode of delivery and deliver benefits over and above some of the current delivery models. Its effectiveness as an approach will depend on target audience demographics, such as how they like to learn and their information technology and communications (IT&C) infrastructure, and the marketing effort to make them aware of the learning resources.

### 3.2 Research on How Farmers Learn

Original research (Kilpatrick et al, 1999)<sup>8</sup> and a relatively recent summary of agricultural extension, learning and change (Fulton et al, 2003)<sup>9</sup> provide information on how farmers learn. Nowadays learning is understood to occur over a lifetime and is socially embedded. Much learning occurs in the workplace, at home and in community settings, in addition to more formal instruction. There is a reliance on social and business networks for information and learning, so social links are very important to farm business operators. Such sources also provide support when implementing change. Participation in organised education/training often helps facilitate the establishment of social and business networks (Kirkpatrick et al, 1999). Support is also provided to farmers by experts and peers outside of any formal education/training context.

Thus, interaction with others is an important aspect of farmer learning and for practice change.

Farmers choose their sources of information according to need. They consult with other farmers (normally proximal to them) for practical issues related to farming, extension officers/consultants for more detailed advice, and both of these sources when implementing change.

Informal learning is distinctly favoured over formal accredited courses, and this is particularly the case once they commence farming practice. Informal learning is defined as individual learning from

 <sup>&</sup>lt;sup>8</sup> Kilpatrick S, Johns S, Murray-Prior R and Hart, D. 1999. Managing Farming: How farmer learn. RIRDC Publication No 99/74
 <sup>9</sup> Fulton A, Fulton D, Tabart T, Ball P, Champion S, Weatherley J and Heinjus D. 2003. Agricultural Extension, Learning and Change. RIRDC Publication 03/032

experience or observation, peers or extension officers, farmer-directed groups, the media, field days and non-accredited workshops or short course events.

Kilpatrick and Rosenblatt (1998)<sup>10</sup> cite the following reasons for a farmer's preference of informal learning over formal learning opportunities:

- Valuing of their independence and self-sufficiency.
- Preference for contextualised learning.
- Their (low) level of confidence in formal training settings.
- Preference for known credible/trusted sources of information.
- Fear of their existing beliefs being challenged.

Whilst adoption of practical farm-based innovations do not normally directly follow from undertaking education and training activities, they do provide awareness and motivate farmers to seek a more favoured adoption pathway; that is, farm-directed groups that allow interaction with experts and fellow producers and customised to local conditions.

The critical success factors in group learning are effective facilitation, experiential learning, information integration, group autonomy and building support networks (Miller and Curtis, 1997)<sup>11</sup>.

### 3.3 Barriers to Learning

Barriers to participation in Agricultural extension programs are similar to most sectors that operate in regional and remote parts of Australia and include location factors, the type of farm, entity structure, learning preferences and social factors.

For example, research and anecdotal evidence indicates that in the agricultural sector the most important factors that influence participation in the agricultural sector are:

- ease of access to learning activities (the tyranny of distance)
- the time-poor nature of small producers throughout their production cycle
- the older age range of producers (range is different between sheep and beef producers)
- whether farming is a lifestyle choice (family lifestyle vs for profit companies)
- the nature the learning opportunities (the learning content) and the perception of relevance to their farming situation (generic information vs regionally and locally specific information)
- a preference for more informal learning rather than formal accredited training opportunities
- where the information comes from (credibility of source particularly from fellow producers)
- the social nature of the learning opportunity (the more social the better).

With respect to eLearning, it is hard to overcome historical barriers and resistance to changes in learning technology. Facilitator-led training is popular and has the advantage that it is often personal (not high tech but high-touch!) Many people still see the classroom as best for cutting-edge

<sup>&</sup>lt;sup>10</sup> Kilpatrick S and Rosenblatt T. 1998. Information vs training: issues in farmer learning. European Journal of Agricultural Education and Extension, vol 5 no 1, pp39-51

<sup>&</sup>lt;sup>11</sup> Miller. J & and Curtis, A. (1997) Moving farmer knowledge beyond the farm gate: An Australian Study of farmer knowledge in group learning. European Journal of Agriculture Education and Extension, vol 4, no 2, April, pp 6-11

advanced skills, group and teamwork activity, and instruction in which face-to-face interaction is crucial. It's safe and predictable. Change to new methods represents risk, uncertainty and instability. The implementation of classroom-based training is easy and something we know how to do, whereas eLearning provides a different level of complexity.

The Flexible Learning Framework sponsored research on **eLearning's contribution to workforce development** (Research Report May 2013), highlighted the factors that hinder workforce training across a number of sectors (including the dairy sector) and identified the areas in which eLearning can promote skills growth. These were grouped into three factors, namely:

• Access refers to particular characteristics that can result in either ease or difficulty of receiving or providing training.

• Motivation refers to the drivers that impel training, or may instead discourage the uptake of the training.

• **Experience** refers to previous encounters, as well as knowledge and expertise that can facilitate participation in or distribution of training.

That matrix is illustrated below (Table 2).

**Table 2**: Workforce development barriers and factors that are overcome by eLearning (from a report on research undertaken under the National VET eLearning Strategy 2012-2015. Bolded terms refer to workforce development factors for which eLearning can make a significant difference.

	INDIVIDUAL	WORKPLACE	INDUSTRY
ACCESS	Work intensification	Location	Fragmentation
	Forms of employment	Workplace size	Networks
	Literacy & learning challenges	Sector	Industry structure
	Computer access		
MOTIVATION	Supportive environment	Timeliness	Quality assurance
	Awareness of training	Cost benefits	Skills shortages
	Career paths	Consistency	Labour shortages
		Type of change	Industry champions
		Job design	
EXPERIENCE	Past learning	Past experiences	Pre-existing model
	experiences	Expertise	Leadership
	Learning types		
	Learning pathways		

While the sample size was small, our interviews with producers and State Coordinators and local deliverers were uniformly positive about eLearning both as a way of reaching deeper into the industry and as a resource for the Type B and Type C extension activities delivered by local coordinators/deliverers.

The historical technical limitation of bandwidth and speed of internet connections for rural and remote producers seems to have been minimised by Government sponsored rural internet subsidies over the last decade and the current National Broadband Network, with close to 70% of producers accessing broadband networks (17% dialup).

On the face of it, eLearning may be able to provide optimal and effective training to rural and remote producers because it can be delivered to the producer's desktop or mobile device at a convenient time and at any location served via the internet. Additionally, MLA represents a credible source of information to producers.

However, challenges such as lack of producer computer technical skills and the self-directed nature of eLearning will need to be addressed in the communication and support aspects of an eLearning strategy.

### 3.4 Use of Media, Internet and Communication Channels

The media (print, television and radio) is an important source of informal learning for farmers, particularly if it contains high quality, relevant and practical information. This source of learning does not normally initiate change but is effective at an awareness level.

As an example, MLA's Feedback Magazine (10 editions per year) is posted to 48,000 addresses per month and rates very highly as a way to find out about MLA's programs in comparison to radio, newspapers and other MLA electronic communication channels (Stancombe, Project Diamond Research 2012).



Figure 2: Survey results from Project Diamond (Stancombe Research & Planning)

Table 3 shows that the number of farmers with internet connections has grown rapidly since 2007, with 85% having access in 2013 and 70% of those with a broadband connection (40% wireless).

3.4.1.1.1	3.4.1.1.2 2007- 08	3.4.1.1.3 2010	3.4.1.1.4 2013	3.4.1.1.5 2013
INTERNET CONNECTION	66%	77%	85%	83%
BROADBAND	48%			70% (17% dialup)
MOBILES		84%	91%	
			(Smartphones 35%)	
Source	ABS 2007-08	RCA 2013	RCA 2013	MLA web survey 2013

Table 3: Summary of ITC research (data from RCA op cit and MLA web survey 2013)

It is reasonable to assume that the percentage of MLA member producers that have an internet connection reflects the general farmer population.

A recent MLA web survey found that 59% of its members visited MLA's website and rated the overall usefulness of the content as being high. Most access on the website was directed to production information, market and industry news, process and indicators and publications. While mobile phone ownership was high, only a third had smartphones and used them to access the internet. The RCA 2013 general farming population survey found that less than 10% used the internet for social media.

### 3.5 eLearning Stakeholders

Background information on the target audience for this research was obtained via telephone interviews with MLA extension managers of Beef, Sheep and Sustainability programs. On MLA's advice, a proposed broader internet-based survey of producers was changed to a phone survey of some nominated state coordinators, facilitators and producers. This survey is not claimed to be representative (see discussion of methodology on page 12 of this report), but serves to indicate and confirm our understanding of the needs of producers and their attitudes to technology-based training. Apart from the three national extension managers, two state coordinators in Victoria and South Australia were consulted, as were three facilitators (deliverers) from southern Australia, and five producers from both northern and southern Australia.

This background information informs on what is the most effectiveness eLearning strategy for their needs. For example, if they all describe issues with bandwidth, then synchronous online learning via live webcasts would be not be considered to be an instructional method.

### 3.5.1 Producers

### **Statistical Data**

The principal stakeholder and the focus of any eLearning initiative are members of MLA who are producers of grass or grain-fed cattle, sheep, lambs and/or goats. All levy-payers are eligible to be members of MLA and currently, membership sits at around 48,685 producers around Australia. Figures 3 and 4 show the geographical spread and farming activity of producers, respectively.

There are about 77,000 properties in Australia producing cattle, with approximately 30% situated in northern Australia (including parts of Queensland) and 70% in the southern states. The southern farms, on average, are very much smaller (3300 ha) than their northern counterparts (138,000 ha) and run far less cattle.

There are over 55,000 properties in Australia raising sheep and lambs for meat, wool or a combination of both.

Both sheep and cattle farms are predominantly small to medium sized businesses that are family owned and operated. As family businesses, women are actively involved in the day-to-day operations in 80% of farm businesses, and are increasingly more on the 'front line' rather than taking 'back office' roles (27% are decision-makers, Rural Communications Audit (RCA) 2013). Most farmers are over 55 (61% in 2013 – RCA).

According to the 2006 Census, almost onethird (31%) of those employed in the agriculture industry had achieved postsecondary education levels, predominantly at certificate, diploma or bachelor degree levels. Higher levels of qualifications are most evident amongst younger farmers and



Figure 3: Types of farming activity



Figure 4: Geographic location of members

female farmers. Even so, the levels are much less than the general population.

Reasons for the low level of formal qualifications include the widely held view that farming is better learnt on the job, enhanced with supplementary short courses and other informal learning.

Research indicates that educated farmers are more likely to be innovative and flexible in their responses to changing farming conditions, and education levels impacts on productivity and profitability outcomes (Kirkpatrick, 1996b). Additionally, better educated farmers rate publications and media more highly as information resources and are an important source of awareness of innovations.

In 2010, over 77,000 students were enrolled in agriculture, environmental and related studies through Vocational Education and Training (VET) programs across Australia.

### **Qualitative Data**

For the telephone survey, interviews with five producers, mainly cattle producers, were conducted. These involved both southern and northern Australian producers.

Most of the producers were aware to some degree of MLA R&D adoption activities and had attended Type A or Type B activities including Edge workshops, Beef up Forums and Meat Profit days. One or two had been associated with research committees.

### Communication Messaging

Some wondered why there was not more attending these workshops and suggested that beef producers fell into three categories; new entrants, lifestyle farmers and corporate profit-driven producers with large herds. Life style farmers represented the largest group and it was suggested that they needed more information about what was going to be covered and the benefits to them in attending (an issue with the Communications sent to them). It was also suggested that messaging for each group could be different and registrants provided pre-workshop information and post-workshop follow up.

### Perception of Manuals and the role of Communications

While most had viewed MLA's online manuals (MBfP and MMfS) and thought they were great resources, few returned to them over time. There was a perception that they did not change, or not noticeably so. Another suggested that regional differences made them less relevant (or too general). For example, with regard to pasture nutrition, the SW Queensland Mulga belt is different to both the northern (Tall) grasses and southern grasses that are covered by the manuals. Interestingly, a feedlot producer and a northern cattle producer who wanted to be across the latest R&D findings indicated they would prefer direct summary information on these findings with links to the full reports. Most producers thought that technology represented a barrier to accessing information on the web for many older producers, including finding information on MLA's website. They thought the answer to that was more direct correspondence from MLA with links to the latest information (a push strategy).

Universally, the Feedback magazine and weekly emails were much appreciated, in accord with communication research undertaken by MLA.

### Prevalence of Type C activities

Type C activities (farmer-led groups) seem to be only prevalent in the more densely farmed parts of the country – namely Victoria and NSW. The tyranny of distance was the reason given that these were difficult to organise in NT, QLD and SA.

### Receptiveness to MLA eLearning

All producers indicated that they would be happy to participate in an eLearning trial and saw the benefit of doing this at a time that suited them and from their home. One producer thought it could overcome the tyranny of distance that hindered adoption in NT, QLD and SA. Others thought that eLearning combined with online access to a subject matter expert (SME) would be beneficial; such as, being able to post questions to a forum and have an SME respond. Other forms of eLearning had been experience by interviewed producers, for example webinars. There was universal agreement that this was very beneficial although some thought technical support would be needed in order to get more people enrolled in this form of training. When a Community of Practice model was explained to them, producers felt that this would have some benefits, including mimicking the social aspects of training liked by farmers and the issue of access to training by some producers.

### 3.5.2 State Coordinators

Two state coordinators were interviewed, both from southern states and both associated with Wool programs. One was also a producer (VIC) and one was not (SA).

Both worked extensively with the MMfS manual and tools, using it as a curriculum to draw from depending on the needs of sheep/wool producers and the production life cycle.

Victoria runs a Best Wool – Best Lamb program based on AWI and MLA funding. Victoria was also well advanced in delivery of Type A, B and C activities in the adoption program. Type C practice change activities were delivered via a network of up to 15 local facilitators. The Victorian

Coordinator organises a twice yearly, two-day catch-up with the facilitators to keep them abreast of new advances.

The South Australian Coordinator was principally focussed on sheep-related training activities and using the MMfS curriculum and tools. In the last 12 months, 78 Type B events were delivered by 20 different commercial organisations with 70 unique facilitators. The lack of Type C practice change activities was put down to the shorter history of the Program in SA, as well as the confidence and qualifications of facilitators and also the wide geographic spread of farmers.

### Barriers and Ways of Overcoming

The Victorian coordinator thought that eLearning, Community of Practice and webinars were all good initiatives but possibly harder for the older demographic (45-65+). He thought the barriers included lack of computer usage/familiarity and possibly bandwidth, but the former could be overcome by 'professional development' for farmers as part of farmer groups. He would be keen to be involved in a trial.

### Perception of Producers Attitude to eLearning

With regard to eLearning options, the SA coordinator felt that only a small group of producers would be attracted to viewing content on the web, with computer familiarity and internet speed being the main barriers. Similar to other parts of the country, webinars were being offered through DPI and commercial agricultural consultants and were well regarded, although significant participation in virtual classroom activities would be dependent on producers having some familiarity with computers and the virtual classroom technologies. Notwithstanding these considerations, the SA coordinator was also interested in being included in any trial of this technological approach and in professional development for facilitator forums.

### Important Content of Manuals, Pre-work and Assessments in Type B activities

The major parts of the MMfS used most often were those related to weaning, pastures and lamb survival. At Type B activities the participants were given a pre-training questionnaire to ascertain their current understanding of the topic to be given in the workshop, and this allowed some tailoring of the workshop by facilitators. A post-workshop evaluation is also applied to the participants to assess the degree of change in understanding as a result of the workshop.

Online pre-workshop assessments or eLearning (introduction) and/or online post-workshop assessments were deemed a possibility by the coordinators, and in particular could be beneficial if applied to the Cost of Production/ financial data needed for Farm Management workshops.

### 3.5.3 Farm Extension Officers/Facilitators

Of the three facilitators interviewed only one was also a producer (200 acres and 70 head of cattle). Some run Type B events as well as recruit, organise and run farmer-led groups (beef and sheep – wool/lamb). Some groups have a long history (15+ years) with a core of participants and minor turnover each year. Groups are formed from 10-15 producer businesses and some send two people to each 'event'.

### Type C Event Structure

Groups take the form a series of six events (usually hosted on a member's farm) of half-day duration and normally held every two months. The group generally drives the topic selection although there is considerable influence from the facilitator. There is usually a different topic for each meeting and is mostly matched to the production cycle. Events are usually independent with no pre-work required, but each event opens with 30 minutes of discussion on 'matters arising' from the previous event.

Basically, the goal of these farmer groups is to implement best practice farming production methods using the 'evergreen' methodologies presented in MLA /AWI based manuals. There is not a lot of leading edge/current R&D discussed in these producer groups.

### **Demographics of Producers**

The average age of beef focused farmers in these groups was around 50-55 years but there is a significant lower average age for sheep farmers (40-45 years), because of the significant turnover of sheep farms compared to beef ('beef farmers don't retire ... they just decrease production'). One facilitator thought that most producers were technology savvy and computer literate and there was no correlation between this and age.

### Sourcing of knowledge and skills

In Victoria the top end producers are very busy and generally hire consultants for individual attention on their production improvement initiatives; hence, they do not generally get involved with Type C farmer groups. The latter are dominated by 'lifestyle' farmers.

The farmer-led groups make good use of MLA and MLA/AWI program manuals – most use either hard copy or CD format. There is more exploration of online content by sheep-related groups, possibly due to younger average age of sheep producers. Some of MLA's support tools are commonly used.

Because of the domination in these groups by 'lifestyle' farmers, the nutrition sections of the manuals are most used because the practical applications of nutrition are poorly understood.

### Receptiveness to eLearning

There was some hesitation amongst the facilitators over the use of eLearning. They agreed that it would be applicable, most likely, to the younger members of the farming community. All had positive experience of webinar activities and saw growth potential in the use of this technology in the future. More emphasis on self-directed learning was useful. More visual material, including video of credible experts or the experience of other farmers, would be seen as valuable learning assets for producers and facilitators alike.

A Community of Practice approach is already exemplified in the Type C activities, but facilitators thought (when asked and had it explained) that the introduction of online groupware to manage producer groups could enhance participation and add new dimensions to management and proliferation of Type C activities. Pre-workshop information and online evaluation/assessment were also positively endorsed, but one facilitator's experience in setting 'homework' had been negative ('very few do it' and 'it's a matter of priorities').

Interestingly for one facilitator, farmer-led group work is not significantly an income focus and was sometimes a distraction from his main game of delivering individual consulting opportunities. The main benefit was the networking potential and community engagement/credibility. Another was fully engaged in running 13 sheep groups and delivering many workshops as an awareness exercise and recruitment forum for Type C activities, and did not carry out private consultancies (due to ill health).

### 3.6 MLA Readiness for eLearning Initiative

The focus of the eLearning initiative is external (members who are producers) rather than internal (staff), so that many of the normal 'assessments' of an organisation's eLearning readiness are not relevant. The proposed eLearning initiative forms part of a comprehensive R&D adoption strategy that has well-defined communication channels and a support network of national, state and local coordinators. Clearly, MLA has the infrastructure and resources to engage the target audience via its extensive communications channels, and personnel capable of interpreting and packaging information on the application of new R&D results for a producer audience.

*Information* is the collection of knowledge, such as facts, data, best practices, and so on, while *instruction* is a process that uses information to expand the learner's ability to perform. While information informs learners, instruction changes them. The development of eLearning material requires a numbers of skills over that of information packaging.

To make instruction work requires a team with the right skills, processes that deliver the right product for the audience with technologies that enable easy deployment and analysis of results.

The principle skill is instructional design, using instructional theories and strategies to create effective online training. An eLearning team must implement practices and procedures that reduce development time, eliminate rework and ensure delivery is on time and budget. Lastly, experience with a range of development and delivery tools is required to choose the right combination of technologies for the target audience.

Appendices A to D of this eLearning strategy document provide a perspective on instructional design, processes and technologies that will be relevant to MLA's eLearning initiative.

### 3.7 Other Examples of eLearning in Agricultural Capacity Building

Education and training has always provided an enabling role in capacity building in any sector in Australia and in all economies around the world. In western cultures in particular, eLearning has delivered an increasing component of a workforce development strategy. The eLearning strategy for MLA can build on the lessons learned from other instances of eLearning in Agricultural Capacity Building. These lessons learned can be applied to the guidelines for eLearning design and development (Appendix A), and to the eLearning delivery methodologies (Appendix B).

### 3.7.1 Australian examples

The Australian Flexible Learning Framework funded (as part of its eLearning for Industry Program) a number of individual organisations (private sector and government agencies) and Industry sectors, in partnership with industry-based eLearning developers and/or Registered Training Organisations (RTOs), to develop and distribute eLearning exemplars. Between 2005 and 2007, 40 businesses were funded to develop eLearning exemplars. The NSW Farmers Association and Fertilizer Industry Federation of Australia partnered with Catalyst Interactive (now KBR Training Solutions) on separate exemplar projects.

Between 2008 and 2010, 12 sectors were funded for short (1 year) or long term (3 years) embedding of eLearning in workforce development. The Dairy industry was the most relevant sector (to this report) that was funded.

The research emanating from all industry sector funding indicated that eLearning functions best when:

- it is integrated into training courses structured around workplace outcomes and which cater to a range of learning approaches
- it is integrated into the organisation's strategic approach
- trainees and facilitators have access to appropriate eLearning and technical support.
- The research summarised anecdotal evidence that eLearning impacted positively on productivity through:
- less disruption of work schedules
- deeper learning outcomes and application of learning
- greater confidence with learning

• broader diffusion of learning and a learning culture.

### The Federal Government has funded a Learning portal

(<u>http://www.extensionprovidersportal.org.au/</u>) for the general agricultural sector (not just livestock) as part of a sustainability initiative; the Carbon Farming Futures Extension and Outreach Program. This program provides credible, clear and consistent technical information to farmers, land managers and their key influencers on reducing greenhouse gas emissions, sequestering carbon in the landscape and participating in the Carbon Farming Initiative (CFI). The program will also support farmers and land managers to make informed decisions about emissions management and the CFI as part of everyday land management activities.

The portal particularly targets extension providers and provides:

- technical information on land sector emissions and their management
- resources and tools
- forums to share ideas and information
- a webinar section to see a schedule of webinars and view recordings of previous webinars
- a face-to-face information area to see a schedule of upcoming classes and networking events .

A Carbon Farming Extension Toolkit for use by extension providers in the field is available to download and eLearning modules are also available free to the general public.

In other research, the development of agricultural internet virtual communities were researched by Whitaker and Parker<sup>12</sup> (2000) using an Australian case study. Their preliminary work identified the factors that enabled or inhibited the development and sustainability of agricultural virtual communities. Enablers included motivational aspects (access to education opportunities, feedback and support mechanisms, and filtered content), training in internet media use, and a knowledge sharing focus.

### 3.7.2 New Zealand example

New Zealand providers of farmer education are finding it increasingly difficult to attract farmers to learning events. Anecdotal information from farmers shows that there is a plethora of learning events offered to farmers, but that few of these meet their needs. Farmers want to attend learning events that have direct application to their own needs, contexts and particular farming issues, and to learn with and from other farmers (like their Australian counterparts).

AgResearch, a government-owned Crown Research Institute supporting the pastoral sector through scientific R&D, has implemented an extension research activity (FeedSmart) to develop a learning package in conjunction with farmers to be used in a trial of eLearning. The eLearning approach is based on video conferencing and the trial indicated that that it is possible to deliver an eLearning program which truly reflects the adult learning principles of participatory, interactive, small group learning based on goals and expectations that are both important to and set by the learners. It also demonstrated that eLearning based on video-conferencing supported by other technologies, can successfully deliver a learning program that caters directly for farmer learning style preferences. The trial demonstrated that it is possible to successfully translate the hands-on content of face-to-face workshops into distance formats using such technologies as document cameras, video cameras and digital cameras (<u>http://www.agresearch.co.nz/our-science/agricultural-systems/people-in-agriculture/Pages/elearning.aspx</u>).

<sup>&</sup>lt;sup>12</sup> Whitaker V M and Parker C M (2000) The factors enabling and inhibiting the development of agricultural Internet virtual communities: An Australian case study. Conference Paper, Proceedings of the 8th European Conference on Information Systems, Trends in Information and Communication Systems for the 21st Century (ECIS 2000), Vienna, Austria, 148-155. Page 27 of 70

### 3.7.3 Overseas examples

There are numerous examples of initiatives involving introduction of eLearning in the agriculture sectors in Africa, Asia and the Middle East. However, most were targeting vocational or higher education environments, not producers.

One exception is the Philippines Department of Agriculture's e-Extension Program (eLearning for Agriculture and Fisheries) delivered in conjunction with the Agricultural Training Institute as the lead implementing agency (<u>http://e-extension.gov.ph/elearning/</u>).

They offer a range of free eLearning courses (125) delivered from a learning management system (LMS) (Moodle) along with Technokits (hard copy versions and instructional DVDs (not free) to approximately 20,000 users.

# 4 eLearning Strategy

### 4.1 Underlying concepts

An eLearning strategy is a systematic and comprehensive plan of action designed to ensure the success of a broad-based initiative that adds value to the organisation in ways that are supportable and sustainable

Learning approaches are undergoing significant transformation, largely driven by technological advances in communication, such as broadband and mobile communications.

In the old paradigm, the instructor is seen as the centre of all knowledge and the classroom is seen as the place where all knowledge is disseminated. The 'course' is viewed as the preferred format for learning and the learning objectives framed in terms of understanding and awareness.

In the contemporary/future paradigm, the learner is viewed as a knowledge seeker with constantly changing needs and timeframes. Online and offline services enable greater access to the total set of knowledge and performance resources. For the learner it is about accessing the right amount of knowledge in order to apply it when they need it. It is all about performance objectives rather than learning (objectives) for 'learning's sake'. This transformation can increase the strategic value of the eLearning strategy to the organisation and to the end users by moving beyond knowledge and awareness to performance and, in MLA's case, adoption.



Figure 5: *eLearning strategy development process* 

In terms of the level of expertise of a learner, there are differences in the learning value of formal<sup>13</sup> and informal learning methods between novice, practitioner and expert learners (Quinn, 2009)<sup>14</sup>.

As shown in Figure 7, more formal learning opportunities are appropriate for novices and some practitioners while experts prefer informal learning opportunities.

We can also define a learning architecture across formal and informal learning domains that incorporate learning approaches,



disciplines, and tools and technologies. This would represent a unique map of agreed learning needs, learning approaches and delivery strategies. This is the basis of the eLearning Strategy.

In MLA's situation an eLearning strategy will add value to the organisation if it aids adoption of MLAsponsored R&D and improves production, productivity and quality of the products produced by members. To add value to members, we must address the characteristics and needs of the member target audiences to allow learning and development opportunities to as many members as possible in a sustainable and cost effective way.

The Australian Flexible Learning Framework Strategy (as part of its eLearning for Industry Program) demonstrated that eLearning can make a significant, positive difference to workforce development. eLearning can improve access, motivation and experience factors that can facilitate participation in or distribution of training.

### 4.2 Current State and Assessment

MLA provides a range of web-based resources—the Majority Market Extension Programs—and manages and supports a network of national extension managers, state coordinators and local facilitators to deliver a range of research extension activities to encourage adoption of industry funded research focused on increasing production efficiencies.

MLA members are drawn from a diverse range of settings that includes location (variations in climate, soil etc.), product type, product mix, position in supply chain, farm size, business focus, and

human factors such as lifestyle and age. Meeting all of the needs of these diverse populations is a difficult challenge.

Figure 7: Learning value of formal and informal learning methods from novice to expert (from Quinn 2009)

Other key factors relating to members are summarised in Table 4.

The main features of that analysis are that:

- Content in its present web based form (the manuals) is overwhelming to some members not comfortable with web-based navigation and searching (and there is a complex relationship between MLA's website and the separate sites for each of the major manuals)
- A large proportion of the members are not 'motivated' or 'driven' to attend training because they do not understand the benefit (to them), are time poor or a located at some distance to the training opportunity

<sup>&</sup>lt;sup>13</sup> In this context "formal" refers to more structured learning events – workshops etc, not the attainment of formal gualifications.

<sup>&</sup>lt;sup>14</sup> Quinn C. 2009. Populating the LearnScape: eLearning as Strategy. In M. Allen, Ed. Michael Allen's eLearning Annual 2009. Pfeiffer: San Francisco

- There are gaps in the manuals that relate to some sub-regional climate / pasture types that would attract more members to investigate / utilise the content
- Facilitated extension activities targeting adoption of R&D validated approaches to production are more common in NSW and Victoria but opportunities seem to be limited in other States.
- Current training opportunities are primarily delivered as Type B activities one or two day workshops
- Most workshops (Type B activities) and facilitated groups (Type C activities) utilise small portions of the main manuals
- Novice producers have different informational needs than lifestyle producers and 'Expert' producers, for example, more background, scaffolding and explanations of underlying concepts
- Searching for MLA funded R&D information (reports etc) is difficult online (advanced search is available but not highly visible)

In the authors view, these key factors prompt a re-evaluation of how MLA provides and structures content online and how it better communicates the availability of this content to members. Additionally, eLearning approaches could enhance the content provision by MLA and provide better learning opportunities to some producers and facilitators.

Factors/Issues	Implication/Barriers	Mitigation	eLearning Delivery approaches
Diverse geographic spread in regional and remote Australia	<ul> <li>Access to traditional training difficult</li> <li>Climate, stock, and production cycles differences</li> </ul>	<ul> <li>Gap analysis of regional content holes</li> <li>Provision of relevant content</li> </ul>	<ul> <li>Learning Objects</li> <li>Vodcasts/podcasts</li> <li>Case studies in eLearning form</li> <li>Webinars</li> </ul>
Farming focus: Lifestyle to profit focus	<ul> <li>Large numbers of members not 'driven' to attend training</li> </ul>	<ul> <li>Push-pull strategy (web subscription mechanism to receive specific info)</li> <li>Better marketing &amp; communications</li> </ul>	
Range of producer expertise (novice, practitioners using traditional methods; practitioners focused on production improvement or product quality or diversity; innovators)	Type of training and content does not suit all	Provision of a range of learning options suitable to prior knowledge	Learning Portal: faceted search to enable content filtering by relevance
Time poor	Need flexible and faster ways to complete training		<ul> <li>Learning Objects</li> <li>Vodcasts/podcasts</li> <li>Case studies in eLearning form</li> <li>Webinars</li> <li>All accessible from a variety of devices</li> </ul>
Internet access/ bandwidth	Possible barrier but		

# Table 4: Key factors relating to member's perceptions of extension and training opportunities

Factors/Issues	Implication/Barriers	Mitigation	eLearning Delivery approaches
	significant coverage now		
Access to Type C – adoption programs	<ul> <li>Limited to NSW / VIC and related to proximity of group members</li> <li>Tyranny of distance in other States</li> </ul>	<ul> <li>Professional development (Producers / facilitators)</li> </ul>	<ul><li>Community of Practice</li><li>Webinars</li><li>eMentors</li></ul>
Age profile of producers	Computer literacy	<ul> <li>Professional development (Producers/ facilitators)</li> </ul>	<ul> <li>eLearning on use of portal</li> </ul>
Formal qualification levels (31% have post- secondary qualifications)	Learning by experience rather than via training opportunities	<ul> <li>Professional development (Producers/ facilitators)</li> <li>Communication Plan</li> </ul>	
Attitude to and preferred training style	<ul> <li>Want informal training options</li> <li>Like learning from /with other farmers (eg Type B and C training events)</li> </ul>	<ul> <li>Professional development (Producers / facilitators)</li> </ul>	<ul> <li>Learning Objects</li> <li>Virtual Groups</li> <li>Community of Practice</li> <li>Vodcasts / podcasts</li> <li>Case studies in</li> <li>eLearning form</li> <li>Webinars</li> </ul>
Web access to resources	<ul> <li>Difficult to find what they want too much information</li> <li>Manuals perceived as 'general'</li> </ul>	<ul> <li>Push communication strategy</li> <li></li> </ul>	<ul> <li>Tagging of content to aid searching</li> <li>Interfaces that stream content according to interest</li> </ul>
Type C events generate greater adoption	<ul> <li>Focus is adoption not just knowledge</li> </ul>	<ul> <li>Professional development (Producers/ facilitators)</li> </ul>	Virtual Groups

### 4.3 VISION for eLearning-based Approaches

The vision for the eLearning Strategy is to provide a set of three complimentary services in support of extension and training activities with the goal of facilitating practice change:

- Online Training/Instructional Services the provision of eLearning resources (both in structured and unstructured configurations) to enable a wider member community to access training and for facilitators to blend with their current instructor-led Type B and Type C training events. Ultimately, this would extend to the provision of a MLA learning management system (LMS) to manage and coordinate all training events nationally. An LMS is capable of managing enrolment in all training events, venues, facilitators, evaluations and feedback and would streamline the collection and reporting of training and training outcomes.
- Performance and Support Services these services focus on supporting access to quick and easy eLearning resources and searchable, tagged information by individuals to pull down whatever they need to do their job.
- Social Collaboration Services these services would focus on helping people work collaboratively in teams and moderated groups to facilitate adoption of research validated processes to increase farm production. These would *not* be traditional training services, but would involve the development of a range of collaboration and community skills by 'modelling' behaviours.



Figure 8: Vision for eLearning strategy as part of R&D Adoption activities.

### 4.4 The GAP

In order to facilitate and increase learning and adoption practices in the membership, we highlight a number of gaps in MLA's learning and knowledge landscape (formal and informal training events; access to non-training related information; and collaborative technologies) that can be filled with eLearning approaches. This also includes different approaches to access and delivery of knowledge-based events and across knowledge domains:

- Chunking of content contained in the majority market program manuals into easily accessible learning resources.
- Creation of online learning resources that can be both aggregated into self-directed learning
  opportunities and disaggregated into support resources to augment blended and face-to-face
  training events (Type B and Type C) delivered by facilitators in the extension network.
- Improved searching and knowledge exploration approaches to extension content and R&D project reports.
- An integrated learning portal (see below) through which knowledge domains and extension resources can be accessed.
- Access to collaboration and synchronous online training technologies (e.g. webinars).
- An online subscription service to allow members to receive targeted emails based on their preference for information and content.

Note that a Learning Portal can mean a website facility that offers learners consolidated access to learning and training resources from one or multiple sources, **or**, an LMS with a web based frontend that allows for the addition, deployment and tracking of learning content used for training purposes. Typically an LMS includes functionality for course catalogues (search/browse functionality), launching courses, registering new students, tracking current/completed student progress and assessments. Most LMS are developed to be independent of any content development/authoring packages. In addition, an LMS usually does not incorporate any authoring functionalities, but rather focuses on managing learning content.

### 4.5 The eLearning Strategy

The proposed eLearning strategy is centred on the development of an MLA learning portal where extension and other resources like MLA's online decision-support tools are consolidated into one web location that's accessible to all stakeholders.

In this strategy we are targeting 'experts' (innovators/early adopters), lifestyle practitioners, and novices (those relatively new to farming or diversifying their product range) in the membership group). The learning portal concept reflects the maturing of distributed learning from stand-alone efforts and multiple locations, to a more coordinated and strategic approach. The portal concept links together formal learning that the R&D extension industry delivers and informal learning opportunities and knowledge sharing that covers knowledge management domains.

The learning portal will provide members with a self-service option and additionally can be utilised by coordinators and facilitators to offer blended learning opportunities, including the use of webinar technologies and groupware (virtual adoption groups). The learning portal offers a member multiple pathways to gaining new knowledge and skills leading to higher levels of performance. The learning portal is about motivating the learner to take action through the following methods:

1. **Focus** – the learning portal is built with the *learner* as the main focus.

2. **Customisation** – the learning portal is customised for specific audiences and topics, so it does not overwhelm the learner with irrelevant information.

3. **Guidance** – the learning portal provides pathways that help the learner navigate to a higher level of knowledge and performance.

Learning portals provide an integrated platform of social media, internet technologies and content management that allow a customised view for different users. Beyond the outer user interface layer there is a filter layer that allows a user to get information that is most relevant to them, based on user preference or membership of a specific group. After entering the portal, a user has a variety of choices to the types of information they want to access and applications that help them process (consume or contribute) information (Figure 9). The Administrator role includes the 'system administrator' and also facilitators that can access certain levels of functionality to setup and manage specific communities of practice, virtual groups etc.



Figure 9: Learning Portal Architecture

For example, a learning pathway for an 'expert' producer might include:

- following up on a research project result received by email based on the preferences the producer set in the Learning Portal
- undertaking a faceted search of other related research results
- posting a comment on the results and implications on the R&D forum, and receiving a response back from the researcher and other producers
- conducting a trial based on research results and share data with a quality circle the producer has joined.
- A learning pathway for a 'Practitioner' producer might include:
- joining a community of practice (CoP) for sheep meat farmers in northern Victoria
- noting new trends in market specifications sent by email by MLA, the producer accesses Module 3 of the Making More from Sheep eLearning modules and follows the procedure (3.2) for managing the production system
- downloading Fat scoring of sale lambs (tool 3.3) to work out MSA processing class
- investigating MSA Sheep meat guidelines to determine the best approach to improving the eating quality of stock and sharing their experience with their CoP.
- A learning pathway for 'Novice' producers might include:
- undertaking several structured eLearning modules on 'Pasture growth' and 'Pasture Utilisation'
- completing Task 1 Construct a pasture map plan (Tool 2.1) and discuss results with participants on a regional community of practice
- viewing a vodcast from a producer who has successfully implemented best practice plant nutrition.

So, a future MLA learning landscape would encompass a range of formal and informal learning approaches, providing facilitated and self-directed learning options, integrated through a

collaboration platform that provide web 2.0 and social media tools, virtual classrooms, virtual groups etc. (Figure 10). This might also be extended in the future to include an LMS as a management tool to organise traditional and online learning extension events nationally.

	FORMAL	INFORMAL		
CHES	ILT Virtual Classroom	On Demand	Performance Support	Social
APPROA	Webinars Online Learning Online Group Testing Evaluation	Manuals Online Learning Vodcasts Podcasts Tools	Faceted Search Learning Objects Knowledgebase Tools	Community of Practice Wikis Blogs Forums
CULTURE	FACILITATED		SELF-DIRECTED	
TECHNOLOGY TOOLS	Virtual Classroom Groupware CMS LMS	Collaboration Platform   Web 2.0   Social Tools		

Figure 10: The future state MLA learning landscape

Figure 11 illustrates the formal and informal approaches that might be the most applicable to the three target populations.



Figure 11: Formal and informal learning approaches and three user target audiences

Figure 12 illustrates the range of eLearning resources involved with the envisaged MLA learning landscape. Depending on the target audience and whether the training is blended or self-initiated online, a learning pathway will make use some or all of these learning resources types.



Figure 12: eLearning resource types

### 4.6 Strategies to Engage the Target Audiences

The target audience is large and geographical spread throughout Australia and their engagement is a challenge. Obviously, a detailed change management, communications and marketing plans for this eLearning initiative would need to be developed and implemented. This would involve using the existing communications channels of the Feedback magazine and weekly email. A communication and marketing plan would involve six key steps:

1. **Designing your program** – you need to consider a series of questions about your own goals, audience, benefits, etc. These considerations and questions help you shape your program plan and description.

2. **Announcing your program** – defines how you will announce your initiative so that the target audience have a thorough understanding of your program goals so that you can achieve member-wide support and commitment for your initiative.

3. **Promoting your program** – this step will define the best ways to promote your message and build awareness and interest to create demand. Promotional messaging, events, and advertising will map back to the objectives and strategies that outlined in your communication strategy plan.

4. **Driving enrolments and completions** – this step defines strategies to motivate trainees to enrol in and complete courses

5. **Ongoing communications** – ensuring that the initiative is kept at the top of your members' minds.

6. **Tracking your success** – This will define tracking and measuring parameters so that you can evaluate the results of your program to ensure that you are achieving the goals that you set for your eLearning initiative.

MLA already has a sophisticated network to promote adoption involving Type A (Conferences, field days etc.), Type B (workshops) and Type C (farmer-led groups) activities. Promotion by MLA senior leadership team at conferences would be essential. Coordinators and facilitators have expressed an interest in being involved in trials, so some professional development around the eLearning initiative could create champions who would, in turn, promote the initiative with members through Type B and

Type C events. The groupware option would allow virtual farmer-led groups to be conducted in regions where distance otherwise creates a barrier to participation in adoption activities.

In our view the Extension and Adoption area of the website (the learning portal) would be raised to a component level of the main MLA homepage to increase awareness.

### 4.7 The Road Map to Implementation of the Strategy

Obviously, the redevelopment of the extension and training area of MLA's website as a learning portal would require considerable planning and interdepartmental cooperation in order to deliver new content, repackaged content, faceted search capabilities, access to webinar and virtual classroom technologies, social networking applications and groupware.

At this time we would suggest this could happen over an 18 month – 2 year timeframe and would require parallel streams of analysis-design-development-delivery project activities (Figure 13). Note that piloting is recommended when introducing any new technologies. Suggestions for content from the Majority Market Programs are provided in the next section.

Technologies are discussed in Appendix B.



Figure 13: a multi-project schedule for learning portal implementation

## 5 MLA Content and eLearning Approaches

MLA's Majority Market extension programs include:

### **1.** More Beef from Pastures

- Online Manual accessible at <a href="http://www.mla.com.au/mbfp/home">http://www.mla.com.au/mbfp/home</a>
- 100% owned by MLA
- Targeted at beef producers in the Southern half of Australia (temperate climate production systems)
- Many of the online decision-support tools (<u>http://www.mla.com.au/News-and-resources/Tools-and-calculators</u>) have been originally developed out of this program, such as Beef Cost of Production Calculator, Calving Histogram, Health Cost Benefit Calculator, Stocking Rate Calculator)
- Range of Edge workshops (face-to-face) are part of this
- MLA Extension Manager: Charlotte Fox.

### 2. Making More from Sheep

- Online Manual accessible at <u>http://www.makingmorefromsheep.com.au/</u>
- 50/50 co-owned with AWI (Australian Wool Innovation)
- Targeted at Australian sheep producers (sheep are only produced in the southern half of Australia)
- Workshops include MMfS workshops and "Bred Well Fed Well"
- Online manuals contain topics that include background information, links, procedures and tools and a quick self-assessment quiz to evaluate prior knowledge / understanding
- MLA Extension Manager: Renelle Jeffrey.

### 3. FutureBeef

- Website accessible at http://futurebeef.com.au/
- 50/50 co-owned with QLD, NT, WA Environmental State Departments (different names across the States)
- Targeted at northern beef producers
- Series of workshops specific to the North, including some Edge workshops (BusinessEdge, BreedingEdge, NutritionEdge) which are owned 100% by MLA, plus Grazing Managements workshops
- MLA Extension Manager: Charlotte Fox.

### 5.1 Suitability of Majority Market Programs to be delivered in an eLearning format

As most, if not all, of the majority market programs focus on attainment of knowledge, they fall within the Cognitive Learning Domain. The Cognitive Learning Domain relates to knowledge and intellectual skills, such as understanding, organising, analysing, applying, synthesizing, evaluation and decision making. The Cognitive Learning Domain is particularly amendable to an eLearning delivery format.

The Making More from Sheep (MMfS) manual is divided in to business-focused modules, resource and pasture modules and sheep technology modules. All are divided in to knowledge components, procedures (containing tasks) and tools to guide the completion of a task or record data gathering. All allow the producer to get to a point of analysing and synthesising their situation, but usually not a judgement or decision-making point. The latter is encouraged through participation in other industrybased training activities or accessing other informational resources. The More Beef from Pastures (MBfP) manual follows a similar approach. Both manuals have excellent content. The procedures are well written and clear with appropriate tools for the producer to use in working their way through the procedure. This material is exceptionally good starting material for conversion to an eLearning format.

But why do this when the content is already excellent and well laid out (you might be asking at this point)?

With online learning options, learners can work at their own pace and tend to retain more information compared to traditional instructor-led training. This is because of the many elements that are combined in eLearning to reinforce the message, such as video, audio, quizzes, simulations, webinars, live tutorials and discussion forums. Also in the eLearning environment it eliminates the visual and social barriers that may hinder some individuals in expressing themselves. In addition, the learner is given time to reflect on the information before responding.

The quality of interaction and collaboration in an eLearning environment provides the learner with the motivation to participate and engage in the learning experience. eLearning can take many different forms such as online courses, chat rooms, discussion forums, simulations, quizzes, and instructor led webinars. Whether you are working alone or in a group, you can contribute ideas, perspectives, and comments on the subject you are studying, and read about those from your fellow learners. The immediate feedback and personalised attention built into an eLearning application enables the learner to take an active approach to learning and encourages them to be responsible for their own learning development.

### 5.1.1 Best practice instructional design approaches

Instructivist, Cognitivist, and Constructivist are three basic approaches to learning. The MLA eLearning strategy considers these approaches with regard to which one is the most effective in achieving performance objectives.

- Instructivist learning is based on the premise that learning is most effective when the learner follows a very prescriptive learning path. Explicit objectives are defined, and a stimulus/response model used where information is presented, a test question is asked, and feedback is provided.
- Cognitivist learning is based on the premise that learning is most effective when the learner 'understands' the subject matter. Hierarchies of understanding commence with being able to recall information and progress through to using mental models as the basis for generalised problem solving.
- Constructivist learning is based on the premise that learning is most effective when the learner is able to use their existing knowledge and experiences as the foundation for future learning and decision-making.

Best practice eLearning commonly follow a constructivist model that recognises an active, constructive role for learners and contains:

- learning activities which engage the learner in active processing of the subject matter rather than mere knowledge acquisition
- learning settings and tasks that encourage meaningful online communication and interaction (between learners as well as between tutors and learners)
- content resources which are visually attractive, motivating to use and organised logically for ease of navigation
- representations of authentic and real life settings in preference to textual descriptions.
- Within this best practice model the instructional design framework recognises three key elements, learning tasks, learning resources and learning supports, illustrated by the diagram below.



Figure 14: Constructivist ID framework

Online delivery fits very well with these design principles. It allows learners to collaborate with peers, and search and review and discuss the knowledge they must acquire. The learning design provides a range of problem-based learning activities based on the principles of authenticity, self-direction and reflection. The learners in the search for a solution attain the relevant domain knowledge (as an 'active construction of meaning'). The activities are carefully chosen to achieve the desired learning outcomes and help learners actively engage with the learning materials. These are placed in an authentic context (their farm) reflecting the way in which the information being learnt is actually used in the workplace, and thus having real world relevance.

This is the way the current manual is structured with modules that contain procedures (series of learning tasks), tools (learning supports) and learning resources (explanations, references, web links). What is missing to fully model the constructivist approach is the reflection activity of sharing their construction of meaning with others in a forum or a Community of Practice.

The major objectives of the Community of Practice would be to:

- enable colleagues to learn from one another through the sharing of issues, ideas, lessons learned, problems and their solutions, research findings and other relevant aspects of their mutual interest
- more broadly share and better leverage the learning that occurs in the Community of Practice with other colleagues
- generate tangible, measurable, value-added benefits to their farming company.

### 5.1.2 Blended learning

The modules in each manual can be re-developed as blended learning modules some of which could be delivered by facilitators to farmer groups using virtual technologies of groupware, face-to-face or virtual classrooms and web 2 and social technologies. This might mimic the current facilitated groups (Type C activities) in NSW and Victoria (multiple events over 12 months).

A typical definition of a blended learning program is a learning solution that integrates online learning methodologies, with traditional instructor-led methods including lectures, in-person discussions, seminars, or tutorials. We would extend the traditional parameters of blended learning to include virtual online classrooms, access to informal resources and social learning opportunities (Community of Practice). We recognise that within the contemporary business context an effective learning solution needs to include processes and technologies that can be effective, not just within the learning domain, but also within knowledge management and performance support domains.

A typical blend (A) is illustrated below. Participants undertake some online pre-work (and offline tasks) to ensure that everyone is at a similar level or have assessed some aspect of their own farm in preparation for an in-depth discussion at the main teaching event. That event may be a face-to-face classroom or virtual classroom event. After this learning event the participants might utilise their fellow participants collective wisdom by participating in collaborative learning activities (preparing activities related to their own farm and sharing and reflecting on this with their colleagues in the group). Discussion might be facilitated online by an mentor or tutor.



### Blended Learning Model A

Figure 15: A blended learning example (A)

Another blended learning approach might involve a different mix of online and online activities, for example model B, below. In this example the participant undertakes a series of eLearning modules that might involve online and offline activities, participates in online collaborative learning

Community of practice

opportunities (e.g. discussion lists or forums), and participates in a 'final' face-to-face classroom (or virtual classroom) event that assesses and discusses some practical skills or culminating activity. Access to resources post the training event provides trainees with moment of need refreshers or access to reference material and can be expanded into a Community of Practice (like a user group).



Figure 16: A blended learning example (B)

### 5.1.3 Evaluations

Evaluations for online learning modules occur at two levels: usability and meeting a performance/learning objective.

The former is monitored by surveying users (members and facilitators) about the efficacy of the interface, navigation and content accuracy. This might be from an embedded survey, an external survey or from focus groups or interview.

Meeting performance or a learning objective is determined through assessments strategies whether that is achieved through online quizzes or monitoring of reflection activities or facilitated discussions in a community of practice. While eLearning resources come in many forms, sometimes the only data you can gather is from web analytical tools (e.g. Google Analytics) where accessing a learning object (video, podcast, PDF etc.) can be monitored.

LMS-based eLearning portals can also monitor usage in a number of ways including detailed information about every interaction within an interactive eLearning module. Additionally, many LMS are implementing the latest tracking technology called TinCan API or eXperience API that makes it possible to collect data about the wide range of experiences a person has online and offline. Very different systems, like use of helpdesk, tools and so forth can be monitored and records stored inside an LMS or outside.

The overall evaluation of whether a producer has adopted new practices is difficult to achieve except through end user surveying.

### 5.2 Suggestions for eLearning pilot

The eLearning Strategy represents a significant challenge in terms of the level of commitment required to repurpose content and introduce new technologies in pursuit of quality training outcomes. Such commitment has the capacity to impose a significant strain on organisational resources. For this reason, a transition approach to the implementation of the strategy is the most cost-effective way of achieving long-term quality outcomes.

Early stages could focus on the development of the technical framework for the learning portal and some pilot 'courses' that provide examples of eLearning for each of the suggested target audiences.

While all of the manuals are suitable for eLearning development, their value as learning tools could be further enhanced in future with a focus on some additional design and redevelopment work. For example:

- restructuring content to more closely align with learning outcomes and build producer engagement in active processing of subject matter
- restructuring learning materials into more manageable chunks for reading and ease of understanding
- incorporating use of Virtual Classroom, Online Forum, Communities of Practice and the like.
- Suggested pilot activities for the eLearning Strategy initiative would include:
- Novices (Sheep and Cattle) an online course containing modules on 'healthy soils and pasture improvement' covering Modules 6-7 and associated tools of the Making More from Sheep Manual and similar modules from the More Beef from Pasture manual. These would be developed using the constructivist approach outlined previously and incorporating learning tasks (the procedures); learning resources (explanatory modules and research links); learning supports (tools and explanations); with webinars, forums and community of practice for reflection and review activities.
- Lifestyle farmers (Sheep and Cattle) healthy soils and pasture improvement utilising the online course materials suggested for novices but delivering in a blended learning mode to a cohort of 15-20 producers that enrol following a marketing and engagement campaign. The blended learning course would be delivered via a series of synchronous events (virtual classroom) over 3-6 months (or other appropriate length), with pre-work involving completion of some online modules before the virtual classroom event; and some intervening on-farm activities leading to adoption. This course would be a facilitated by a consultant or local coordinator. The ultimate aim would be to enlist producers in states in which Type C activities have not been implemented, although the pilot might be trialled with Victorian producers given the state coordinator's enthusiasm to be involved in a trial. Professional development for facilitators on running a virtual course, and producers around accessing virtual classroom technologies, would also need to be trialled.
- **Cutting-edge' Experts' producers** develop a Community of Practice for feedlot producers, and prepare short learning objects on new R&D results applicable to this group. These might include for example a vodcast from the research team, a short interactive online learning module on on-farm applications of the research and access to research reports and summaries.

# Appendices: Guidelines and recommendations for the design, development and delivery of eLearning approaches

A successful implementation of an eLearning strategy relies on a solid framework of guidelines and recommendations for the design, development and delivery of eLearning approaches.

The design and development of the eLearning approaches has several phases:

- Project Initiation and Planning
- Design
- Development
- Delivery (Implementation)

The figure below summarises the inputs, activities and outputs that contribute to MLA's eLearning approaches.



### Figure 17: Framework for eLearning design and development

## 6 Appendix A: Project Initiation and Planning

The Project phase involves:

- Scoping and scheduling
- Creating or gathering base documentation
- Preparing the platform technologies
- Resourcing people to do the work (internal and/or external)

### 6.1 Project scope and scheduling

Project scoping involves the following:

• **Listing tasks and their subordinate activities:** The rest of this appendix will assist in defining these tasks and their sub- activities of the eLearning approaches project. Examples include: Development, which itself has the activities of data cleansing, testing and quality control.

• **Assigning roles to tasks:** Once you have the list of tasks, assign the role for who will do the work. If you do not yet have names, assign by position type. Also define what the responsibilities are and the reporting structure for each of these roles. More information about the roles involved in the eLearning approaches is provided in the "Resourcing People to do the work" section.

• **Creating a schedule:** Applying the eLearning approaches works most effectively and efficiently if there is an overarching schedule of all the different phases. This schedule needs an estimated duration of each task and the sub-activities, critical path identification and setting of milestones. Usually produced in Microsoft Project and/or Excel.

The above three elements are then compiled into a **Project plan**. This contains work breakdown structure of all tasks involved in project completion. Includes timing, dates, resource allocation and task dependencies.

### 6.2 Creating or gathering base documentation

Base documentation for the eLearning approaches project involves documenting detailed requirements for eLearning approaches as first delivered at high level in the eLearning strategy. These detailed requirements are like a thorough series of blueprints that the project team will use to bring the strategy into real-life.

Key base documentation includes the following:

### 6.2.1 Performance objectives

As the eLearning strategy is about supporting the adoption element of MLA's purview, these requirements are essential so as to provide means of evaluation of the eLearning approaches. That is, 'have the members used the eLearning support to help them adopt our proven way of XYZ'.

Effective learning objectives are SMART: Specific, Measurable, Action-oriented, Reasonable, and Time-bound.

Rather than trying to develop learning objectives based on these criteria, use SMART as a checklist to help ensure that you have considered each item in formulating learning objectives.

 Specific means that the learning objective describes the knowledge, attitudes, or skills that a learner should be able to demonstrate following exposure to a teaching strategy or learning activity.

- **Measurable** means that achievement of learning objectives can be measured by test items, observation, problem-solving exercises, or other evaluation methods during or after the session.
- **Action-oriented** means that the objective includes an action verb that demonstrates change or acquisition of knowledge, attitudes, or behaviours.
- Reasonable means that the objective reflects realistic expectations of knowledge, attitude, or behaviour acquisition/change given the conditions for instruction (e.g., time and size of group, scope of training).
- **Time-bound** means that the objective specifies a timeframe in which learners are expected to achieve the learning objective(s);usually by the end of the session.

The MMfS modules have loosely defined learning objectives at the 'procedure level' (see the 'At a glance' boxes).

For example, MMfS – Module 6 – Procedure 6.1 has 'Identify and understand the different soil types on your property and manage them appropriately'.

In looking at the procedure (6.1) this broad learning objective is not met by completion of procedure 6.1 as the 'management' part is covered in other procedures (7.1, 7.3 and 7.5) in the *Grow more Pasture* module 7 and elements from Module 5.

The task required for this 'procedure' is to draw a map showing type (and other parameters (slope etc.) and distribution of soils on your farm. The enabling objective would be to understand the classification and identification of soils (which is not part of the content of this module).

So in order to make an achievable learning objective based on the learning task (create a soil map) for this module you would need to provide learning resources and supports that enable the learner to:

- Perform What must the learners do to achieve the goal?
- Learning What must they understand to be able to perform?

### 6.2.2 Assessments

We would argue that the fundamental basis for all assessment of learning should be the context in which the material is being learned. Within our constructivist instructional design (ID) framework model we recognise three key elements: learning tasks, learning resources and learning supports. Assessment tasks in that framework can serve all three elements. So our approach could be termed 'authentic assessment', where the assessment tasks resemble the forms of activity and application of the learning in real life setting. Authentic assessment is the natural extension of the use of authentic tasks in learning settings.

There are some settings where skills and expertise can be assessed through more conventional means such as short answer or multiple choice questions, but the most successful forms of assessment is the use of integrated forms of assessment, where the learning tasks and the learning activities merge. It provides a reliable and valid means to determine achievement.

FOCUS	PROBLEM TYPE EXAMPLES	EXAMPLES
Rule-based	Logical problems story problems Rule-using problems	Solving a task that requires the selection and application of one or a set of principles to achieve a goal
Incident-based	Case-based activities Problem solving Decision making	Read a scenario and identify the key issues and how these influence what should be done
Strategy-based	Trouble shooting Diagnostic solution problems Strategic performance tasks Design tasks	Provide an approach to a complex and ill- defined issue
Role based	Dilemmas Social dilemmas	Conduct negotiations for a resolution of a problem within the setting

**Table 5:** Examples of authentic assessment approaches

Assessment in MLA Majority Market Extension Manuals is limited to a self-assessment by a producer of their experience in the topics of the manual and, while this is one way for a producer to select modules of interest, it does not reflect a competency in the topic or an understanding of concepts. Given one producer's comment on the currency of many producers' understanding of farming practices ('many farm with practices taught to them by a parent') it might be more relevant to provide quick quizzes at the beginning of each module to test their understanding of the learning objectives in each module.

This would reflect the current practice in some Type B activities where participants are tested (multiple choice) on the concepts before and after a workshop. In this latter case, the pre-test is used to determine what needs to be taught on the day, and would be more efficiently completed prior to attending the workshop. This could of course be delivered online in a scenario where all adoption activities are managed from a learning management system (enrolling, pre-test, venue, results, reporting).

### 6.2.3 Assessments, learning objectives and evaluations

Learning objectives relate to assessments as assessments are the primary way of evaluating whether a learning objective has been met. Kirkpatrick's four levels of evaluation have traditionally been used in the training industry to evaluate whether learning objectives have been achieved. Those levels are:

1. **Reaction**: To what degree did the learners react favourably to the training experience?

2. **Learning**: To what degree did the learners acquired the intended knowledge, skills or attitudes as a result of the training?

3. **Behaviour**: To what degree did the learners apply what they learned back on the job?

4. **Results**: To what degree did the target outcomes occur as a result of the training experience?

Typically in training events, 80-90% of evaluations do not go beyond the 2<sup>nd</sup> level. And this is true for Type B training events, although the intention to adopt new practices is often recorded but the actual adoption is not confirmed.

In defining and planning the learning approach and objectives we flip this hierarchy of evaluation to define the result we are seeking. That is, you start with an end goal to achieve an overall return on the performance and engagement:

- Results or Impact What is our goal?
- Performance What must the learners do to achieve the goal?
- Learning What must they do to perform?
- Reaction What needs to be done to engage the learners/performers?
- In general, in MLA adoption and extension activities:
- the overall goal is for the producer to adopt the research-based practices in order to achieve a greater production outcome (or other material goal) [Goal]
- in order to achieve that goal, they need to plan and then change aspects of their production processes to achieve a greater production outcome [Performance]
- in order to decide on a plan, they need to evaluate their current production (performance) state and decide on what changes must be made [Learning]
- in order to engage the learners, they may need to understand the benefits for them of a new approach to production [Reaction].

### 6.2.4 Technical requirements

The technical requirement refers to how the eLearning approaches will be managed, hosted and delivered to the members via online means. For example, whether you need to consider accessibility factors (eg do any members use screen readers). The analysis done in the strategy report helps to define the technical restrictions, for example, maximum download speed, devices used. This data then informs the requirements, for example: maximum file size of an eLearning object, use HTML 5 instead of Flash (as Flash is not supported by Apple devices)

If you decide to outsource the work, the above three documents will inform the Request for Quote (RFQ) and Statement of Work (SOW).

### 6.2.5 Style guide

A style guide provides a basis for consistency to apply across all eLearning approaches and the delivery platform. The guide outlines the specific conventions to be used including grammar, punctuation and language. It should also include style aspects such as font, colour etc.

It may be appropriate to create separate style for particular groups of topics or themes – in the MLA situation this might be related to geography and type of product (e.g. Northern Cattle, Wool, Fat Lambs etc).

#### 6.2.6 Resourcing people to do the work

Now you have the planning and setup completed, it's time to find the people to do the work.

The requirement for these resources within MLA will depend on whether production is outsourced or completed in house.

The personnel typically involved in the eLearning approaches are listed in the table below. If outsourcing, the vendor will usually provide the services of the Instructional Designer, Graphic Artist, Programmer or Authoring Specialist and Project Manager.

### Table 6: Typical eLearning human resources requirements

Personnel	Typical Responsibilities
Instructional Designer	Plan, write and update eLearning content
Graphic Artist	Illustration, animation, media production, web production
Programmer or Authoring Specialist	Scripting and coding in an authoring application, programming language, or web editing
Subject matter expert	Clarify content, provide workplace examples, develop scenarios (would be MLA staff/consultant or MLA member)
Quality Assurance and Control	Evaluate eLearning objects for quality including: aesthetics, grammar and content
Webmaster or Database Specialist	Post eLearning approaches on platform, manage websites
Project Manager	Manage production schedules, personnel assignments and stakeholder relationships

### 6.2.7 Resourcing the technology

MLA already has an extensive suite of eLearning objects that can be used in the realisation of the strategy.

For the strategy to reach its full potential, MLA will require the following functionalities:

- Rapid online learning course software
- Blogging application
- Virtual classroom application
- Webinar application
- Adequate Server space to store files
- Load sharing (cope with multiple users accessing site at same time)
- Responsive web design
- Faceted search

The eLearning strategy is centred on a learning portal hub that can access collaborative technologies like a community of practice, online learning (learning objects), virtual classroom/webinar technologies and eLearning development tools.

Learning objects can be created using rapid eLearning tools such as Articulate Storyline, Lectora Inspire and Adobe Captivate (v6 or above). While there is a plethora of eLearning development tools, both as cloud-based SaaS<sup>15</sup> and desktop applications, the three listed above are the tools most likely used by eLearning developers. In terms of output these applications produce HTML 5/Javascript eLearning materials that are accessible across PC/Mac platforms and mobile devices such as tablets.

Unfortunately, when Apple banned Flash from their mobile hardware range, the world had to shift to HTML 5-based delivery if cross-platform capability was required. We would caution against promoting the use of smart phone devices to deliver interactive online training materials because of the small screen resolution; however, smartphones are useful for reading PDFs and viewing short audio or video training material.

<sup>&</sup>lt;sup>15</sup> SaaS – Software as a Service

# 6.2.8 Online learning development tools

### Lectora Inspire

Lectora is a desktop eLearning authoring tool, which enables you to publish content to dynamic HTML for the web and to SCORM, AICC and learning management systems. Lectora is not a PowerPoint plugin like Articulate or a Word plugin like RapideL. Lectora is a fully functional self-contained authoring tool. It is richer and more functional than other desktop tools we have used, particularly the professional version which comes with additional editing tools such as an image editor, audio and video editor. Most



Figure 18: The Virtual Classroom

authoring tools require you to create and size images, for example, in a separate tool such as Photoshop. Lectora exports HTML content with Javascript code for functions and is stable on mobile devices.

### Articulate Storyline

Storyline is a powerful standalone tool with unparalleled interactivity features that will help you build dynamic, engaging content, including simulations, screen recordings, drag-and-drop interactions, click-and-reveal activities, quizzes and assessments, and much more. It publishes to HTML5, Flash and iOS.

An extensive review and comparison of Lectora Inspire and Articulate Storyline can be found at this link: <u>http://www.electronmedia.in/wp/lectora-inspire-articulate-storyline-side-side-comparison/</u>

### Adobe Captivate 7

Adobe Captivate has been the tool of choice for developing system simulation training; however, in Version 5 it was revamped to be a fully functional eLearning development tool as well. It has a wide range of template-driven drag-and-drop components such as games, quizzes and learning modules and Flash and HTML5 output.

An extensive review and comparison of Adobe Captivate v7, Articulate Storyline and Lectora Inspire can be found at this link:

http://www.electronmedia.in/wp/adobe\_captivate7\_vs\_articulate\_storyline\_vs\_lectora\_inspire/

### 6.2.9 Webinar/Virtual Classroom technologies

A Virtual Classroom is a simulated classroom used to deliver course content via the Internet. They allow student and teachers to interact using text, audio and/or video chat, whiteboards, streaming video and audio, file sharing, and so forth, as well as a hosting platform for a mix of synchronous and asynchronous learning environments.

Web Conferencing, on the other hand, is a simpler concept. A web conferencing platform provides a facility for holding meetings and discussions between remote locations via the Internet. Participants interact in real time using a computer, and a web camera or audio connection.

There is also a third category of these technologies – a web meeting product – like WebEx.

The primary use of a web conferencing tool (webinar/web meeting) is to share ideas and experiences or solve problems and make decisions; whereas, a virtual classroom is primarily used to facilitate learning. A face-to-face equivalent of a web meeting is a short business meeting; for a webinar a face-to-face equivalent is a session at a seminar or conference; for a virtual classroom the face-to-face equivalent is a classroom session.

The principal products in the virtual classroom space are:

- Adobe Connect
- Blackboard Collaborate (formerly Elluminate).

In Australia, the Adobe product is common used by corporations, whereas Elluminate is found mainly in the TAFE system. There are many options for leasing a cloud-based Virtual Classroom facility.

### 6.2.10 Project Collaboration Software

Our experience of collaboration tools has largely been through their use as virtual project management tools. All have been cloud-based and are therefore simple to set up and costs are very inexpensive. These tools are equally useful for running a farmer-led group, having a document repository, meeting organisers, calendars, chat and discussion lists. Combined with access to a virtual classroom technology, it would be possible to run a virtual Type C event for any region in Australia.

Two product options are:

- Zoho Projects
- Basecamp.

### 6.2.11 Community of Practice

Online Communities of Practice can be created using a number of individual technologies like wikis and blogs and there are several fully functional platforms that integrate these web 2.0 technologies. Download a very useful guide at: <u>http://connectededucators.org/wp-</u> content/uploads/2011/03/0143\_Platforms-and-Tools-march-2011.pdf

### 6.2.12 Collaboration Platforms

The community of practice guide (see URL above) does contain information about a number of community enhancing frameworks. An additional framework is also worthy of investigation - .LRN ("dot LRN") .LRN stands for Learn, Research, Network.

### http://dotlrn.org/

DotLRN provides a comprehensive suite of collaboration tools, a flexible toolset for innovation, and an enterprise-class infrastructure for scalable deployment. It is not a traditional eLearning system. Its underlying architecture is based on a highly-scalable community framework that is ideally suited to support teaching, research, and administration DotLRN allows users and administrators to define different kind of communities, where each community can be equipped with different tools and resources for shared work, dialogue, and investigation.

DotLRN "out-of-the-box" consists of a robust portal system, a comprehensive suite of collaborative applications, and an enterprise infrastructure layer based on open standards. It is based on the underlying premise that Learning is inherently social and takes place most successfully in the context of communities.

The preparation phase involves planning, resourcing people and resourcing the technology. Then the next phase to progress in establishing the eLearning strategy is the Design phase.

## 7 Appendix B: Design phase

The design phase involves determining how to present the eLearning objects so as to assist the members in achieving MLA's desired performance objectives relating to adoption.

### 7.1 Designing learning activities

According to Bloom's Taxonomy, human thinking skills can be broken down into the following six categories.

- 1. **Knowledge**: remembering or recalling appropriate, previously learned information to draw out factual (usually right or wrong) answers. Use words and phrases such as: how many, when, where, list, define, tell, describe, identify, etc., to draw out factual answers, testing students' recall and recognition.
- Comprehension: grasping or understanding the meaning of informational materials. Use words such as: describe, explain, estimate, predict, identify, and differentiate, etc., to encourage students to translate, interpret, and extrapolate.
- 3. **Application:** applying previously learned information (or knowledge) to new and unfamiliar situations. Use words such as: demonstrate, apply, illustrate, show, solve, examine, classify, experiment, etc., to encourage students to apply knowledge to situations that are new and unfamiliar.
- 4. **Analysis:** breaking down information into parts, or examining (and trying to understand the organisational structure of) information. Use words and phrases such as: what are the differences, analyse, explain, compare, separate, classify, arrange, etc., to encourage students to break information down into parts.
- 5. **Synthesis**: applying prior knowledge and skills to combine elements into a pattern not clearly there before. Use words and phrases such as: combine, rearrange, substitute, create, design, invent, what if, etc., to encourage students to combine elements into a pattern that's new.
- 6. **Evaluation:** judging or deciding according to some set of criteria, without real right or wrong answers. Use words such as: assess, decide, measure, select, explain, conclude, compare, and summarise, etc., to encourage students to make judgements according to a set of criteria.

Later revisions have swapped "Synthesis" with "Evaluation", placing Synthesis as a higher order category of learning.

Key to the model is the principle that there is a hierarchy to the levels. Therefore, when designing learning you should construct the programme so that the relevant knowledge (for example) for your particular situation is developed, tested and achieved at level 1, before you progress to achieving the more complex aims of learning at level 2 and 3 and so on. For some learning, you may be able to progress through the levels very rapidly, for others it may take some time. Either way, the design of the learning should consciously address each of the levels.

The activities and procedures covered in MLA's Manuals can all be classified under Bloom Taxonomy – with lower levels of knowledge, comprehension and application more common. While Bloom's categories are very useful for constructing learning / performance objectives they also assist in designing instructional approaches.

### 7.1.1 Instructional strategies

Figure 19 provides some examples (above the step) of instructional activities that fit with Bloom's Taxonomy with a list of (action) verbs (below the step) that are consistent with each category and are commonly used to create learning objectives.



Figure 19: Bloom's taxonomy staircase (Source: ftp://ftpfc.sc.egov.usda.gov/NEDC/isd/taxonomy.pdf)

### 7.1.2 Blended learning using multiple eLearning resources

The eLearning strategy involves the members in selecting from a palette of eLearning resources.

A factor in achieving adoption is to present the resources in a way that is relevant and engaging to the member and depends on what is the learning or performance objective.

The following table by learning expert William Horton (from Hubbard, 2013<sup>16</sup>) helps to blend eLearning resources with activities in both the online and real-world realms.

Horton's **GEARR methodology** (Gather, Expand, Apply, Reflect and Review) was expanded in Hubbard's book to include" exercise / practice" - Gather, Expand, Exercise/Practice, Apply, Reflect and Review). The GEEARR methodology helps to segment out the different learning methods / approaches that can be used to build a capability. This methodology allow you to consider how the information and skills should be provided based on what stage in the learning journey the learner is at and the multiple ways in which they might engage with the learning.

Horton (2006) expands the GEEARR methodology (the methods) int0 a matrix that includes appropriate selection of media. He divides the media selection into three classifications – Absorb, Do, Connect.

The following tables – extracted form Hubbard's book are provided as an example.

<sup>&</sup>lt;sup>16</sup> Hubbard R 2013. The really useful eLearning instruction manual: your toolkit for putting eLearning into practice. Publisher John Wiley & Sons Ltd

See also Horton, J 2006 . eLearning by design John Wiley and Sons

Blended Learning Design Model		Media		
	Method	Absorb	Do	Connect
Gather	Facilitated discussion, Viewing, Reading, Listening, Lecture, Presentation, Networking, Personal curation	Seminar, Conference, Virtual Classroom, Workshop, Meeting, Podcast, Video, elearning mod- ule, Email, Documents, Intranet/ Internet, SMS	Curation tool	Forum, Microblogging
Expand	Reading, Viewing, Facilitated discussion, Unfacilitated discussion, Listening, Research, Q&A with SME, Visit, Coaching, Mentoring, Lecture, Presentation, Collaboration, Exploration, Networking, Personal curation	Seminar, Workshop, Classroom, Meeting, Podcast, Video, Television programme, Phone, Email, Documents, Intranet/ Internet, SMS, Virtual classroom Virtual classroom recordings, Forums, Microblogging, Instant messaging, Shared workspace, elearning module, Knowledge bank or Curated content	Curation tool	Forum, Microblogging, Shared workspace
Exercise/ practise	Instruction, Problem solving activity, Procedures, Practical exercise, Game, Simulation, Assignment, Test, Project, group activity, Observed performance, Networking	Explicit and Tacit experience	Workshop, Classroom, Virtual classroom, elearning activity, Step- by-step documents, Shared workspace, elearning, Other online activity, Multi- user virtual world, Face-to-face, Paper based or digital competency activity, Knowledge bank, Curated content, Blog	Forums, Microblogging

Table 6.2 Methods and media for different stages of the learning journey

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#### Table 6.2 (Continued)

Blended Learning Design Model		Media		
	Method	Absorb	Do	Connect
Apply	Task (on job), Observed/ monitored performance, Serendipitous leaming, Leaming by doing	Explicit and Tacit experience	Use of appropriate existing perfor- mance support/curated media to effect completion of the task. (Note: all the resources here should have been provided in the previous stages of the learning journey)	
Reflect	Writing, Recording, Facilitated discussion, Questionnaire or survey, Test/assessment results, Coaching, Mentoring, Collaboration, Networking, Shared curation		Meeting, Workshop, Virtual Classroom, Instant Messaging, Shared workspace, Video, Audio recording (podcast), Photographs and other media outputs	Forum, Microblogging, Blog, Contribute to knowledge bank, Curate
Review	Facilitated discussion, Q&A with SME or line manager, Coaching, Mentoring, Shared curation, Content review, Contribution acknowl- edgement, Lessons learned process		Meeting, Blog, Telephone, Instant messaging, Shared workspace, Paper-based or digital feedback process, Case studies, Impact statements	Forum, Microblogging, Blog, Contributions to knowledge bank acknowledged and attributed

What this means to MLA is that to most effectively enable adoption, media within each of the 'Absorb, Connect, Do' should be used for all of the learning journey stages (Gather, Expand, Exercise/practise, Apply, Reflect, Review).

If the performance objective were for awareness only, then the learning journey stages of Gather and Reflect, with their corresponding methods and media would be sufficient.

### 7.1.3 Meta-tagging configuration plan

Once you have identified which learning journey stage each of the eLearning resources media supports (for example, a video supports 'Gather', 'Expand'), each resources needs to be tagged in a way to identify it as such.

This tagging will be used for the faceted search functionality so that the member can choose to 'see' what is most relevant to the learning and/or performance need.

A meta-tagging configuration plan defines the tag categories, tag terms, and what to tag them to. The plan should contain a list of eLearning resources with all their relevant tags.

### 7.1.4 Plan for usability: Platform wireframe structure

Even with the faceted search capability, members will still need to browse content. Anyone using an online interface needs it to be: efficient, effective, engaging, error tolerant and easy to learn—these elements comprise the concept of 'usability'.

So how to make the platform as usable as possible? The interface design and underlying technical architecture provide these elements.

- Efficient: Page display times, search results return time, desired content found within two clicks of navigation.
- Effective: The aim of the platform for members is to get the information and resources they need. Thus, the search capability and results display must be able to find content.
- Engaging: allow the member to customise the look and feel of their page and create their profile: For example, when they visit, to show a list of new content that they have indicated as relevant to their needs.
- Error tolerant: Provide feedback to members if they cause or experience an unintended event. For example
- Easy to learn: base the design and functional elements on platforms members have already experienced, such as Google search.

The Design phase aspect of achieving a usable platform, involves writing the specifications to fulfil the criteria and creating a functional mock-up interface with link to sub-pages with the above five criteria in mind.

Every eLearning resource needs to be arranged in the platform in both a default display (what appears to a member if they have not used faceted search or profile display) and for a customised display.

### 8 Appendix C: Development Phase

The development phase is when all the planning and design outputs come to life and become a tangible result. This then needs to be tested from the point of view of technical functionality, usability and for adherence to the planning outputs (style guide, performance specification).

### 8.1 Data cleansing

During the design phase, you will have noted which eLearning resources are either out-dated as far as content accuracy goes, or are superfluous to any learning journey stages.

These resources should either be removed completely from the platform or tagged and arranged as an archive.

### 8.2 Quality Assurance: Testing

Testing the eLearning resources and the platform helps to improve the member's experience of the eLearning and thus to likelihood of adoption.

When planning the testing of the eLearning resources and platform, the following must be tested:

- the content
- the instructional design
- the user interface
- the navigation system
- the interactive components , including any assessments
- the programming
- the delivery platform, to ensure there are no technological problems

Testing should always follow a designated Test Plan.

### **Developing Test Plans**

A test plan is usually developed describing the scope, approach, resources, and schedule of intended testing activities. It identifies the following:

- the items and features to be tested
- the testing tasks to be undertaken
- the bug-reporting procedures, and procedures for verification of issues as being fixed (regression testing)
- details of who is responsible for each task
- the timeline and budget for the testing
- the purpose of the testing of the product— this should indicate to the testers the types of things they are looking for as they work through the product
- any limits to what should be tested and how it should be tested
- questions that may need to be answered during the test process.

When an eLearning resource or the platform itself is tested, it is important that the feedback from testers is controlled, and in particular that when they report issues the location of these issues in the product is readily identifiable by those responsible for fixing them.

The following should appear as general information on a test report sheet:

- the name of the tester
- the date the testing is being done
- the version of the course being tested
- the technology environment under which the course is being tested (platform, operating system, screen dimensions and colour depth, computer processor and speed).

The following should be provided for each problem or issue that is found:

- a specific identifier for the screen where the problem is found such as a screen number, or a description of the precise location
- the problem or issue that has been found, including its location on that screen or site
- the correction that is required (if this is known)
- a space beside each issue or problem reported for the person to indicate that the problem has been corrected, and how it was corrected.

### Test Content

The content of the eLearning resource should be tested by a content expert and/or educationalist for accuracy. For online learning courses or written resources, this should also include a check of all screen text (including titles, body text, captions and labels) for:

- spelling
- grammar
- stylistic consistency, such as capitalisation and punctuation
- content accuracy.

Test illustrative and sound assets to ensure that:

- they match labels and captions
- they are accurate.

Verify the following:

- proper names
- job titles
- any telephone and other contact numbers mentioned
- dates
- copyright notices
- copyright acknowledgements
- other acknowledgements and information, such as names of the development team, to appear on title screens.

### Test Media Assets

Media assets should be checked to confirm the following:

- all files are correctly named
- all files are the correct byte size or near the projected file size (examining the file-sizes in a directory listing can be helpful in identifying problem files which are either much too large or much too small)
- all files are at the correct resolution (screen-size and bit-depth in the case of graphics; duration, sampling frequency and bit-depth in the case of sound files)
- the quality of files displaying on the target monitor or heard on target listening equipment is acceptable.

Although functional testing is a painstaking procedure, it is an essential part of the total quality assurance process. Key functionality testing to be undertaken includes:

- For online learning courses: Desk-testing of software at a screen level, then at the module level, and finally at the course level (testing the integration of modules). This entails going through the program systematically, and along as many routes and through as many permutations as time allows.
- If a product will be used on a variety of devices, it should be tested on as many different hardware and operating system configurations as possible. Different devices (eg Smartphone, tablet) operate at different speeds and this may upset things, especially if the program has to synchronise the simultaneous playback of diverse dynamic elements (such as sound and motion video). This is called configuration testing.
- In some operating environments, programs may clash with preloaded initialisation or control devices, so test as many typical configurations as possible.
- Testing effect of reducing the program's memory partition and the screen's resolution.

### **Usability testing**

According to the Australian Government's Web Guide, usability goals underpin the overall design and functionality of a website. These goals have three facets:

- Performance What should the user be able to do?
- Conditions Under what conditions should the user be able to do it?
- Criteria How well must it be done?

Information Architecture usability testing focuses on testing, improving and refining the information architecture. Specific information architecture features that require testing include:

- design page design, readability, layout, graphics, scrolling
- finding information navigation, category names, links
- understanding information content quality and presentation
- search quality of search results.

Usability tests frequently involve carefully creating a realistic situation in which a person has to perform a number of tasks using the system, while observers watch and take notes. Some tests also use devices such as scripted instructions and pre- and post-test questionnaires to collect

feedback on the product being tested. (<u>http://webguide.gov.au/accessibility-usability/usability-testing/</u>)

### 8.3 Focus Testing

Member buy-in to the eLearning resources and platform is essential in increasing adoption rates. Ask a cross-section of members to use a trial platform and gather feedback regarding usability, functionality and how they believe it may or may not assist in the increase in adoption.

Use their feedback to improve the solution before undertaking the implementation phase.

### **9** Appendix D: Implementation phase

The Implementation phase is when the majority of the members get to use the platform. The phase involves using marketing to encourage members to use the platform, and setting up and following administration and maintenance of the resources and platform.

### 9.1 Marketing strategy

Encouraging the use of eLearning by members requires elements of educating them about eLearning and highlighting the value it brings to their farming.

Integrate the eLearning into the MLA's other adoption activities. Some best practices to follow include:

- Offer incentives for successful completion of performance plans on or before your defined time frame.
- Tie eLearning resources to other projects or workshops.
- Use eLearning resources as pre-requisites to instructor-led workshops or training events.
- Recognise and reward each member's accomplishments.
- Support and manage ongoing integration of topics and techniques learned into the member's daily work.

### 9.2 Manage the eLearning resources and platform

It is important to have an administrator (or team of administrators) responsible for the management and administration of eLearning. These people need not be experts in eLearning, but capable of effectively managing the administrative tasks associated with the tracking and distribution of membership wide eLearning.

Aspects of administration include:

- Making decisions as to change request fulfilment and priorities
- Approving purchases of further eLearning resources and platform technologies
- Moderating or delegating moderation of member uploaded content.

### 9.3 Maintain the eLearning resources and platform

The eLearning resources and platform will require maintenance. While some of this maintenance will involve the technology for its delivery, it also will involve the content, the look and feel, and even the functionality.

It is important to have mechanisms in place so that the maintenance is relevant, it is carried out at an appropriate time, and is effective.

The following should be checked at regular intervals according to a maintenance schedule:

• There are no technology issues that could cause problems with the delivery of the product. These could arise because of updates to operating systems, software and hardware, as well as changes in any network and browsers over which the platform and resources are delivered

- The eLearning resource is still relevant, and that there have been no changes required of its aims and objectives.
- The look and feel of the eLearning resource has not become dated. For example, it does not show images of outdated equipment, or it does not contain contact details that are no longer relevant.
- Software bugs that have been found and need correcting.
- There are several ways you can receive feedback about any required maintenance for an eLearning resource or the platform:
- Interview the member and SMEs.
- Provide regular survey forms about the product to the members and MLA staff and consultants (embedded by site page, or external, such as by Survey Monkey).

### 9.4 eLearning platform guidelines

An eLearning platform is the visual and functional interface the member has in accessing the MLA's eLearning resources. Currently, these resources are accessed via HTML pages as content on a page, embedded within a page or as downloadable files.

For the eLearning strategy to fulfil its maximum potential it must have an eLearning platform that can:

- manage content: provides a file directory format 'back end' for MLA staff to read, edit and publish with version control
- host content
- track content use dashboard of user analytics: pages, product viewed, time on platform, IP address locations
- deliver content: Access point for learners to access the products, filterable by member comfiguration
- These features could be achieved by the following platform types:
- Webpage-based Portal: similar to the existing delivery method of MLA, but with added features such as faceted search and eLearning resources such as a blog and forum.
- Learning Management System or Learning Content Management System: provides tracking of member interaction, progress and completion rates of eLearning resources, enables creation of learning/performance plans and pathways.

When choosing an eLearning platform, consider the following:

- Expandability/scalability number of validated users the platform can support
- Upgrade path
- Flexibility to cope with advances in WWW functionalities
- Predicted feature changes
- Costs (upfront and ongoing for support and upgrades)
- Licenses server and client (if not web based)

- Additional software (if required)
- Hardware
- Technical support general maintenance/administration and specialist customisation

### 9.5 Mobile-ready: required platform and resources functionality

The use of mobile devices such as tablets and mobiles is increasing. To make sure that the MLA eLearning platform and resources function fully on such devices mean taking into consideration HTML5 and the concept of responsive web design.

### 9.5.1 Use of HTML 5

When presenting video, audio and other media it is better to use HTML5 instead of Flash. This is because Apple devices (iPad, iPhone) do not support Flash based content (such as animations or video).

### 9.5.2 Responsive web design

To make the eLearning as accessible to as many members at as many opportunities as possible, the online content must be able to be displayed on various interfaces: PC, Smartphone and Tablet. Even within each of these product types are a range of parameters that could affect the way the content is displayed.

Whichever platform type MLA use, it must be responsive.

**Responsive Web design** is the approach that suggests that design and development should respond to the user's behaviour and environment based on screen size, platform and orientation. As the user switches from their laptop to iPad, the website should automatically switch to accommodate for resolution, image size and scripting abilities. In other words, the website should have the technology to automatically respond to the user's preferences.

The example shown in the figures below shows how when a web design is non-responsive, how difficult it is to read the text and touch menu items.



Figure 20. Example above of the same site on a mobile phone, the left is a responsive site the right a non-responsive site (Source: <u>http://www.doyoucompute.co.uk/is-responsive-website-design-important/</u>)

### 9.6 Webpage based Portal

A *Web portal* or *public portal* refers to a Web site or service that offers a broad array of resources and services, such as e-mail, forums, search engines, and online shopping malls. The first Web portals were online services, such as AOL, that provided access to the Web, but by now most of the traditional search engines have transformed themselves into Web portals to attract and keep a larger audience. (http://www.webopedia.com/TERM/P/portal.html)

Whether MLA use an application or use the existing infrastructure, the following functions need to be introduced.

- Faceted search
- Content management system

### 9.6.1 Faceted search

Faceted search is the dynamic clustering of items or search results into categories that let users drill into search results (or even skip searching entirely) by any value in any field. Each facet displayed also shows the number of hits within the search that match that category. Users can then "drill down" by applying specific constraints to the search results. Faceted search is also called faceted browsing, faceted navigation, guided navigation and sometimes parametric search. (Definition and example from Yonik Seeley<sup>17</sup>)



Figure 22. Example of facets with search results (http://searchhub.org/2009/09/02/faceted-search-with-solr/).

This allows the member to display search results according to criteria they select.

For example, if a member only wanted to see resources for sheep farming in southern regions, they could select those filter objects.

The benefit of faceted search is that the member is able to find the most relevant and thus enable them to better progress in their performance pathway towards adoption.

<sup>&</sup>lt;sup>17</sup> Yonik Seeley - http://searchhub.org/2009/09/02/faceted-search-with-solr/

### 9.7 Learning Management System/Learning Content Management System

A learning management system (LMS) is a software application for the administration, documentation, tracking, reporting and delivery of e-learning education courses or training programs. LMSs range from systems for managing training and educational records to software for distributing online or blended/hybrid courses over the Internet with features for online collaboration. Colleges and universities use LMSs to deliver online courses and augment on-campus courses. Corporate training departments use LMSs to deliver online training, as well as automate record-keeping and employee registration.

### LMS Functionality

- Course Content Delivery
- Student Registration and Administration
- Training Event Management (i.e., scheduling, tracking)
- Curriculum and Certification Management
- Skills and Competencies Management
- Skill Gap Analysis
- Individual Development Plan
- Reporting
- Training Record Management
- Courseware Authoring

A Learning Content Management System (LCMS) has an authoring application, a data repository, a delivery interface, and administration tools-many of the things you find in a full-featured learning management system. Some LCMSs have collaboration tools, including chat, integrated email, and threaded discussion groups. Again, these are all features you can find in a robust learning management system. In fact, many of the features found in a LCMS have been incorporated in a full-featured LMS. The most salient features of a LCMS, are those focused on the development, management and publishing of the content that will typically be delivered via an LMS.

### LCMS Functionality

- Template-driven, Collaborative Content Development
- Facilitated Content Management (i.e., indexing and reuse)
- Publishing
- Workflow Integration
- Automated Interface with an LMS
- 9.7.1 Features and benefits relating to adoption objectives

A LMS / LCMS enables creation of performance/learning pathways and plans so that pathways can be easily differentiated for the MLA target audiences. It also provides enhanced tracking features through SCORM and more recently via Tin Can API.

SCORM stands for "Sharable Content Object Reference Model". It is a set of technical standards for e-learning software products. SCORM tells programmers how to write their code so that it can "play well" with other e-learning software. It is the de facto industry standard for e-learning interoperability. Specifically, SCORM governs how online learning content and Learning Management Systems (LMSs) communicate with each other. SCORM does not speak to instructional design or any other pedagogical concern; it is purely a technical standard.

The Tin Can API (sometimes known as the Experience API or xAPI) is a brand new specification for learning technology that makes it possible to collect data about the wide range of experiences a person has (online and offline). This API captures data in a consistent format about a person or group's activities from many technologies. Very different systems are able to securely communicate by capturing and sharing this stream of activities using Tin Can's simple vocabulary.

Previous specifications were difficult and had limitations but the Tin Can API is simple and flexible. It lifts many of the older restrictions. Mobile learning, simulations, virtual worlds, serious games, real-world activities, experiential learning, social learning, offline learning, and collaborative learning are just some of the things that can now be recognized and communicated well with the Tin Can API.

People learn from interactions with other people, content, and beyond. These actions can happen anywhere and signal an event where learning could occur. All of these can be recorded with the Tin Can API.

When an activity needs to be recorded, the application sends secure statements in the form of "Noun, verb, object" or "I did this" to a Learning Record Store (LRS). Learning Record Stores record all of the statements made. An LRS can share these statements with other LRSs. An LRS can exist on its own, or inside an LMS.



A Learning Record Store (LRS) = a place to store learning records.



The data stored in an LRS can be accessed by LMSs, reporting tools, or other LRSs, and can be stored as individual learning records and/or entire transcripts.



### Figure 24: A learning record store can transfer learning records to LMSs and other tools.

SCORM and other e-learning standards only store a certain amount of learning data. Tin Can allows for the LRS to store nearly everything, which means better reporting and a much more accurate picture of learners.

# 10 Appendix D: How to monitor and evaluate the eLearning solution

As means of the continual improvement of MLA's adoption programs, it is necessary to determine whether the eLearning is assisting members in their adoption of new practices.

This can be determined by monitoring member use of eLearning to generate quantitative and qualitative data, and then, evaluating the effectiveness of eLearning by analysing that data against the performance criteria.

### 10.1 Monitor

### 10.1.1 What to monitor

MLA needs to monitor the eLearning resources and platform from the point of view of its usability and its effectiveness in supporting adoption (against performance objectives).

The following are categories to monitor:

- Intuitive interface, ease of navigation, length of learning curve for: members; Facilitators including ease of developing and uploading content and managing eLearning resources; Administrators; and Technical staff – including ease of installation, maintenance, user administration and security objectives
- Educational model used for example instructivist, constructivist, etc. and how it supports adoption activities
- Flexibility to adapt to use by members at different points on the technology learning curve

After obtaining the data, the next action is to analyse it and determine findings that inform recommendations.

The analysis, findings and recommendations are presented in a report.

10.1.2 How to collect data

The table below describes the data to collect and how to collect them against each evaluation category.

Table 7 – Data to collect to evaluate eLe	earning strategy effectiveness
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Evaluation Category	Data objects	How to collect data
Usability	search terms used, page visits, length of page visit, help desk queries	Website analytics
		Embedded survey
		External survey
		Interviews
Performance objectives	Depth of new practice application	Post performance activity survey
		Community of Practice upload review

### 10.2 Evaluate

After obtaining the data, it is time for evaluation and the subsequent recommendations relating to how to improve member adoption via eLearning resources.

### 10.2.1 Kirkpatrick levels explanation

As part of the eLearning development methodology of ADDIE, ensuring an effective learning experience involves seeking feedback and evidence as to whether the product fulfilled its learning objectives via evaluation.

The commonly used Kirkpatrick's Four Level Evaluation Model is used to determine this. Note that the higher the level, the higher the time, effort and cost is involved.

Level 1 – Reaction	Level 2 - Learning	Level 3 - Behaviour	Level 4 - Results
This measures how the learners react to the learning process. It is known that learners who enjoy the learning experience often learn more and transfer more of the learning to the workplace. Low levels of learner acceptance can indicate that the current approach is not working.	This measures the extent to which the learners gain knowledge and skills. Any increase in performance after training indicates that learning has been successful.	This measures the participants' capability to perform the learned skills while on the job. The transfer of learning is gauged via interviews between the learner and training staff over time, 360° review data and performance appraisal data. This should commence prior to the training in order to provide a baseline for performance.	At this level of analysis, the results from the third tier (transfer) are quantised into business results. The value of training here is the financial value of the errors not made. This is a difficult figure to generate, as the content domain issues need to be identified and costed.

Table 8 - Kirkpatrick's Four Level Evaluation Model

10.2.2 Write report: analyse data, present findings, make recommendations

When developing a strategy for monitoring and reporting results, focus on business impact and how the eLearning supports performance, competencies and intellectual capital. Important points to note:

- highlight success by focusing less on numbers, and more on the nature of learning
- focus on benefits, not features
- communicate the obvious returns from eLearning such as reduced training time, delivery of training to the member

When reporting on the **learning** associated with eLearning, focus on:

- evidence demonstrating that eLearning secures better member retention of what is learned, and better application to real work situations
- statistics that underscore that members typically achieve higher test scores, and have improved attitudes toward eLearning format
- numbers that prove a higher number of members achieving 'mastery' level.

- When addressing **performance** gains associated with eLearning, try to:
- provide specific examples; statistics that show improvement in work performance
- describe anecdotal evidence, for example, members reporting higher confidence in their roles
- show numbers; an increase in number of applications processed
- reinforce the common performance drivers that great eLearning implementation can impact such as productivity, safety, customer satisfaction, personnel.

Reinforce in the report that eLearning rapidly and consistently provides members with skills, knowledge, and attitudes to innovate and help them make sound decisions on their own and in teams.

### 10.2.3 Act on recommendations

The data in the report provide evidence to support the recommendations. The change committee formed as part of the eLearning management can decide whether to act on these recommendations, taking into account the cost, time and effort required to do so.