Re-purpose, re-use: Reconsider

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Tam and Lam note, "learning objects (LOs) are potentially useful to many innovative applications for next generation learning", and go on to suggest that "the high complexity of the designed structures for LOs" and "the huge costs involved in the re-engineering of existing e-learning platforms" will discourage LO reuse[2]. There may be, however, a more fundamental, and insurmountable, reason for the lack of re-usability of LOs.

A well-designed LO addresses one or more carefully delineated intended learning outcomes (ILOs), where the LO activities, assessments, and content are specifically focussed upon the achievement of those ILOs. Since an ILO is an expression of an educational purpose, a LO is (or should be) a systematic embodiment of that purpose. This view derives from Ulrich's[3] contributions towards the critical analysis of systems, and may be illustrated by Figure 1. Ulrich's terminology is shown in bold, while the corresponding terms to be used in the subsequent discussion are shown in a smaller point size within parentheses.

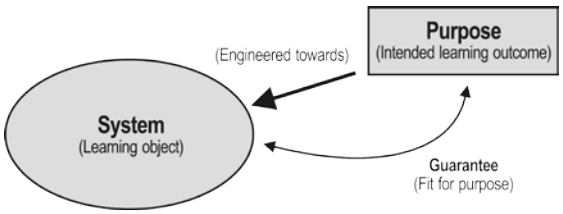

Figure 1. The relations between LO and ILO.

It is often said that one of the main benefits of LOs is that they can be re-used or "re-purposed", yet the re-purposing of something which has been thoroughly engineered to fit a different purpose might be easily thought an exercise in pointless futility. Assuming no change to the LO content, it is rather difficult to imagine how it could in fact be fit for its new purpose or be said to be "re-purposed" (ie suited to a different ILO) in any logical or sensible sincere use of that phrase.

Purposes and ILOs tend to be individual rather than common. A project some years ago at a prestigious UK university secured a large grant and three years to produce an e-learning module (what now might be called a set of LOs) on "Introductory statistics" that would be suitable for engineers, psychologists, and medical doctors. Four years later, the outcome was a high pile of bitterly contested paper (and nothing else) which no one accepted. Everyone did agree, for example, that there should be a LO on Student's t-test. Not unexpectedly, everyone wanted to use their own domain-specific examples, exercises, and case studies. But interestingly, no agreement

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[2] Tam, V. and Lam, E.Y. (2009) Call for articles - Learning Technology Newsletter Special Issue on Learning Objects and Their Supporting Technologies for Next Generation Learning.
[3] For example, W. Ulrich (2002). "Critical Systems Heuristics," in: *The Informed Student Guide to Management Science*, ed. by H.G. Daellenbach and R.L. Flood, London: Thomson Learning.

could be reached on how the subject matter should be taught, or on the ILOs and their associated assessment.

The point of this unreported but often-repeated (other domains, other universities, other times) case study is to highlight the significance of contextual factors which surround seemingly detached, abstracted, and self-contained ILOs. What each stakeholder wanted were ILOs (and hence LOs) which suited their individual and particular ways of teaching, which were relevant to the particular departmental approaches to the topic, and which were appropriate to their particular subject matter domains. What the project attempted was the definition and delivery of re-usable LOs. It all failed.

A development of current ideas surrounding competencies suggests a conceptual model of ILOs augmented by contextual factors, as illustrated in Figure 2[4]. Such augmented ILOs might be called competences.

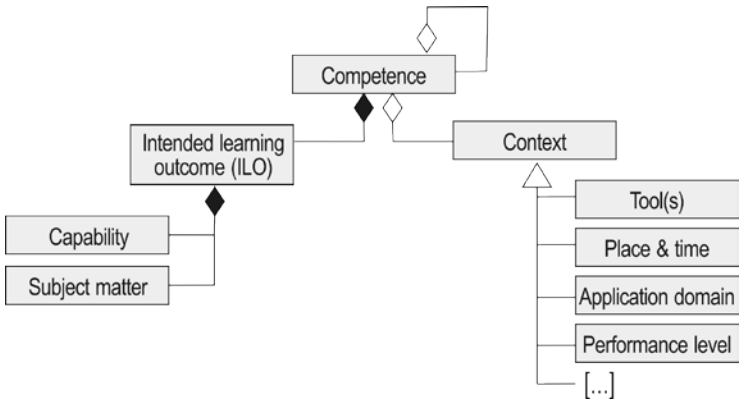

Figure 2. A conceptual model of competence as contextualised ILOs.

The point of highlighting contextual factors in the use (and attempted re-use) of LOs is to suggest that, while the re-purposing of a LO to some different ILO might be thought to involve considerable conceptual difficulties, the re-purposing to a different competence should be considered impossible in practice and perhaps even impossible in principle. This follows from the richness of context which is hinted at in Figure 2. While an ILO may be reasonably constrained by an agreed ontology of capability terms (eg Bloom's taxonomy) and an agreed subject matter topics list, context is in principle limitless and dependent upon particulars (if not peculiarities) of the target students, teachers, locations, times, tools, required mastery levels, available services, etc.

There are circumstances where a LO might be thought capable of re-purposing. Such a LO would probably have an ILO of such generality that it would be better described as an aim or goal, capability on Bloom's hierarchy that hardly ventured beyond 'knowledge' or 'comprehension', and content that focussed on facts rather than on richer material which might be described by Merrill's[5] concepts, procedures, or principles. Another way of saying the same thing would be to suggest that such a LO would likely have negligible value as front-line learning and teaching material (though it may well have application as background reference material).

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[4] For example, Sitthisak, O., Gilbert, L. and Davis, H. (2008). Deriving e-assessment from a competency model. In: *The 8th IEEE International Conference on Advanced Learning Technologies (ICALT 2008).*

[5] Merrill, MD (1999). Instructional transaction theory (ITT): instructional design based on knowledge objects. In CM Reigeluth (Ed), *Instructional Design Theory and Models: A New Paradigm of Instructional Theory Vol. II*. Lawrence Erlbaum Associates.

Editing a LO, of course, opens the possibility of better re-using its content in the service of a re-purposed ILO. However, this is not what is meant by "re-using a LO", and for purists the discussion therefore stops here. We might just explore the potential, though, of editing LO content to see if such an approach might at least yield some pedagogic value from re-purposed or re-used material.

We could approach the question by considering the learning transaction[6], a simple analysis of a learning and teaching situation based upon the conversational model of Laurillard[7], integrating it with the competence model of Figure 2, and expressing it as a conceptual model of teaching and learning compatible with IMS Learning Design (IMS LD)[8]. The result is Figure 3.

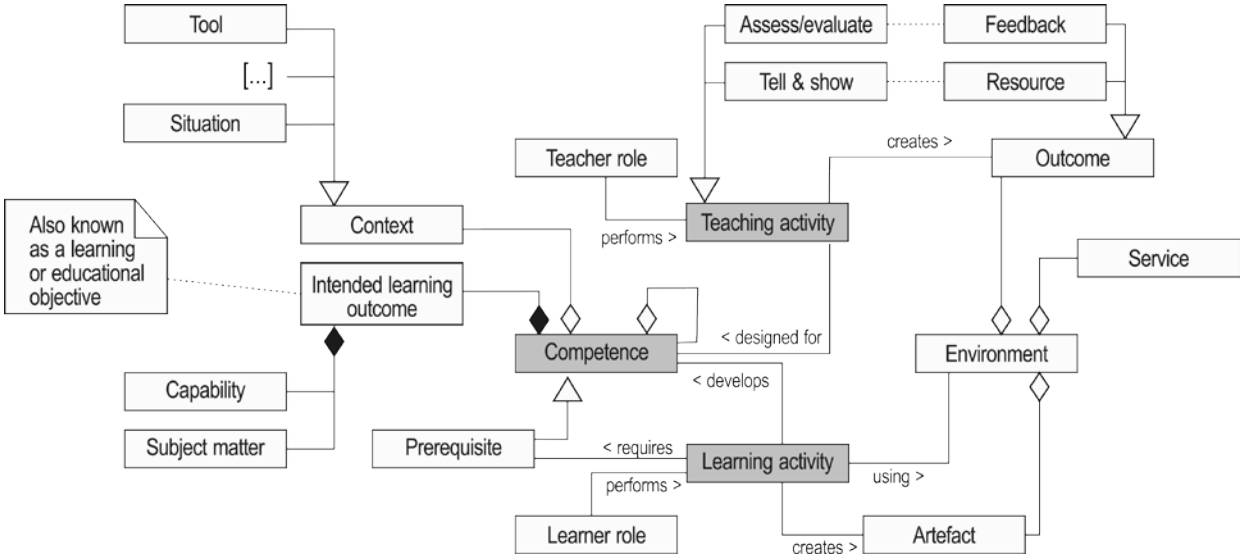

Figure 3. Conceptual model of learning and teaching.

The key points to note are that a pedagogically effective IMS LD Unit of Learning, which could be thought of as a fully elaborated LO, is based upon learning activities which are entirely connected to the ILO, and upon teaching activities similarly. Editing LO content so as to effectively re-purpose it is equivalent to simply originating a (new) LO in service of a (new) ILO. The purists are right about the conceptual inadequacy of the idea of editing LO content and calling the result a "re-used" LO.

We may conclude that we cannot meaningfully (conceptually or practically) re-purpose a properly executed LO to a different ILO, and we should not be surprised by little evidence of meaningful LO re-use.

[Words: 991]

[6] Gilbert, L., Sim, Y. W. and Wang, C. (2005). An e-Learning Systems Engineering Methodology. In: *The 5th IEEE International Conference on Advanced Learning Technologies*, July 5 - 8, 2005, Kaohsiung, Taiwan. pp. 150-154

[7] Laurillard, D (2001). *Rethinking University Teaching: A Conversational Framework for the Effective Use of Learning Technologies* (2nd ed), Routledge Falmer.

[8] IMS LD (2003). IMS Learning Design Best Practice and Implementation Guide. Available from http://www.imsglobal.org/learningdesign/ldv1p0/imsld_bestv1p0.html