

Structuring the discourse about how to develop digital textbooks

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Abstract—In this paper the authors propose a model to enable broad stakeholder representation and discourse focused on the requirements for interoperability in the etextbook domain. The model is currently being applied and validated in the establishment of a CEN WS/LT etextbook project with the ambitious aim of bridging the chasm that exists between the established commercial publishing industry and stakeholders from the education sector, specifically the Open Educational Resources (OER) community.

Keywords—ebooks; digital textbooks; standardization; requirement elicitation

I. INTRODUCTION

Textbooks are an integral part of a student's experience both academically and economically. The average American student spends \$1,200 per year on textbooks and supplies; this constitutes 40% of the tuition fees community college students expect to pay [1]. According to US PRIG, a US consumer group, over the last two decades textbook prices have been rising at four times the rate of inflation¹. The US National Association of College Stores has identified that expenditure on textbooks is declining as students increasingly explore alternatives; including rental, used books, and digital resources². The traditional economic ecosystem for educational textbooks is becoming increasingly threatened by an increase in the use of digital content and resources accessed and consumed by a variety of devices including tablet computers and mobiles.

Historically commercial educational publishers have been reluctant to engage in the discussion until a substantial ebook market, with a proven business model, is established and they have mastered the demanding technical challenges of developing digital resources. However in 2013 there is a realisation of the commercial imperative in engaging with the innovations and broader debate.

To develop an international etextbook market specifications and standards are required to ensure that content and services are accessible and prevented from being locked in silos of vertical markets such as Apple's iBooks. The Chinese and South Korean educational communities have highlighted this requirement for etextbook interoperability through their contributions to the

International Organization for Standardization (ISO/IEC JTC 1/SC36). In Europe the Workshop on Learning Technologies of the European standardization organization has established the etextbookseurope.eu project with the aim to establish a consensus based European position on etextbooks.

This paper proposes an etextbook lifecycle model designed to enable the discourse to establish the requirements for interoperability including potential specifications and standards development within the domain. The model is currently being validated as part of the CEN WS/LT etextbook project.

The model will be iteratively refined informed through collaboration and a discourse that is representative of broad essential stakeholder perspectives with the aim of bridging the chasm between stakeholders from the publishing industry and education and the Open Educational Resources community in particular.

II. DEVELOPING THE MODEL

The model has been developed through the application of a Design Science Approach [2,3,4]. The approach requires a detailed analysis of early requirements, which then informs the representation by way of a model of the constructs describing the identified problem space. The relevance of the created model is considered and discussed within a small case (pilot) study and can be described as a first cycle of validation [5]. Further design cycles are required to validate the findings in this study.

The initial stage in developing the model (Figure 1) was to elicit stakeholder requirements from those directly involved in creating, acquiring and using digital textbooks. It is arguable that the list presented in (Table 1) is not fully representative and there are additional stakeholders who benefit from an efficient ecosystem for etextbooks. However, the eight stakeholder roles selected as representative are the ones initially identified as actors or agents within an eTextbook lifecycle.

The second phase was to represent the processes within the etextbook lifecycle. The model (Figure 1) identifies seven main processes, each consisting of a number of sub-processes required to author, market, distribute, use and revise the new generation textbooks still to be developed. The factorisation of the lifecycle is done through a considered analysis of stakeholder engagement in the different processes, represented in Table 1.

1 www.uspirg.org/issues/usp/affordable-higher-education

2 www.nacs.org/advocacynewsmedia/pressreleases/studentpendingontextbookscontinuestodecline.aspx

TABLE 1 STAKEHOLDER AND PROCESS ENGAGEMENT MATRIX

Stakeholders	Author	Publish	Search	Learn	Remix	Republish	Community
Publishers	x	x	x			x	x
Curators		x	x				x
Teachers			x	x	x	x	x
School authorities			x			x	x
Schools			x	x	x	x	x
Universities	x	x	x	x			x
Parents			x	x			x
Learners			x	x	x	x	x

III. OUTLINING THE SEVEN LIFECYCLE PROCESSES

The lifecycle model is designed to support stakeholder discourse relating to the etextbook processes. In order to stimulate this discourse a non-conclusive list of issues related to each process is presented as detailed below.

Authoring & publishing

- Authoring tools
- Pedagogical design, e.g. pathways, adaptivity, input from learner

analytics (informing use of eTextbooks)

- Maps / Navigation / Semantic metadata inclusion
- Rich media / interactivity
- Packaging (what is optimal unit?)
- Licencing / Digital Rights Management (DRM) / Intellectual Property Rights (IPR)
- Tools interoperability / relationship to external services
- Technical formats (EPUB, HTML5, etc.)
- Publication channels

Aggregation & Searching

- Sharing of metadata on the eTextbook
- Aggregation of eTextbooks according to curricula, reading lists
- “Visibility issues” - eTextbook vs. OER
- IPR, eg. orphaned works, works with unclear digital use IPR
- Preview options / Subscription / Sales

Learning with eTextbooks (Use of eTextbooks)

- What are basic learning activities (use patterns) of an eTextbook?
- Navigation
- Annotation, sharing annotations
- Tagging
- Saving excerpts
- Sharing (what are sharable units?)
- What are educational (e.g., teacher directed) use of an eTextbook?
- How to interact with the eTextbook (content) from outside (by whom?)

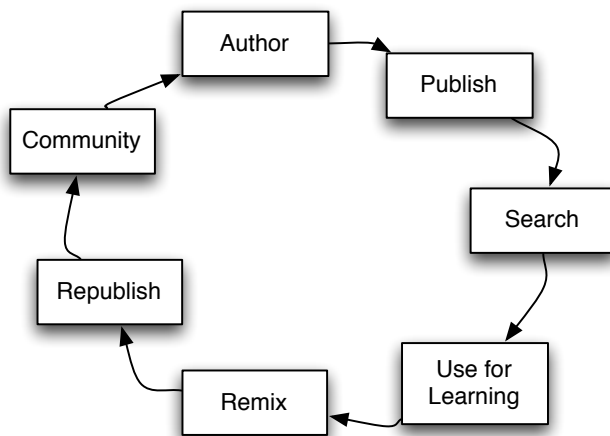


Figure 1 eTextbook lifecycle model

From the engagement matrix we note that the educational publishers, arguably the most reluctant participant are represented in only a few processes of the lifecycle.

On the other hand learners, are represented in processes where there is far less publisher engagement such as Remixing and Republishing. The model is premised on the assumption that key stakeholders require a sophisticated understanding of the entirety of the model and the seven processes identified in order to comprehend and further develop their individual role in new eTextbook ecology. The authors will refer to this assumption in the text discussing the results of the initial validation below.

- How to interact with services from inside the eTextbook (guided by use of the content)?
- Simple Quiz (given by the eTextbook author / publisher)
- Questions and tests directed by teacher / schools (bidirectional); Exams / complex assessment based in curricula / registered courses
- Progress report to LMS or other support services
- Interaction with ePortfolio and systems for “self representation”
- Disaggregation and reassembling
- Scaffolding by teachers (learners contact teacher about issues in the ebook. Or teachers to provide more information about a given subject/ task / annotation in the ebook based on the learner’s progression)
- Personalisation of the eTextbook?

Remixing

- Remixing is closely related to learning and teaching activities.
- Teacher: Curation of optimal mix of learning material for the class.
- Mixing eTextbooks, OER and own material
- Pedagogical, economic and licencing issues influencing the mix
- Learners’ motives for remixing may be more ambivalent
- Active learning style buy in, eg. active annotation
- Sharing
- Maintenance of participation in community of learners
- IPR and DRM
- Quality issues: The remix may lead to a new resource of higher quality, or to quite the contrary

Republishing

- Channels for republishing
- Local, e.g., school or school district
- Regional or National, e.g., behind a SSO wall (in Norway FEIDE)
- International, e.g., indexed by search engines
- IPR and remuneration
- Lifecycle issues: when is a remixed and republished resource “expired”?

IV. INITIAL MODEL VALIDATION

The lifecycle model was validated in the initial meeting of a new etextbook standardization initiative [5] The

proceedings of the meeting was recorded and analysed using discourse analysis methodologies [6] and the following observations were made:

Publishers are inclined to start analysis with the Authoring process, whilst educational stakeholders tend to start the analysis by examining the Search and Learn processes, with the most digitally literate focussing on the ability to disaggregate, remix and republish content.

Without the facilitator foregrounding the lifecycle model discussion on requirements, a single process, e.g. Authoring, may be the container of most issues related to an etextbook ecology. This may result in the distortion of perspective on transversal issues like navigation, digital rights management and licencing, definition of granularity, marketing and distribution, etc.

Limiting the discourse to the processes where a stakeholder has vested interests may constrain development of innovative ideas. E.g., Publishers focussing on Authoring, Publishing and Search may overlook the marketing potential in the Community process.

V. DISCUSSION

From a publisher’s perspective the etextbook is a single coherent unit and monetization happens through sale of “books”. From a learner’s perspective the focus of discourse is the learning unit, which may not necessarily be the book, but the curriculum or subject and its instantiation in a learning resource (text, video, game, quiz, visualization, etc.). When mobile and open learning, open educational resources and other e-learning trends and initiatives challenge the traditional textbook model all the processes in the proposed lifecycle model need be analysed. Innovative publishers [7] are beginning to explore the potential of changing from a “push” to a “pull” model for digital textbooks. If this is indeed the case to thrive in the new ecology publishers will be required to understand the entire Learning processes with Remix and Republish, as well as the Community process, where alternative relationships are established between the learner, content and its granularity, and the publisher.

VI. CONCLUSIONS AND FURTHER WORK

The lifecycle model for etextbooks (Figure 1) is the first version of a series of discourse supporting artefacts designed to facilitate the elicitation of broad stakeholder requirements for interoperability and potentially new standards for educational ebooks. A first validation of the model shows that it may have the potential to be fit for purpose. A further iteration of the model development will occur, providing more detail on the main processes within the sub models for each process through the application of the process outlines above as input.

REFERENCES

- [1] College Board (2012) Trends in College pricing, online at <http://trends.collegeboard.org>, accessed 2013-01-24
- [2] Hevner, A. R., March, S. T., Park, J., and Ram, S. (2004) "Design science in information systems research", MIS Quarterly, Vol. 28, No. 1, pp 75-105.
- [3] Hevner, A. R. (2007) "A Three Cycle View of Design Science Research", Scandinavian Journal of Information Systems, Vol. 19, No. 2, pp 87-92, 1-6.
- [4] Hevner, A. R. (2009). Interview with Alan R. Hevner on "Design Science". Business & Information Systems Engineering, 1, 126-129.
- [5] CEN WS/LT (2013) Substantial stakeholder interest for the new CEN WS-LT eTernity project, online at <http://etextbookseurope.eu/?q=node/20>, accessed 2013-01-25
- [6] Norris & Jones (2005) Discourse in Action, Routhledge
- [7] Personal communication in eTernity kickoff meeting 2013-01-16