INTRODUCING TEACHERS AND DEVELOPERS TO LEARNING OBJECTS – FOUR SUGGESTED SHIFTS IN PREVAILING DISCOURSE

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1   Abstract

Being convinced that the learning objects yields value creation promises for e-learning, the author, drawing on state-of-the art literature, his experience of two European projects dealing with learning objects and his experience as a teacher, documents 4 issues regarding teachers' awareness and acceptance of this emergent instructional design approach.

2   Introduction

Still predominantly driven by technological challenges, literature on learning objects (LOs) has been devoting scarce or incidental attention to communication with teachers as users or designers of LOs. In a noticeable exception, Weller, Pegler, and Mason (2003a) predict that the learning object debate is bound to move from technical field into the practitioner's arena. This change in audience carries along the need for a specific way of talking about learning objects. Definitions and presentations provided by stakeholders busy with the development of technical tools, standards and specifications are unlikely to be the ones that will prompt a teacher to embrace a "learning object technology/pedagogy" in the development of distance education material. In this paper, we try to outline what could be those necessary shifts of the prevailing discourse.

2.1   Recommended shift 1: Highlight flexibility more than reusability

In the literature, learning objects have been receiving scores of competing definitions and synonyms. The ambition driving this model nevertheless remains the same: the reconstruction of educational practice around chunks of knowledge, resources, assets, likely to be combined with each other to form larger instructional units such as activities, lessons, or whole courses. This atomization, this formalization of learning processes is usually nested in a broader discourse advocating more education streamlining considered in a learning object economy (Campbell, 2003). Within this managerial view on education, reusability comes out as a key concept, and one that pertains through all other virtues attributed to learning objects technology: better personalization, task-based design approach, economies of scale, recycling of pedagogical patterns, computer-generated courses, larger accessibility, improved interoperability, just-in-time and on-demand aggregation, etc. The development of resources which are reusable in many situations logically entails some degree of standardization both of

the description of the resources and of the tools and environments these resources inhabit (Littlejohn, 2003).

The "reusability" stance is seducing. But, since it is still in its infancy, when it comes to detailed and concrete implementation, it turns to be rather fuzzy, intriguing, crowded with wishful thinking and unquestioned claims. Though posing a range of problems that are only beginning to be explored, reusability and exchange of educational resources was nevertheless the initial mainspring of the learning objects movement. The IMS-LD standard, one of its driving force, though more permeable to pedagogical dimensions, finds its origins in interoperability preoccupations (Hummel, Manderveld, Tattersall, & Koper, 2004). This notion is still regularly invoked in articles describing technological achievements in the field. But is this notion of reuse understood by the teacher? And what would actually be the kind of value she grants to it? To the extent of our knowledge, those questions have never been treated systematically. There are only indications that re-use might not be the best entry point for presenting learning objects to practitioners, like it is with developers or publishers. When shown samples of modular representations of real-world online courses[1] (http://www.labset.net/projets/iclass), teachers attending iClass workshops felt prima facie more interested about the model underlying the segmentation of the narratives, by an effort to qualify their own learning activities with the model so that they can input them into the system, and the perspective of manipulating in a visual way pedagogically delineated units of study, than by re-use issues per se. There are for sure re-use aspects included in those reactions but pedagogical sequencing and gains in flexibility of learning objects seems more spontaneously at stake as McAndrew (2005, p. 19) also concludes from a more extensive experience: "Practice work at the Open University has shown that re-use is not sufficient as a focus (…) Rather it has been found that the learning object approach can best serve as a working method during the design process to help divide online courses into discrete sections and to reintroduce flexibility for both the designers and the learners".

2.2   Recommended shift 2: Highlight pedagogical consistency and independence more than size

What amount of context should a learning object encapsulate for remaining reusable on a large scale? This issue triggered many debates between early supporters of the new approach and yet hypnotizes newcomers in the field. They all touch upon the optimal granularity of reusable content, if any. The debate was fed by Wiley's "reusability paradox" (Wiley, 2002) and Baumgartner "Reusable Object & Instruction Paradox" (Baumgartner, 2004) that both rightly pinpointed tensions between reusability which requires context-free objects and educational quality whose essence is contextuality. Fortunately, the quest for the ideal granularity faded away (Wiley, 2003, p. 1) and several researchers have been trying to "give another trial" (Krämer, 2005) to learning objects by a renewed interest to learning context and description format (Griffiths & Blat, 2005, p. 3; McAndrew, 2005, p. 18; Richards & Knight, 2005) of the objects. Baumgartner (2007), for example, without departing from reusability goals, investigates learning objects as constructs, consisting of an information object, an educational scenario and a learning target, with their dependencies and specific reference taxonomies, available or missing.

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[1] Based on the 8 Learning Events Model (8LEM), the website was intended to provide a demonstration and a proof of the educational versatility of the iClass platform by visually displaying modular activity structures and variations thereof covering multiple approaches, from the most transmissive ones to socio-constructivists and recent approaches developing meta-cognitive competences. For a comprehensive presentation of the 8 Learning Events Model, a coherent pedagogical framework helping for thinking diversification of method, segmentation of the continuum of pedagogic practice into pedagogically meaningful parts and, possibly pedagogical repurposing of objects, see Leclercq & Poumay (2005) and Verpoorten, Poumay, & Leclercq (2007).

This shift of attention from granularity to internal consistency of the learning objects is good news for communication with teachers because it calls pedagogy back in the loop and takes up with vocabulary and processes (definition of objectives, methods, evaluation) they are familiar with. It demonstrates, firstly to teachers, that didactic fundamentals have not changed and that their expertise remains prominent over technical aspects. Consequently, and following Rehak and Mason (2003) who observe that the many definitions of learning objects reflect the interests or concerns of its proponent, a definition of learning objects more suited to teachers is one that brings to the forefront this effort targeted on embedded pedagogical coherence at the service of a quality learning experience. Mason, Pegler, and Weller (2004, p. 720) provide an interesting shift in this direction. Their tentative definition does not even contain the word reusability: "Our view of learning objects is that of a microcosm or condensed set of components that give the learner an overview of the issue and ways of following up the ideas in more detail. The instructional design principle underpinning the approach taken to learning objects centres on the notion of the integrity and internal contextualisation of each object. So instead of making up a learning unit from many self-standing learning objects (eg, readings, pieces of interactive multimedia, an activity), each learning object was designed as a holistic learning experience with internal integrity as a unit of study".

Autarky of a learning object is a condition for its ubiquity. As a modular building block or "atom of learning experience" (for the pros and cons of those metaphors, see Wiley, 2000), it is mandatory to remove any link to other learning objects which would hamper its use in a variety of contexts. This is the reason why the authors of the Open University UK's course "H806 - Learning in the Connected Economy" - probably the most advanced and convincing application of a higher-education online course entirely composed of pieced-constructed courseware - carefully crafted the pedagogical aspects of each LO while imposing themselves not to make any cross-LOs referencing (Weller et al., 2003b, p. 5).

It is not impossible that such an obligation to create self-sufficient chunks of learning might hurt some Web-natives or e-learning designers used to considering internal (hyper-)links as the hallmark of the digital learning environment. But stand-alone LOs is a trade off between reusability and didactics. Pieces that will always be used together should be kept together. But if components will be used separately, they will be developed into separate learning objects[2].

Ideal learning object size gave rise to many discussions during our 3 years involvement in the iClass project. Time and resource were devoted to content aggregation model, metadata, data exchange between various elements of the system… Pedagogues were therefore requested to provide clear-cut answers aimed at solving mainly technological problems, whereas learning objects are still suffering from theoretical and practical underdevelopment within their own field (Koper & Olivier, 2004, p. 107; Nurmi & Jaakkola, 2005, p. 4). In order to balance this trend detrimental to pedagogical quality, we suggested two conceptual models helping to delineate a learning object and secure its consistency.

The 8 Learning Events Model (8LEM) allows to characterize a learning object by the essential nature of the learning method the learner experience therewith. Soundly grounded in instruction theory, the model divides pedagogical practice into rough but meaningful, circumvented and easily recognizable chunks. It helps implementing them as modular pieces

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[2] Beef and bread slices, sauces, vegetables… are managed separately because they can play a part in the fabrication of a wide range of hamburgers. None of those elements are therefore bundled to each other. Are learning objects leading us to a McDonaldisation of online education? An introduction of teachers to learning objects should include warnings expressed by reference authors about the limitations of the approach: Butson (2003), Nurmi & Jaakkola (2005), Parrish (2006).

of Learning Design code. Such a labelling in terms of a dominant method (Verpoorten, Poumay & Leclercq, 2005, p. 14) ensures, among other possible advantages (pedagogical variety management, shared vocabulary, prompt to reflexivity, diagnosis instrument, framework for resource repurposing, implementation of contemporary learning theories), the sought independence between learning objects. Regarding internal consistency – we are not anymore "between" learning objects but "within" learning objects -, we proposed to design learning objects with respect to the "triple consistency principle" (Kovertaite & Leclercq, 2006; Petit, Castaigne, & Verpoorten, 2007) which commands to establish a triple consistency between objectives, methods and evaluation in any given learning situation. It is obviously a useful instrument when it comes to inspect learning objects deemed to self-contain the specific educational objectives they are covering, the instructional materials and methods to teach those objectives, and an assessment of student mastery of the objective.

2.3 Recommended shift 3: Highlight localization more than creation or crude reuse

Schools involved in the iClass project put an enduring emphasis on authoring facilities as a crucial empowerment tool. Right from the outset of the project and repeatedly afterwards, the Director of the European Schools network noted that, should this possibility not being given, iClass "could become a potentially powerful tool which is only be used as a resource repository but not as a learning process tool" (Galvin, 2004), meaning that teachers will certainly use some excellent ready-made objects (they already do with resources from the Internet)[3] but need also to be offered ways of modifying existing ones in order to make them better fit their local context.

Frequent contacts with teachers or practice as a teacher immediately questions indeed the idea that reuse of existing material would be a straightforward action. In many cases, a practitioner adopts an existing material as a basis for her own teaching only after having transformed it to a greater or lesser extent. Adoption often means adaptation. The teacher seldom creates resources from scratch but she frequently grants it a new and appropriate pedagogical functionality. Its expertise primarily lays in this action, situating its intervention between pure creation and crude reuse. For example, a Web page presenting a content can be wrapped in various didactic settings which differ from what it has been initially intended to: being read. With the expertise of the teacher, this page will trigger, still according to the 8LEM, a learning event "debate", be incorporated in an "exploration" event, be taken as a model in an "imitation" event... Or, when encountering an existing exercise, the teacher may decide to use it as a placement test, or a final evaluation, or a formative training, or a resource for implementing a more inductive path of learning. Each of these options induces necessary minor or major changes in presentation and assignments. Therefore, the search for a "good resource" (for instance in a learning object repository) will usually be assimilated by the teacher as the quest for a "good resource to be localized", a blatant fact - largely ignored or underestimated by current developments of learning objects systems - that makes Wiley (2006) say on a funny and provocative mode: "What if all the effort and money spent hyping and building technically interoperable content systems had gone into better understanding the process of localizing educational materials, and developing whatever new tools were necessary to support that process?"

The importance of localization processes also questions the kind of tool to be offered to teachers, and especially novices in technology-enhanced learning, in order to help them to

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[3] Unfortunately for the professional publishers of learning objects involved in the project, the ready-made objects they presented to teachers, especially science teachers of the European School Mol, turned out to contain mistakes or undesirable elements!

revamp existing learning[4] objects into new, useful learning resources and to act as the designers of the environments that their students learn with in the classroom (Ainsworth & Fleming, 2006, p. 147). E-learning platforms should therefore become "context-treatment places".

2.4 Recommended shift 4: Highlight the map more than the path

Learning objects, viewed as a technology, is regularly harnessed to development of adaptive systems (iClass and Elektra are examples but see also Theng & al., 2006; Conlan & Wade, 2004; Karampiperis & Sampson, 2006; de Bra & al. 2003). The core idea is to nest into the system enough pedagogical rules so that personal learning paths are automatically built from a collection of available learning objects. For reasons argued in details in Verpoorten, Petit, & Castaigne (2007), several aspects of this machine-driven selection, ordering and distribution are problematic from a trainer's viewpoint. Though research is very welcome for knowing which aspects of the learning process can truly be automated without making a caricature thereof, connecting learning objects to more mundane practice of teacher/learner-driven course creation deserves an attention of its own[5]. So doing, learning objects can sustain improvements in the learning design of traditional "one size fits all" sequences but their true value presumably lays in the service of a more self-directed learning. In iClass, we firmly supported the move from a purely adaptive approach to one that makes room for self-directed personalized learning. In that case, personalization is achieved not via the provision of a personal learning path which implies a decision-making process external to the pupil but through the overarching narrative she himself draws across a map of possible choices. Covering" content by the instructor becomes less important than students "uncovering" content, within a given framework or structure and through learning objects selection strategies, information handling skills and practice of reflectivity (Davis, Sumara, & Luce-Kapler, 2000; Pegler, 2006, p. 2; Weller, C. Pegler, & R. Mason, 2003a, p. 3; West-Burnham & Coates, 2005, p. 73). This promotion of an independent learner is likely to capture the attention of teachers willing to improve reorganize and improve their educational practices, although it opens the Pandora's box of student's choice which may deter other trainers because "it remains to be seen whether the removal of explicit connections may render the material more meaningful for students, since it places the responsibility for making such connections with the student" (Weller et al., 2003b, p. 6; Pegler, 2006)

3 Conclusion

Progress in education is inevitably bound up with teacher training. The learning objects technology/pedagogy will be accepted by teachers and fostered in renewed practice (Buzza, Richards, Harrigan, Bean, & Carey, 2005, p. 3; Casey, Brosnan, & Greller, 2005; Salter, Richards, & Carey, 2004, p. 210; Bratina, Hayes, & Blumsack, 2002; Pernin & Lejeune, 2004) to the conditions that it demonstrates as a useful aid for improving educational design for e-learning and can be considered as an understandable and valuable answer to challenges they face. In summary, we advocate that the value of this approach will be better perceived if the rationale underpinning its presentation accentuates:

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[4] Griffiths (2005, p. 1) pinpoints the difficulty for LOs management tools based on the IMS Learning Design standard: "There are two levels of engagement with LD which we can envisage for teachers with no advanced LD skills a) *Adapting*: identify existing UoLs which may be valuable, and adapt them to their needs b) *Bricolage* (or more prosaically perhaps) *mix and match*: construct new UoLs by bringing together parts of other UoLs. These two levels raise many issues of tool design (e.g how do you make it easy for a user to understand what a UoL does?), and systems development (e.g. how can you disaggregate a UoL so that the chunks are still useful)".

[5] In the evaluation of the Redeem authoring tool, Ainsworth & Fleming (2006, p. 128) observe that: "It is apparent that teachers mostly used REDEEM to create customized Computer-based Teaching (CBT) rather than adaptive Intelligent Tutoring systems. For example, authors often wanted control over the order of presentation of material, like CBT, and felt uncomfortable releasing this role to REDEEM. No teacher has chosen to let the system macro-adapt based on student performance. Thirdly, it is apparent that more attention should be paid to how the REDEEM tools support authors in understanding the consequences of their decisions". See also Ainsworth (2007, p. 26).

- gains in flexibility, preferably to reusability and exchange of content. In teacher's mind, re-use is always subject to a prior pedagogical decision;
- localization and repurpose facilities, preferably to off-the-shelve or set-in-stone objects[6];
- pedagogical consistency, preferably to the quest of an optimal size;
- advantages regarding promotion of autonomous learning, preferably to automatic definition of learning paths.

Those areas of value creation should be validated. Reaching this objective cannot escape more frequent development and research (D&R) work, conducted in close collaboration with teachers (Heargraves, 2005, p. 14; OECD, 2006, p. 2) around the production and use of online courses wholly authored as sets of learning objects. This practitioner-based approach (Kay & Knaack, 2005; Schoner, Buzza, Harrigan, & Strampel, 2005; Akpinar & Simsek, 2005) would deliver additional illustration of pedagogical achievements termed in learning objects and would provide a research field for consolidating, thanks to empirical observations, effective ways of working with teachers on LOs. Such materialization and testing of the concept, still scarce at this stage of its evolution, is crucial for its larger understanding, acceptance and deployment.

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[6] The germane issue of copyright should not be underestimated but the advantages of Los reviewed here can be presented and illustrated with teachers' personal material.

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