

This document is set out in the IMS format as a 'Proposal for Work Group Task'. It was first drafted in August 2001 by Kevin Donovan and Tony Tait, Development Advisers with the UK's Learning and Skills Development Agency, and is based in part on LSDA's valued work on a 'credit framework'.

See www.lsda.org.uk and www.learningtechnologies.ac.uk

Title

Learning Outcomes

Nature of Task

There is an existing IMS Reusable Competency Definitions Information Model (Public Draft Specification, IMS, February 2001). UK colleagues feel that it reflects US rather than wider global practice on the specification of learning outcomes and, particularly, is based upon specific industry skills development rather than wider education and training contexts capable of support through technology.

Much thinking on learning outcomes is rooted in pre-knowledge economies. The model presented here offers an individualised structure, which is learner-centred rather than based on descriptive course-centred language. It is felt that this model offers greater possibilities for interoperability and compatibility with other specifications. In particular it is most relevant to new developments in teaching and learning which make use of technology platforms.

Target Version/Date

1.1 August 2001

Requirement Statement

Why we need this specification.

The framework presented here is based on research and development by the UK's Learning and Skills Development Agency (LSDA). It uses a system of 'learning outcomes', 'units of assessment' and 'credit' (which are described in detail below).

The framework is a universal way to:

- describe
- measure and
- compare

learning and achievement.

The framework has been used successfully in academic, vocational and workplace contexts, and at all levels from basic education to university/professional qualifications.

Although there is an existing 'competence' public draft specification (IMS, February 2001) UK colleagues feel that it reflects US rather than wider global practice on the specification of learning outcomes and, particularly, specific industry skills competence rather than wider education and training contexts.

If learning could be specified using a standard IMS model, and linked to existing or planned specifications for learning object metadata, learner information, question and test interoperability etc, learners might effectively discover material (and be assessed, their learning tracked etc) for particular purposes and at particular times.

The immediate stimulus for the paper came from:

- a meeting of a UK sub-group at the Madrid launch of IMS Europe; and
- a subsequent meeting convened by Fretwell-Downing and also involving LSDA, Ufi, Becta, JISC and MEG.

The developing UK thinking and practice, based on the LSDA framework detailed later, represents wide professional consensus and use in a range of education and training settings. It was, for example, presented to a March 2000 IEEE seminar in London and met with a favourable reception.

The approach has been endorsed by UK national training organisations (NTOs), organisations and institutions in higher education/university level, university credit consortia, academic and vocational awarding bodies, the UK University for Industry (Ufi) and other key UK agencies. It has also been accepted by the assemblies (devolved governments) for Scotland, Wales and Northern Ireland.

This paper results from:

- work by the LSDA and other agencies over recent years to specify learning outcomes within a coherent framework
- the recognition that a coherent 'map' of learning outcomes (what learners know, understand and/or can do at whatever level and of whatever 'volume') could fit logically onto a map of learning objects (for purposes outlined below).

The framework – and this specification – can give confidence in learning assessment regimes which are based on social and cultural realities whatever the institution or country.

It does this by

- linking so-called 'units of assessment', and allowing learners to
- combine units of assessment in a variety of different ways to meet particular specific needs.

Whole learning programmes and qualifications can be based on combinations of units, which are tailored for the needs of individuals, employers, and selectors for college and university courses. Units are derived by learners/tutors/trainers/peers within a framework, which is adaptable to different circumstances as outlined in this specification. Learners can be offered individual outcomes to meet their needs, as in the example below.

What the framework is

A unit of assessment

At the heart of the framework is the unit specification. This includes:

- Title – what the unit is called
- Learning outcomes – statements of what a learner can be expected to know, understand and do
- Assessment criteria – criteria for judging whether learning outcomes have been achieved
- Credit value – based on volume of achievement/notional learning time
- Notional learning time – the time taken on average for a learner to achieve a set of learning outcomes at a specified level
- Level – the degree of complexity, learner autonomy and range of achievement derived from level descriptors
- Size – the extent of learning represented by the notional learning time required to achieve the unit.

Units do not specify how, where or when learning takes place.

The relationship between units and provision therefore becomes totally flexible. The outcomes of a unit may be achieved through a single learning activity. Outcomes may be reached through 2 or more activities - or 1 activity can contribute to the achievement of a number of units.

For example learning to use a computer-aided design (CAD) software package could contribute to a unit in CAD, or to units in CAD, maths, communication and team working. An infinite number of combinations and permutations of episodes, units and outcomes becomes possible.

Although the framework is neutral as to how learning outcomes and units may be combined, it is recognised that for coherence users of the framework (providers, awarding bodies, standard setting agencies, materials developers) may specify combinations to meet particular requirements. Designing overarching or synoptic units can ensure overall understanding. The assessment of achievement is independent of the particular mode/s of learning.

For example, in practice the visible manifestation of units will be 'modules of delivery' – how the unit or units are 'taught'/delivered. A diagram [in various LSDA publications] shows various notional possible relationships between units, modules and learning materials.

Units and modules can thus link 1 to 1, 1 to many etc. There can be a many to many relationship between learning outcomes and:

- learning materials
- modules of delivery
- units of assessment

Learning outcomes are seen as potentially freestanding - i.e. they may be independent of any awards scheme or delivery scheme, although in reality the relationships are likely to be established on the basis of developing professional and peer practice and emerging learner needs. What is important are the possibilities for creative and/or relevant programme and course design etc. A major benefit of this framework is that units can be of any size. The system of credit value (based on the notional learning time) means that units can vary

in size. Small units will have a low credit value, larger units a higher value. Each unit will also be ascribed a level.

Therefore the framework can demonstrate:

- what a learner can do (learning outcomes)
- at what degree of difficulty/complexity/autonomy (level)
- how much (credit value)

The system therefore makes it possible to award learners credits based on the achievement of single units, combinations of units and/or full qualifications. These can be shown on an individual learner profile or transcript. For example:

<i>Unit A</i> (credit value 2 level 1)	2 credits level 1
<i>Unit B</i> (credit value 3 level 2)	3 credits level 2
<i>Unit C</i> (credit value 8 level 3)	8 credits level 3

Thus learners can build up credits at different levels.

What the framework can do

The framework:

- Measures the level and volume of learning in an agreed and logical way
- Presents the possibility of aggregating coherent and explicit sets of learning outcomes into units (of assessment);

The framework offers a coherent way to maximise the effective use of technology for learning. For example it provides a model for disaggregating learning from accreditation. A student can:

- Undertake some learning using appropriate media and support etc
- Decide whether/when to go for accreditation for this piece of learning, and if so, to which award this will contribute
- Prepare for the formal assessment for accreditation - e.g. by doing "practice tests"
- Collect all the evidence required for accreditation
- Register for and be assessed for the accreditation.

(This would allow an awarding body to work towards near-100% success rate, and to encourage learners to be confident of success before registering.)

Because learning outcomes can be linked to delivery and assessment within a logical framework (and tagged appropriately) it is also possible to establish links between learning outcomes and learning objects. Thus designers and producers of learning material can match material to learners' needs; learners can discover and use material appropriate to learning needs (and? learning styles?); schools and colleges and trainers can source material appropriate for their students. This can be done:

1: Using an agreed classification scheme, and a controlled vocabulary. Two advantages of this approach are:

- Access to the classification categories can help users in their search. For example, if a student is interested in taking a course in Social Care, the system can show what sub-categories the institution has defined, so it is possible to drill down to Child Care, and then to Nursery Education. This can be more helpful than being presented with a blank search box, and having to think up appropriate query words to type in.
- A controlled vocabulary avoids the situation where (for example) some courses are classified under “care of the elderly” and some under “care of old people”, so that users typing in either “elderly” or “old people” only retrieve half the relevant courses.

2: Using free text. Three advantages of this approach are:

- It does not require the overhead, or the possible restriction of an agreed classification scheme.
- It is usable where no agreed classification schemes / controlled vocabularies exist
- It provides greater flexibility in search and retrieval.

Both approaches are relevant to resource discovery using learning outcomes. However, in the short term (and possibly long term) learning outcomes will sometimes not be part of an agreed classification scheme or controlled vocabulary, so free text retrieval on learning outcomes may be a necessary facility.

In addition educators can use resources to deliver other than the learning outcomes that the creator had in mind. For this reason, a separate subject search and classification is also important (e.g. Dewey, Library of Congress, Superclass). Thus educators can reuse resources in a varied and creative ways to deliver desired learning outcomes.

How it can be used

The framework described here has many uses across a range of educational purposes (for example):

- Assessment
- Materials
- Funding
- Progression

A common format for learning outcomes and units of assessment would:

- Support technology-based delivery of learning
- Allow accredited just-in-time learning
- Link directly into the search for appropriate interoperable and reusable learning materials and assessments
- Support individual learning styles
- Motivate learners via incremental learning and interim accreditation
- Provide clarity and consistency in the expression of learning outcomes
- Help international harmonisation and standardisation
- Be the basis for local, national and international credit accumulation and transfer

- Help materials developers, designers, providers and purchasers to identify overlap and gaps in the market
- Clarify and support guidance needed by learners
- Provide a tool for mapping learning and achievement
- Support evaluation and quality systems
- Allow the creation of credit transcripts and records of achievement
- aid curriculum planning by states and institutions
- aid curriculum and qualifications design
- be a possible basis for funding education, training and learners
- aid parity of esteem for academic and vocational education and training
- be a universal performance/added value measure
- be a finer measure against individual, institutional and national education targets.

The framework allows:

- Recording progress and achievement
- Recording what the person knows/understands/can do
 - For employers, college selectors for accreditation
 - For individual reflection and planning
- Helping to plan and build learning programmes
 - Defining the purpose and content of a programme
 - Tailored/fine-tuned programmes ('just in time')
- Facilitating Resource discovery
 - By learners
 - By educators
- Facilitating resource re-use

[A further draft would include situation/problem, stakeholders and use scenarios]

Possible Solution(s)

Solution Statement

- All achievement is defined in terms of learning outcomes.
- These can be combined into units and ascribed a credit value and level.
- Units can be combined into modules of delivery according to circumstances
- It then offers a common language and currency which can be used by learners, providers, materials designers and national agencies for a wide range of purposes
- It can help to simplify and make more transparent complex relationships between groups offering education and training services and their customers and clients
- As an industry standard for education and training this curriculum framework would promote interoperability according to agreed levels (how 'difficult') and volumes ('how much').

Example(s)

[Many example scenarios could be included here]

Some scenarios

For example:

- An educator, in developing a new course, first defines the learning outcomes the course should deliver, then searches for or develops: (a) the resources needed to deliver these learning outcomes and (b) the units of formal assessment which can be used to accredit it.
- A tutor or learner uses learning outcomes to search for appropriate resources in a repository, in order to build up a learning programme. (Resource discovery etc).
- In figuring out what course a learner wishes to enrol on, a learner and an adviser primarily think about learning outcomes the learner wishes to achieve, and match these to the learning outcomes of the modules/courses/ learning programmes on offer. (Possibly using learning needs assessments, which help identify the learning outcomes/competencies which the learner possesses and lacks.)
- Achievement of learning outcomes may be recorded as the learner progresses through the course, and used by both learner and tutor to reflect on the learner's progress.
- Where any "learner profile" is being populated - learning outcomes/competencies achieved are likely to be an important part. (The "learner profile" could be purely local, through to a lifelong learning record that travels with the learner forever)

Some issues for resolution

- The 'politics' and purposes of assessment, e.g. cohort and norm/criterion referencing, formative and summative uses etc.
- International validation and acceptance.
- A single coherent framework of learning outcomes, which everyone uses, can be beneficial from some points of view, for example aiding resource discovery. However this is not easy to achieve; discussion is necessary on moves towards such a situation. In the meantime, a situation where multiple frameworks are in use, and (for example) free text search on the learning outcomes field is used in resource discovery, is perfectly plausible. In fact, individual educators in colleges etc. may well devise their own set of learning outcomes in developing a course, rather than using any existing framework; others may use learning outcomes from local/national/ international frameworks (e.g. from national occupational standards).
- Test relationship of other specifications to learning outcomes and learning objects so that learners can identify what they can and can't do and things they can't do for which they need support and materials.

[Further discussion to be added here around a proposition such as “Learning outcomes for which, once you need what you need to know, you can find materials to get you there etc!!! “]

Current Practice

[to be elaborated]

Peer practice exists – credits framework etc have been adopted in Wales, by the Ufl etc... (See the QCA and LSC statement.)

UK: open college networks, University for Industry, Wales, Scotland, Northern Ireland.

[Need to explore and explain how/if current practices, maybe outside IMS membership/specs support this solution]

Validation Process

The system is already in widespread UK use. There is a need, for example, to

- *test with pilot groups of tutors and learners in a range of countries and educational/training settings and in relation to other specs.*
- *inject other specs into a UK Open College Network moderation process. Or*
- *inject this spec into a compatible MLE etc*

Backwards Compatibility

?

Cross W-G Consultation Needs

Learning objects, QTI etc

Possible Timeline

?

Contributors/Version/Date

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1.1 August 2001

1.2 With minor amendments April 2002