

BRIFING PAPER

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Single
Sourcing
with
Standards
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Introduction

About twenty five years ago an information revolution occurred in global information publishing and delivery. The World Wide Web was established, greatly aided by a well refined international standard for information called “HTML”. This revolution allowed organisations and individuals to publish information instantly around the world, at relatively low cost. It is still under way, but few organisations and individuals have yet to experience its benefits.

Like any revolution, there are difficult and sometimes painful adjustments to be made before the benefits can be obtained. All organisations and individuals involved in the processes of producing and delivering education and learning materials have been challenged by it, and many are still struggling in one way or another, to cope with the extra cost or technicalities of working with online media as well as print.

Education publishers, particularly small ones, are still challenged to produce and publish effective products for online education from existing print legacy assets, and to achieve this cost effectively at scale. Many costly failures in “eLearning” have been experienced, and many product offerings are still inflexible and poorly fit for purpose.

Education providers including professional associations, universities and training providers have been challenged to design better individual teaching, learning and professional development experiences, and deliver them more conveniently at a distance. Much expensive “hand crafting” of online learning materials is still being endured, and in general the large scale provision of good quality learning materials for use online is still seen as too expensive and difficult.

So is there a magic bullet for education providers – a single solution that can take away most of these struggles with high preparation costs, low convenience and poor quality? Yes. Its called “single sourcing”, and if you want to know more about it and what it can do for your organisation, read on.

What is single sourcing?

Ten years before the arrival of the World Wide Web, a prior revolution occurred in information publishing when a new ISO standard for information called “SGML” provided a better way to publish information and capture knowledge. This prior revolution laid the electronic publishing foundations for the World Wide Web, but it also established the concept of “**Single sourcing**” as described thus in Wikipedia:

“Single sourcing, also known as single source publishing, allows the same content to be used in different documents or in various formats... Eliminating duplicate content can reduce translation and maintenance costs, improve consistency and minimise errors.”

[Wikipedia Definition of “Single Sourcing”](#)

It works by capturing your valuable new or legacy learning materials into a more flexible format called XML (eXtensible Markup Language). Like the older SGML standard, XML allows you to **capture the meaning of the information** as well as the content, in a non-proprietary way.

Figure 1 illustrates how web pages, which actually have little meaning attached to them, can be converted into XML using flexible labels or “tags” to record the extra semantics. In this example, a learning “<outcome>” has been identified and recorded in the XML form, whereas it has to be labelled as a simple “<P>” paragraph in the web page form because the web page standard only has a limited set of labels.

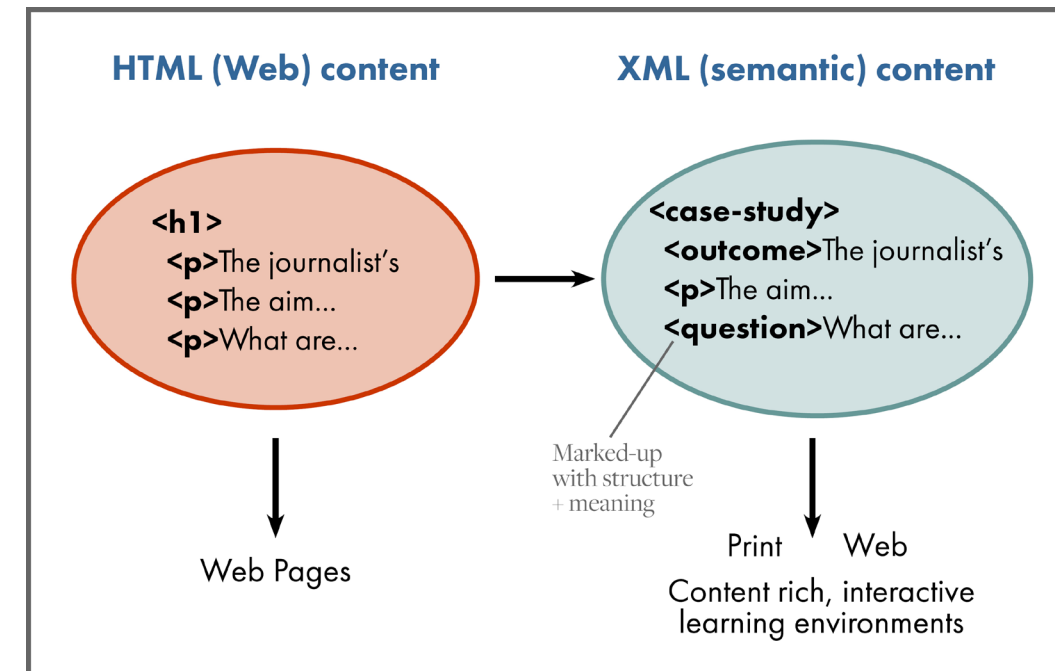


Figure 1: Adding XML markup to your course masters to create more reusable single source masters and richer online interactions

The same ‘semantic capture’ process can be used to convert Microsoft Word files into XML, and typical industry conversion processes can convert a 100 page Word documents in less than a minute with an average accuracy of greater than 80%.

What this means is that you can now afford to create a “single **master** file” of your book, assessment, article, study guide etc. and capture in it all of the meaning you need to create more useful print and online products. You only have to edit that single file when you want to change or enhance it. This saves time and prevents duplication of effort, because you then use the single source to batch generate all of your print and online products in seconds.

“...Ideally, the tools used for single-sourcing do not require human intervention to customise the formatting or content for the various outputs.”

[Wikipedia](#)

Batch processing tools can take single source masters, and professionally typeset then as 700 page academic textbooks in 2 minutes, or generate 3500 HTML files in the same space of time to enrich your online learning environments. This extreme productivity improvement not only removes much of the drudgery of traditional typesetting, but also lets you generate many formatted outputs (web pages, mobile assessments, electronic books) in minutes from the same single master.

Single sourcing brings 'manufacturing' efficiencies to the production of learning materials in the same way Henry Ford revolutionised the production of automobiles. For managing large and complex domains of learning materials, it is quite simply the only way to do it cost effectively and at scale.

Why open standards

"A Standard is a documented agreement containing technical specifications or other precise criteria to be used consistently as rules, guidelines, or definitions of characteristics, to ensure that materials, products, processes and services are fit for their purpose."

[The International Organisation for Standards \(ISO\)](#)

So what? Well, their main value is that they contribute to making life simpler, and to increasing the reliability and effectiveness of the goods and services we use. For example, the format of the credit cards, phone cards, and "smart" cards that have become commonplace is derived from an ISO International Standard. Adhering to the standard, which defines such features as an optimal thickness (0.76 mm), means that the cards can be used worldwide. Consider this benefit, the next time you travel.

The last thing you want to do is make a substantial, one-off investment in single sourcing, and find yourself tied to a proprietary vendor of format. It makes commercial sense then that the choice of formats you use for your single master sources, should be based on open, semantic standards, and XML is the most pragmatic choice for the majority of education content providers.

The bottom line

Single sourcing has already revolutionised the engineering documentation and news publishing industries, and is now poised to do so in education publishing and management. Why?

It can deliver an appreciable cost saving over the lifetime of an average information product (typically of the order 40-60%); it enables greater reuse of valuable information assets; and it drives up the quality and consistency of your education products. Single sourcing underpins the drastic reductions in cost that the batch processing of information enables, but an important by-product

of the process is that you get much more consistent (better quality) materials, produced more quickly for all output media.

It is also highly strategic because it helps you to do the following:

1. Control your own education content rather than handing it over to a commercial publisher to produce for you. This is true for textbooks, journals, assessment banks, case studies and other valuable knowledge assets you produce and maintain for your own core business use.
2. Centralise your CPD and distance learning programme developments by bringing the assets back in-house, even when you outsource their production and delivery.
3. Keep your delivery options open and migrate easily from paper to online, and from one VLE system to another.
4. Set your own standards and maintain them by encoding your own competency frameworks semantically using XML, and applying them to your various CPD and distance learning contexts.
5. Cherish and publish your own professional knowledge by committing to maintain and steadily enhance your education assets.
6. Outsource more intelligently, by being more clear about what you want to resource directly yourself and by what you must keep and manage yourself.
7. Partner more easily with other education providers by holding your materials in a much 'healthier' state which can be more easily re-used, re-styled and re-branded by your business partners.
8. Build a complete single solution for all your print and electronic publishing needs, and allow expert online CPD partners to share it with you.

The World's largest on-line MBA programme at Edinburgh Business School is now being delivered from its third VLE system. 20 million words of course materials in four languages; 8,000 diagrams and sundry other media objects were reused – without a single character having to be changed. This highly successful programme proved a 15 year record of successful single source publishing with open standards.

During the last ten years, the World Wide Web has continued to expand rapidly. However, it has also become more complex and more interactive. Some say it is well on the way to becoming more meaningful and useful too as the developers of the next generation of world wide web or "[Web 2.0](#)" are working to achieve.

To cope with the increasing complexities of publishing education materials for more interactive delivery in more languages and on more convenient devices, tomorrow's, education providers will turn to single source publishing solutions and standards. The sooner you start, the sooner the resources being spent today

Summary

on separate hand crafted print and online developments can be put towards creating single source masters, and the quicker the cost, quality and strategic benefits of single sourcing can be obtained.

Which standards are relevant for us?

Notable standards efforts in education:

1. [IMS Global Learning Consortium, Inc \(IMS\)](#) - IMS is developing and promoting open specifications for facilitating online distributed learning activities such as locating and using educational content, tracking learner progress, reporting learner performance, and exchanging student records between administrative systems. IMS has two key goals:
 - a. refining the technical specifications for interoperability of applications and services in distributed learning, and
 - b. supporting the incorporation of the IMS specifications into products and services worldwide.

IMS endeavours to promote the widespread adoption of specifications that will allow distributed learning environments and content from multiple authors to work together (in technical parlance, 'interoperate'). IMS is a global consortium with members from educational, commercial, and government organizations. IMS specifications include:

- a. Metadata Specification;
 - b. Learner Information Packaging Specification;
 - c. Content Packaging Specification;
 - d. Common Cartridge Specification;
 - e. Question and Test Interoperability Specification;
 - f. Learning Resource Metadata Specification.
2. [SCORM Evolved - Experience API \(Tin Can\)](#) - SCORM is a set of interrelated technical specifications built upon the work of the airline, IMS and electronics industry to create one unified 'content model'. These specifications have evolved into xAPI.
 3. [The Text Encoding Initiative \(TEI\)](#) - the international Text Encoding Initiative has sponsored a major effort to "develop guidelines for the preparation and interchange of electronic texts for scholarly research, and to satisfy a broad range of uses by the language industries more generally."

Notable Standards efforts in publishing:

- [DocBook 5 – Semantic Publishing Standard](#)
- [Open eBook EPUB3 Publication Standard](#)
- [Elsevier Science SGML DTDs](#)

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