

Xpos're: A Tool for Rich Internet Publications

Leen Breure <L_dot_Breure_at_uu_dot_nl>, Utrecht University & DANS (Dutch Data Archive)
Maarten Hoogerwerf <maarten_dot_hoogerwerf_at_dans_dot_know_dot_nl>, DANS (Dutch Data Archive)
René van Horik <rene_dot_van_dot_horik_at_dans_dot_know_dot_nl>, DANS (Dutch Data Archive)

Abstract

Internet technologies are gradually reshaping the function of traditional scholarly publications. There is a growing tendency in some disciplines to publish a digital paper together with supplements such as images, videos, 3D-models and underlying data. More information requires a better usability in terms of overview and finding information, which has led to new features in journals and thus to modifying and extending this genre. These so-called enhanced publications or rich internet publications have various physical forms: PDF documents with embedded interactive models, HTML files enriched with hyperlinks to contextual information and with facilities to highlight information in the text, or aggregations of documents and other resources linked together through metadata which make them findable for semantic search engines.

However, many of the originally print-based journals, particularly in the humanities and social sciences, are still rather conservative in format and offer hardly any opportunities for enhanced publishing, which leaves room for some form of self-publishing, perhaps as addition to a regular journal article. In this paper we introduce the Xpos're tools for authoring and displaying an interactive multimedia scholarly publication, which may be created as a digital companion to a regular journal paper and published, for example, on the author or institution's website in order to share related research products and to achieve greater visibility. We also report about practical experiences with this software in a few research projects.

The Xpos're software (see: <http://xposre.nl/software/>) comprises a Flash-based document reader and a set of extensions (plug-ins) that extend the basic functionality of this text browser. The extensions are used to display specific types of multimedia that provide additional functionality, such as viewing images, videos and interactive maps. The input text is XML based, which not only guarantees a durable and flexible encoding of content, but also allows automatic rendering in different formats according to the preferences of users and the limitations of their hardware. In addition, the XML source can be easily transformed to an RDF resource map to meet the requirements of the semantic web. The document reader generates output in HTML, in two flavors, namely a slide based version that uses JavaScript, and a plain HTML text (single page), which is most suitable for printing and which can be used to create e-books. This plain HTML text can also be displayed in a format similar to that of scientific journals through the Xpos're HTML Reader, which has more features than the automatically generated slides and which can be highly customized by the user.

1. From PDF to Rich Internet Publication and E-book

Innovation in Scholarly Genres

The journal article is still the basis of scholarly communication in most disciplines. For a long time, the available space in a printed publication and the high production costs have put restrictions on adding supplementary material such as pictures, maps and fragments from historical sources. The change to web publishing has taken away these material impediments, but in facing new media we are inclined to recreate the old genre by new means. The form and layout of online publications are in general still dominated by genre conventions based on printed journals and books. The capabilities of the digital channel are often underutilized, which makes that scholarly communications are currently at a

“horseless carriage” state, that lies somewhere between the world of print and paper and the world of the web and computers, with the former still exercising significantly more influence than the latter [Force 11].

There are signs that point to profound changes coming to the system of scholarly communication [Borgman 2007]; [Wouters 2012]. Research on digital curation deliver new publishing models, social media plays a rapidly increasing role in the exchange and discussion of scientific ideas, and some journals have already deliberately changed track by adopting a new format with enhanced usability. Moreover, scholarly blogs offer ample opportunity to experiment with new media such as audio and video. These innovations are unevenly spread over the scholarly landscape: most changes occur in the hard sciences, particularly in physics, chemistry and the bio-medical field, while humanities and social sciences are more reluctant in this respect.^[1]

The downside of this transition has a practical problem: the technology required for the novel forms of publishing is generally not yet embedded in a smooth authoring process comparable with that for printed publications. Adding multimedia to a blog may not be a big problem, but a scholarly journal adheres to higher standards of long-term sustainable information access and aesthetic layout, which also places demands on the authoring process, and, therefore, on the tools and templates which authors have at their disposal. Non-printable supplements are often stored in a separate section of the publisher’s website and as such are not perceived as part of the discourse itself. The Xpos’re software package discussed here addresses this type of problem for online publications that contain interactive multimedia closely connected with the text. The pros and cons are best understood after a short overview of the upcoming digital genres (section 1.2 through 1.4) followed by a preliminary conclusion (section 1.5) explaining why new tools are needed.

The innovative scholarly genres can be grouped into a few, not strictly defined categories: (1) enhanced publications, (2) rich internet publication and (3) ebooks. These new genres still reflect many features of the old ones from which they are derived, but have in common a certain integration of the scholarly discourse with interactive access to research material. This integration varies greatly, from linked research data and spreadsheets to embedded interactive statistical charts and maps with results of analysis and computation, image galleries, animated models and videos. The interactivity added to the linear reading allows for diversion from the main line of discourse and enables the user to select the information in which (s)he is particularly interested, to choose different perspectives and to explore data with new questions.

Enhanced Publications

The less advanced category is the so-called “enhanced publication.” The term refers to the old genre of printed papers, which, in digital format, have been enhanced with additional material such as research data, models, illustrative images, or post-publication comments and rankings, all rather loosely linked to the publication through metadata. The data enhancements enable the replication of research as well as secondary analysis of the underlying data sets.

Relating digital content resources that are distributed over different collections (e.g. in literature studies and historic research) can greatly enhance their value provided this is done in an interoperable machine-readable way, which makes that they can be indexed by semantic search engines. The *Open Archives Initiative – Object Reuse and Exchange* (OAI-ORE) has provided a standard for this purpose [Lagoze 2007]. The Australian LORE (Literature Object Re-use and Exchange) software is one of the tools supporting this standard. It consists of a lightweight Firefox extension for creating, labeling and visualizing typed relationships between individual objects, and relies on a backend repository [Gerber 2009]. The ESCAPE editor in combination with the InContext visualizer (both of Dutch origin) has a similar functionality and also allows to create and to display a semantic overlay in the form of an OAI-ORE based resource map, encoded in RDF [Bentum2009]. There are more projects working into the same direction using RDF or the OAI-ORE protocol more specifically, such as Foresite^[2] and eChemistry.^[3]

The advantage of such a package that includes the publication plus loosely coupled addenda which are accessible through hyperlinks, is that the creation is relatively easy, because it does not affect the published document itself; a layer of metadata is sufficient. However, it has a low degree of integration and, therefore, is not particularly comfortable.

The display of these extras is usually spread over different windows, each operating in isolation.

Rich Internet Publications

The more integrated publication formats cannot be adequately described as simply “enhanced publications”. We have argued elsewhere [Breure 2011], that the term *rich internet publication* (RIP) is to be preferred for this more advanced form, which consists of seamless combination of text, data and illustrations. Usually it has a higher degree of interactivity by the use of slideshows, image galleries, maps, and query interfaces. Integration concerns a variety of aspects, such as internal linking between information objects and the functional combination of user interface components on the presentation level.

8

Elsevier’s *Article of the Future* is the most well-known example. In 2009 this publisher initiated this project to improve the electronic communication of research. In the new layout the article is divided into three panes, one for navigation, one for the core text and one for supplementary and contextual information. Interactive tables, graphs and other discipline specific tools have been brought into the text and make that readers can drill down to underlying data [Aalbersberg 2012].

9

Since December 2009 Portland Press has been using Utopia Documents^[4] to enhance the content of their *Biochemical Journal*.^[5] A Utopia document is an enhanced PDF file for which a special reader has to be downloaded. It connects the static content of scientific articles to up-to-date online information and allows a great variety of annotations made by the author or publication editor. Currently, the publisher’s version of this software is only available to Portland, but it is promised to be in time available more widely [Pettifer 2011]. *BMC Medicine*, the flagship medical journal of the BioMed Central series, has chosen a similar technological direction by including 3D models in the PDF, benefiting from Acrobat options to embed interactive objects in a PDF document. Because in this case standard technology is used, the document is mostly accessible through regular PDF readers [Ziegler 2011] (unfortunately, the iPad does not support these advanced features).

10

The creation of RIPs has far-reaching consequences for the authoring and publishing process. The production system must support the enhancements in storage and layout and many journals have not (yet) chosen to move into this direction; the regular PDF is the ubiquitous standard. This means that authors will have no free choice regarding media rich publishing. The selection of a journal will be based, rather, on more ponderous reasons like ranking and readership than on this presentation aspect. A double track solution is feasible by doing both, publishing the article in a highly ranked journal to earn credits, and providing a text with supplementary material through a private or institutional website to serve the community of peers and to enhance visibility. One may consider this as an alternative form of co-publishing, in which the efforts rather than the expenses are shared — but with which technical means, and can it be done within a reasonable amount of time? An ordinary HTML page is not a good solution, precisely because of all the extra material. Think of a large set of photos, an interactive map for display of research data or an interactive spreadsheet. One needs special components to avoid a messy layout and to provide a decent reading experience, which will require more technical skills than we may expect from the average author.

11

An obvious channel for alternative communication is the research blog. In general, bloggers do not see their blogs as appropriate outlets for original research [Puschmann 2012]; [Kjellberg 2010], which is also confirmed by a look at blogs in humanities studies. Scientific blogging is often motivated by the need of sharing knowledge with a wider public than the community of experts, to express opinions and start discussions. Moreover, in terms of layout the blog genre is not geared to extensive scientific discourse. However, the blogging software can be used for other purposes as well. The popular WordPress package, which is used on many blog sites, is also the basis of PressBooks^[6], a commercial website, which presents itself as the simple way of web book publishing with PDF as extra output option. WordPress itself has also themes (i.e. layout templates) suitable for scholarly publishing as well as special components for multimedia [Jankowski 2009]; [Tatum 2011]. Installation of the software does not require much technical knowledge. Authoring can be done online, however, a drawback is that WordPress adds additional codes to the HTML, which makes the source text less standard and therefore more difficult to re-use.

12

A new platform with interesting architecture is Scalar [Dietrich 2012] ^[7], created by the Alliance for Networking Visual Culture and is now available. It is a free, open source authoring and publishing platform that is designed to write text online (or to copy and paste it from an existing source). Scalar enables users to assemble media from multiple sources and juxtapose them with their own writing in a variety of ways, with minimal technical expertise required. Comments and annotations are also supported. A user can easily switch between different views such as text emphasis, media emphasis, metadata and various visualizations. Content consists of pages and media, which can be related to each other in different ways, which results in non-linear structures. Media can be imported from online archives like Critical Commons, the Internet Archive, Flickr and Vimeo. Scalar is a semantic web authoring tool that brings a balance between standardization and structural flexibility to all kinds of material. Authors familiar with WordPress will feel comfortable with the online authoring process; an export option to other formats is not directly available, but seems to be possible through the API ^[8]

E-books

An offline alternative to the RIP is the modern e-book. In contrast to what its name suggests an e-book does not need to be of the same substantial size of a printed book because of the lack of overhead printing costs. The first generation of e-books consisted mainly of texts with a few gray-scale illustrations, and e-readers based on “electronic paper” technology (e-ink) like Amazon’s Kindle could hardly display more, but this is changing. Recently, e-books can be enriched roughly in the same way as RIPs and e-reader software can be downloaded for all computers.

In fall 2011 Epub 3 was approved as recommendation^[9], which allows the embedding of audio and video together with some scripting and makes interactivity possible. The great plus is that an Epub 3 document is a ZIP-file with only standard code inside: HTML5, CSS and Javascript, which guarantees the reusability of the content. There are two types of layout. Reflowable layout is default, which gives users a high degree of control of the look and feel of the page; however, for the same reason, it is more difficult for authors to make sure that multimedia appear on the right position in the text. The alternative is fixed layout, which sounds good, but is not yet very successfully implemented by reader software.

Currently, the Epub 3 standard is not widely supported by publishers and e-reader manufacturers, which makes that in practice one may come across some annoying hitches. Apple offers extensive and good-looking support in the form of its proprietary iBooks format. The text can be interspersed with interactive images, image galleries, video and audio. Touch Press ^[10] has already produced a set of impressive titles on popular subjects such as the pyramids of Egypt in 3D, the work of Leonardo da Vinci about human anatomy, and the march of the dinosaurs. Apple created a nice authoring program, iBooks Author, which runs only on Apple devices, and the same applies to the iBooks, which require an iPad. Conversion to PDF is possible, but then all interactivity gets lost. Moreover, Apple requires that iBooks files are only distributed through its own iBookstore unless the work is free.^[11] So, the highly proprietary nature of this channel may be an impediment to scholarly publishing, which is increasingly marked by openness.

The Verdict: No Royal Highway

Conventional publishing is rather straightforward: there is a well-defined path starting from a Word file or Latex document based on templates to an HTML page and PDF. Enhanced publications add a linkage layer on top of this existing system and require users to hop from one piece of content to another. On the other hand, publishing an article in a digital format with integrated research data, a set of photos, videos, interactive maps or animations as with RIPs affects structure and layout of the publication itself and requires new technology. Making a choice one has to avoid at least four basic technical pitfalls:

1. *Cluttering* of the added content and thus creating an aesthetically unacceptable document. We know that aesthetics do matter, also because it influences credibility. Experiments have shown that users can judge a web site’s credibility in as little as 3.42 seconds merely on the basis of its aesthetic appeal [Alsudani 2009]; [Phillips 2009]. This may be mitigated in a scientific context, but the factor should not be neglected.
2. *Information overload*, which is closely related to the previous point. The reader may not attach the same

importance to the extra information as the author did. Aside from the main line of discourse the user should be given a choice with regard to content, e.g. to view or to skip a chart, a model, a set of images or a video.

3. *Format-device mismatch*. Nowadays this easily happens with the great variety of mobiles and diversity in screen resolutions. In the good old days we were safe if our content stayed inside an area of 800x600 pixels. However, now we have got wide screens, tablets, iPad minis, phablets, smartphones and more. Text should not “fall off” the screen or be displayed with uncomfortably long line length. The answer is responsive design, a relatively new technology that allows a document to resize and to restructure depending on the size of the screen on which it is being viewed, similar to the reflowable layout of epub.
4. *Proprietary solutions*, because of a lack of openness (for example for commercial reasons) or not adhering to standards. Creating a scholarly publication requires a great deal of effort. If we can do it once, in a standard format like HTML or XML, we can re-use it in its entirety or parts of it, and automatically reformat it by means of XSLT.

Authors are lucky when their publisher has well organized the rich publication route as for example Elsevier did. This implies more than refreshing the journal system and providing updated templates. Careful instructions are needed how to submit multimedia material and, in addition, Elsevier offers a paid illustration service. Overlooking the various alternatives for self-publishing as discussed in the foregoing sections one must conclude that each of them has certain snags; there is no royal highway. Most authors will either need technical assistance or have to accept compromises; new, user-friendly tools are badly needed to fill the gap between the low end of WYSIWYG HTML editors and blog publishing on the one hand, and less flexible and less open full-fledged commercial systems on the other.

18

2. Xpos're as Cross-platform Solution

Background

The Xpos're project has its roots in handcrafted multimedia web applications for research purposes, mainly made in Flash.^[12] Just before Flash was banished from the tablet platform a wish arose to make this kind of application more generic and author-friendly, which resulted in the Xpos're suite. The software does not solve all problems identified above, but avoids at least most of the pitfalls mentioned. Due to its background in multimedia applications the Xpos're suite allows the creation of publications with a well-structured aesthetic layout. With regard to information overload: the layout concept encourages (but not enforces) a style of writing that divides the text into small sections, presenting essentials first followed by more detailed evidence. The variety of hardware platforms and screen resolutions is addressed through different output options, both fixed and more reflowable HTML formats. Input and output is based on standards, XML, HTML and cascading style sheets, which precludes any lock-in.

19

The Xpos're software is free and is distributed under a non-commercial Creative Commons license and can be downloaded from <http://xposre.nl> which contains also a few examples of real publications (note, that the illustrations in this paper are based on a simple demo with brief pseudo-text kept short for the sake of clarity).

20

Flash Text Browser with Extensions

The main component of the Xpos're package is a text browser, a Flash program, which primarily renders the text as a set of slides (see Figure 1) and which delegates the display of specific, mostly multimedia content to external components, the so-called extensions, which are similar to plug-ins of a web browser. These enhancements (in Flash or HTML-Javascript) may vary from zoomable images, image galleries, interactive maps, and videos to interactive data tables and statistical charts. The extensions are different in size, are launched through special event-hyperlinks and are displayed on top of the main text. The native Xpos're Flash extensions can also interact through this type of links with the main text, for example, changing the slide displayed. In this way an image gallery can be used as a pictorial index through goto-event links in the captions of the gallery images; by clicking on the event-link a user can go to the slide where the image is discussed (see Figure 2). Xpos're has been designed to work together with other web tools. Particularly the statistical market segment has companion software, which is worth to be used and, depending on the application interface, can also be used with Xpos're as a less integrated extension.

21

Simple demo Xpos're 2.0

A. Nonymous

Lorem ipsum

Pharetra arcu mi

Summary: Lorem ipsum dolor sit amet, consectetur adipiscing elit. Morbi et risus quis turpis volutpat blandit quis non lacus. Donec consequat, odio non adipiscing bibendum, diam libero lacinia ipsum, in tempor sapien libero non ligula. Phasellus dictum congue orci, nec scelerisque risus laoreet non. Duis eget orci ipsum, vitae sagittis nunc. Aliquam venenatis iaculis felis, sit amet bibendum libero eleifend a. Nam rutrum aliquet orci, a gravida lorem rutrum in. Nunc velit diam, lacinia sed pellentesque ac, blandit non est.

In accumsan ultrices risus, in posuere nisi lacinia non. Sed nec libero eros, in blandit ante. Nam iaculis nulla id turpis hendrerit consequat. Quisque rutrum iaculis porta. Curabitur hendrerit ligula at elit tristique elementum. Suspendisse blandit, mauris ut suscipit imperdiet, turpis mi hendrerit tortor, ac varius libero risus nec libero. [1]

Nullam rhoncus consequat diam at dictum. In ipsum odio, commodo sed mollis sed, blandit eget tortor. Aliquam ligula nulla, tempor at aliquet eget, viverra eget diam. Suspendisse ut leo gravida nulla sollicitudin condimentum ut in magna. Etiam ornare ligula at eros pharetra vel elementum odio consequat. Phasellus et tincidunt dolor. Curabitur nec eros arcu, sit amet placerat purus. Curabitur blandit vulputate pharetra. Vestibulum ante ipsum primis in faucibus orci luctus et ultrices posuere cubilia Curae; Morbi elit nulla, laoreet vel suscipit nec, sagittis a felis. Vestibulum aliquet blandit est sit amet iaculis. Phasellus ornare iaculis pretium. Proin pellentesque, sapien at tristique convallis, nunc sem dictum purus, non laoreet nisi mauris sed est. Mauris fermentum venenatis quam. [Barish et al. 2009]

[More...](#)



Phasellus dictum congue orci. (Click on image to enlarge)



Sodales nisl quis.

Id: intro

Figure 1. The Xpos're text browser showing a slide with one text column and an image list (Flash, CSS).

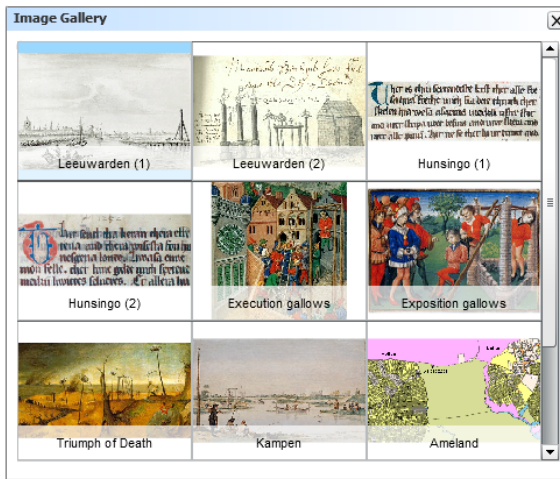
Gallows in Medieval Frisia

J.A. Mol

Table of contents

[Image gallery](#) [Slideshow](#)

- Introduction
 - Gallows as landmarks
- What is in a name
- Questions
- Compensation versus the death penalty in Old Frisian law
- Execution and exhibition: towns and country
 - Execution and exhibition gallows
- Urban and rural gallows
- Gallows in or near towns and grietenien
- Misleading names
- The right to set up gallows
- Visible locations
- The owners of gallows and gallow lands
- When and why
- Conclusion
- Notes
- Selection of literature



and persons mentioned and cannot freely copied. Material from Wikipedia and Wikimedia Commons is used under the license agreement issued by these organizations. Reasonable effort has been made to obtain permission for use of images. In some cases this was not succesful because one or more entitled parties could not be traced or no reaction was received. Those who feel that their rights are not fully respected, should contact the authors. See [contact page](#).

Id: toc

Figure 2. The text browser showing a slide with the image gallery extension.

In the basic display format the publication is a series of slides, each having a fixed layout of 950 x 720 pixels, which fits most common screens in landscape mode. It is not responsive, but there are options for more flexible HTML output, which we shall discuss later. A slide should correspond with a piece of text that is internally coherent, such as a section or subsection of an article. It may contain the full text or a summary, for example, if the Xpos're publication is mainly intended to make supplementary material available. For this purpose each slide can be linked to the related page in the PDF file with the full text; then the linked page is displayed by a button click. 22

A slide can contain one or two text columns and images. Images are displayed as a list outside the text blocks, unless, like in HTML, defined through an `img` tag and thus embedded in the text itself. The number of images that fit on a slide depends on the size and orientation of the image list, horizontal or vertical. How physical text layout affects reading from screen is a thorny debate, which has produced a large number of unfortunately inconclusive and slightly contradictory studies [Nimwegen 1999]; [Dyson 2004]; [Santosa 2011]. Conclusions have mostly favored short to medium lines (about 60 characters per line), because longer lengths require greater lateral eye movements, which makes reading more tiring [Bernard 2002]. The Xpos're slide format allows text columns in this range. 23

The limited space does not necessarily restrict the amount of information that can be displayed. If a text is larger than the predefined column, it is scrollable, but choosing continuation text may be more user-friendly. A slide can have one continuation text of unlimited length, in the Flash version displayed in a popup window and in the HTML slide version as a new screen. This helps to present main things first. Usability research has shown that users prefer brief information before reading a full text and appreciate facilities for rapid browsing [Dillon 1989]. 24

HTML Output and the HTML Reader

Flash was kept because of its robustness and high quality of accurate graphic rendering, which has proven to be consistent on different platforms over a long period of time. It should be emphasized that no content is embedded in the Flash file itself (which is still a common misunderstanding with regard to Flash applications): at startup all text and images are preloaded from the web server to guarantee good performance. 25

However, the user is in no way bound to Flash and can easily switch to HTML output. The Flash text browser contains a code generator, which automatically creates a look-alike HTML version of the Flash slides with similar functionality to serve platforms where Flash is not supported (such as the iPad). In the same way it can produce a plain HTML version with a minimum of formatting suitable for printing, conversion to PDF and further processing such as the creation of e-books through software as Calibre.^[13] 26

This flexible HTML document can also be manipulated and displayed by other reader software. For example, the Xpos're suite also comprises a highly customizable HTML Reader, which displays this text in a three column reflowable format (table of contents, main text and sidebar), similar to the layout of most digital scientific journals. It has more features than the automatically generated HTML slides and is particularly tablet friendly (see Figure 3). An additional advantage of this reader is that it accepts also other HTML texts (non-native XML) provided that basic formatting rules have been followed. 27

Index All Text Refresh Images Sidebar Options Source Help

Titles

0. Title page
1. Lorem ipsum
2. Pharetra magna in ut purus
3. Mus tortor
4. Notes
5. Bibliography
6. Table of contents

Lorem ipsum

Pharetra arcu mi



Summary: Lorem ipsum dolor sit amet, consectetur adipiscing elit. Morbi et risus quis turpis volutpat blandit quis non lacus. Donec consequat, odio non adipiscing bibendum, diam libero lacinia ipsum, in tempor sapien libero non ligula. Phasellus dictum congue orci, nec scelerisque risus laoreet non. Duis eget orci ipsum, vitae sagittis nunc. Aliquam venenatis iaculis felis, sit amet bibendum libero eleifend a. Nam rutrum aliquet orci, a gravida lorem rutrum in. Nunc velit diam, lacinia sed pellentesque ac, blandit non est.

In accumsan ultrices risus, in posuere nisi lacinia non. Sed nec libero eros, in blandit ante. Nam iaculis nulla id turpis hendrerit consequat. Quisque rutrum iaculis porta. Curabitur hendrerit ligula at elit tristique elementum. Suspendisse blandit, mauris ut suscipit imperdiet, turpis mi hendrerit tortor, ac varius libero risus nec libero. [1]

Nullam rhoncus consequat diam at dictum. In ipsum odio, commodo sed mollis sed, blandit eget tortor. Aliquam ligula nulla, tempor at aliquet eget, viverra eget diam. Suspendisse ut leo gravida nulla sollicitudin condimentum ut in magna. Etiam ornare ligula at eros pharetra vel elementum odio consequat. Phasellus et tincidunt dolor. Curabitur nec eros arcu, sit amet placerat purus. Curabitur blandit vulputate pharetra. Vestibulum ante ipsum primis in faucibus orci luctus et ultrices posuere cubilia Curae; Morbi elit nulla, laoreet vel suscipit nec, sagittis a felis. Vestibulum aliquet blandit est sit amet iaculis. Phasellus ornare iaculis pretium. Proin pellentesque, sapien at tristique convallis, nunc sem dictum purus, non laoreet nisi mauris sed est. Mauris fermentum venenatis quam. [Barish et al. 2009]

[Memoria](#)

[More... >](#)

Sodales nisl quis.

Phasellus dictum congue orci. (Click on image to enlarge)

Notes

[1] Odio montes neque. Luctus placerat blandit metus nisl orci eget tortor leo. Donec augue tellus sed dignissim libero. See also [Friedman 2006](#)

[2] Consequat ut ipsum enim diam dolor. Nascetur libero massa. Suspendisse blandit risus. Tempus eleifend sollicitudin. Luctus sollicitudin feugiat dignissim etiam nam per integer donec risus non ligula rutrum lectus et.

Xpos're HTML Reader vs. 0.1

Figure 3. The same text as in Figure 1 displayed in the Xpos're HTML Reader (HTML, Javascript, CSS). Notes and literature references are displayed next to the text in the sidebar. It has other convenience features, e.g. concept highlighting, navigation by images, look up of selected words on the internet.

The cross-platform concept also applies to extensions. An important principle in the Xpos're architecture is “gentle fallback”, which guarantees that the content of Flash extensions is still displayed in the HTML slide version if Flash is not supported on a certain hardware platform. Although the HTML version can handle Flash extensions, the user may select the fallback option to let the web browser use the XHTML source directly (which is sufficiently formatted) instead of the better looking Flash rendering.

3. Authoring a Publication

An Xpos're publication consists of two main files: one containing the structured publication text and one with metadata and instructions for the Xpos're software. A cascading style sheet (CSS) defines the layout in terms of colors, font family and font size. XML has been chosen for the mark-up of the content. The input must comply with an XML schema, which makes it easy to control and to validate text entry. In many respects the Xpos're XML vocabulary is close to XHTML, particularly on the level of paragraph mark-up, but it contains non-HTML instructions, among others, for the control of the extensions mentioned.


```

<slide id="intro" template="vright">
  <pdfPage>1</pdfPage><!--Related page in the PDF -->
  <title>Lorem ipsum</title>

  <visual>
    <url>Tulip_field.jpg</url>
    <!--Link to an Xpos're extension, in this case the image viewer: -->
    <onClick href="event:add#ImageViewer.swf#Tulip_field.jpg" />
    <cap>Phasellus dictum congue orci. <i>(Click on image to enlarge)</i></cap>
  </visual>
  <visual>
    <url>Red_tulips.jpg</url>
    <cap>Sodales nisl quis.</cap>
  </visual>

  <text1>
    <h2>Pharetra arcu mi</h2>
    <!-- Summary: -->
    <p><b>Lorem ipsum dolor sit amet, consectetur adipiscing elit.
      Morbi et risus quis turpis volutpat blandit quis non lacus. Donec consequat,
odio non adipiscing
      bibendum, diam libero lacinia ipsum, in tempor sapien libero non ligula.</b>
    <!--Start of core text: -->
    <p>Phasellus dictum congue orci, nec scelerisque risus laoreet non. Duis eget
      orci ipsum, vitae sagittis nunc. Aliquam venenatis iaculis felis, sit amet
      bibendum libero eleifend a.</p>
      Etc.

```

Example 1. Beginning of a slide containing a text column and two images. The template *vright* defines a vertical image list on the right side. The result is shown in Figure 1.

The most direct form of authoring boils down to alternating between an XML editor and the Xpos're text browser, which shows immediately how the document rendered looks. If the XML document is created on the basis of an existing publication, text entry will be a matter of copy and paste. Other, more (semi-) automated workflows, which start for example from a Word text, are feasible as well. A Word document saved as a (filtered) HTML text can be further cleaned by conversion tools ^[14] and worked up to XML. This may be a more convenient way if an existing text contains much mark-up (bold, italic et cetera) that is to be preserved. This preprocessing stage could be more automated. A dedicated, task-oriented XML editor with a word processor-like view such as XMLmind ^[15] could simplify the authoring and tweaking for those authors who are less familiar with the nuts and bolts of XML.

The layout of each slide can fully meet the requirements of the particular content. The author can choose on which level he defines the position and size of the text and images. By default layout is controlled through user-defined templates. The advantage of this template mechanism is that it allows global changes for the entire text at once; modifying a template affects all the slides that use it. In addition, fixed layout is not hard coded in the text itself and may be even completely disregarded as, for example, with the reflowable HTML output in the HTML reader.

```

<template id="vleft">
  <text1 x="370" y="110" width="500" height="485">Maintext</text1>
  <text2 x="370" y="595" width="500" height="100">Used as secondary text or text
block</text2>
  <visuals x="15" y="115" size="270" orientation="vertical">Vertical image list on the
left side
  with 'width' equal to 'size'</visual>
</template>

```

Example 2. Example of a template. This template defines the layout for a slide with a vertical list of images on the left, and two text blocks (text1 and text2) on the right.

If required, the author can also locally specify precise size and position of layout elements in the slide itself. A local specification precedes over the template in use, in the same way as local style definitions have priority of a linked style sheet in an HTML document. In this way images can also be “pulled out of the list” and placed anywhere on the slide. For this purpose the text reader contains a so-called measuring tool (see Figure 4), a transparent rectangle which can be drawn and resized by mouse and arrow keys to make positioning and resizing of text and images easy. Each time when the rectangle changes, its x, y, width and height are displayed at the bottom of the slide in a format that can be copied and directly pasted into the XML text. Although simple, this facility proves to be an effective compensation for the fact that the text editing is not WYSIWYG.

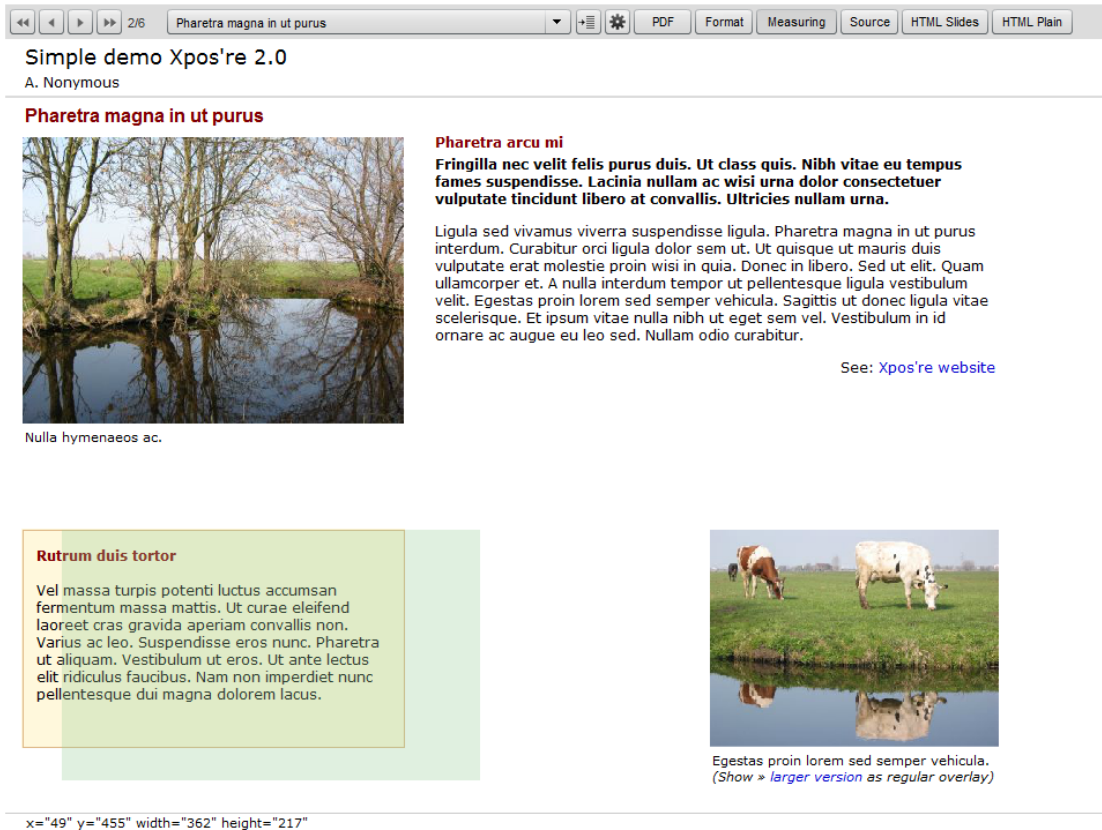


Figure 4. The measuring tool (green rectangle), with, at the bottom of the screen, position and size in a format which can be directly copied and pasted into the XML text.

Slide text may contain two kinds of hyperlinks: (1) regular HTML-hyperlinks and (2) internal event-links, which represent instructions for the text browser. Documents linked to the publication text through the former type of links are displayed

in a target window (just like in HTML), but Xpos're can also show them as an overlay on a transparent background on top of the slide, which creates a sense of unity in the user interface. The second type of link is used, among others, for navigation: `Lorem ipsum` will display the slide with the id-attribute having the value "intro". Another use is calling an extension. For example, the image viewer can be activated to show a larger, zoomable version of a picture by adding the tag: ``. Extensions linked through event links appear as pop-ups in the Flash text browser, and as overlays in the HTML look-alike.

When ready, the text with all depending files is copied to a webserver, which completes the publishing process. There is no content management system or other back-end required. When published, this RIP can be aggregated with other content (e.g. related publications or data sets) into an enhanced publication. Xpos're also supports the generation of an OAI-ORE resource map (see section 1.2), which is automatically generated by means of an XSLT file, to be downloaded from the Xpos're website.

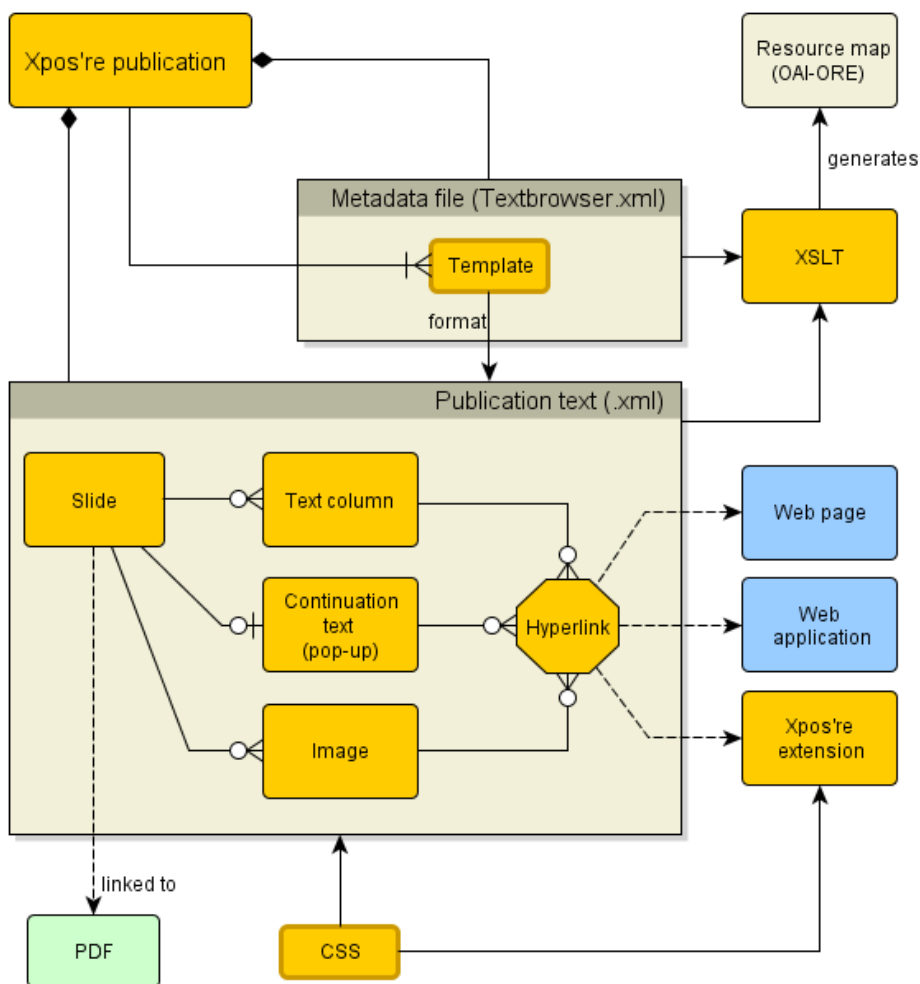


Figure 5. Summary of the Xpos're publication model. Symbols on the connecting lines: diamond: composition; cardinality: circle: zero; vertical bar: one; crow foot: many.

4. Pilots

We did some small scale testing of the software in research projects. The development of Xpos're started as part of a larger collaboration project within the Royal Netherlands Academy of Arts and Sciences and got national attention in the context of enhanced publications. The combination of both attracted some volunteers, who wanted either to add an Xpos're publication to an already published paper or to use the package for a new, born-digital product. This resulted in

four “showcases” about a diversity of subjects: gallows in late medieval Frisia, a textual analysis of a Dutch novel, a prototype for a Berber dictionary, and a rather long text (of the size of a book) about parks and country houses in the Netherlands (the products and more details are on Xpos’re website ^[16]). In the first two cases the technical work was done by the developer of Xpos’re; the Berber dictionary was implemented by a student in collaboration with a computer scientist, and text about parks was converted to Xpos’re source text by technical personnel of a university library, who had followed a short XML course and got a workshop of two half days about Xpos’re.

In all four cases the content production process went smoothly. The Berber dictionary, however, used a special text font, which required recompilation of the Flash text browser. During the encoding of the book about parks we offered some support for minor questions about image processing and how to create the best layout. Using Xpos’re for such a long text raised questions about search facilities, which are currently lacking in the text browser, because it was designed with texts of article size in mind. Furthermore, we could observe a tendency to stick to the basics and that more advanced features, such as the plugins, were not easily used.

36

5. Conclusions

Scholarly communication is in a process of transition and has not yet arrived at a steady state. Both users and publishers realize that the traditional genre of printed papers, even in digital form, does not suffice any longer and feel the need to publish supplements to the text. This has resulted in quite different digital solutions, varying from a multimedia section on a journal web site to enhanced PDF documents and semantic aggregations of articles plus other resources, but for most authors the way is not yet paved. Given the current state of scholarly publication, rich media publishing entails a set of difficulties and inconveniences that have to be dealt with:

37

1. *Lack of integration*: Given the current state of scientific publishing, multimedia material is often only loosely connected with the publication itself. This will not be experienced as a problem by all authors and readers, but it is to be considered as an issue against the background of the rapidly increasing influence of visual and audio content in our culture. The recent upswing of multimedia journalism is a good example of this tendency. We are now easily able to show what for centuries could only be described, but in practice there are still hurdles, particularly in the publishing infrastructure itself.
2. *Information overload*: More and diverse content requires adequate composition skills in combination with optional selection by the user. Next to the information push of the publication itself we should leave room for information pull: let readers select the details they like, just as we do with an extensive footnote apparatus in printed publications. This requires a slightly different style of writing and technical support in the publication format.
3. *High quality layout*: The variety of media tends to make layout more complex. Unless supported by a user-friendly authoring system or the publisher’s design department, this may demand too much from the average author.
4. *Format-device mismatch*: A uniform and consistent layout across different devices, which have a great variety of screen resolutions and idiosyncratic browser behavior, is an enormous challenge. So far only PDF publications have been really successful on this point. Flash was a second winner, but lost the battle on the mobile platform.
5. *Proprietary solutions*: The situation is certainly not hopeless; however, some attractive solutions tend to be proprietary by not fully adhering to standards and / or by vendor lock-in.
6. *Lack of skills*: Even if the technology in this field becomes more user-friendly, authors should have more global technical knowledge and basic skills to create a multimedia publication or to guide and to manage its production by assistants.

The architectural concept of software has usually a much longer life than the implementation, which is highly sensitive to changes in technology and market positions. We all know spreadsheets, but only a few of us will remember Lotus 1-2-3, a highly popular spreadsheet and “killer application” in the mid-1980s. Although the few pilots we did ^[17] showed that that the software works well without hitches, the Xpos’re tools may be best evaluated on basis of the architectural concept.

38

A major goal has been a good-looking layout that integrates different types of content, much better than with the “content package” of the enhanced publication. Aesthetically, the Flash version is often found most attractive, also because the high graphic quality allows a pleasant information density in a relative small screen space. In the fixed layout slides, text and images can be precisely positioned. Other media types like interactive maps, spreadsheets and video are so different in size that the same juxtaposition is not possible as a generic solution. Extensions have been used instead, which are displayed on top of the text and keep the context visible as much as possible. The template mechanism encourages the predefinition of a layout model, which can be both globally changed and locally overridden.

39

Information overload is discouraged by a combination of several features, which leads to dividing the content into layers. The first layer is the text on the slide, the next one the continuation text, and, if required, a third layer in the form of a PDF page linked to the slide. In the HTML Reader the sidebar can be used for digressions and short introductions of related subjects and videos that do not fit in the main text.

40

The variety of devices and screen resolutions has been addressed to a certain extent by a fixed layout that fits normal tablets and larger screens, and by the flexible layout of the HTML Reader. A future version should be more responsive, but downsizing for lower resolutions has its limits; hotspots as on an interactive map or timeline require a minimum size and spacing on touch devices.

41

The elements of the Xpos're XML vocabulary are not standard, but the large overlap with HTML for sentence and paragraph mark-up and the ease of transformation of XML content make reuse relatively simple. A drawback is the basic knowledge of HTML, XML and CSS required for authoring. This may be inhibiting for scholars who want to stay far away from web technology; they will need some technical assistance. The barrier is not as serious as it may appear. In one of our pilots a large publication was rather easily encoded in XML by two persons who had only attended a short basic XML workshop and got a one-day instruction in Xpos're software.

42

The Xpos're architectural concept can be positioned between RIPs on basis content management systems as WordPress and modern e-books. Although quite different in many respects, all three of them are HTML-based and can be used to create publications with enhanced reading experience. Unlike WordPress Xpos're is a completely client-side solution. The optional scripting in Epub 3 makes these e-books in principle more versatile and powerful (and also more complex!) than Xpos're publications with extensions only. With regard to flexibility Xpos're stands out by an easily reusable source text and a variety of output options.

43

Notes

[1] See for an preliminary inventory of the occurrence of new publication features: <http://xposre.nl/epfeatures/index.html>.

[2] Forsite: <http://foresite.cheshire3.org/>. Date accessed: August 13, 2013.

[3] eChemistry: <http://www.rsc.org/chemistryworld/News/2008/January/29010803.asp>. Date accessed: August 13, 2013.

[4] Utopia website: <http://getutopia.com>. Date accessed: September 4, 2013.

[5] Biochemical Journal: <http://www.biochemj.org/>. Date accessed: September 4, 2013.

[6] PressBooks' website: <http://pressbooks.com/>. Date accessed: September 4, 2013.

[7] Scalar: <http://scalar.usc.edu/scalar/>. date accessed: October 16, 2013.

[8] See “Working with the API” under advanced topics in the User’s Guide: <http://scalar.usc.edu/works/guide/working-with-the-api?path=advanced-topics>.

[9] International Digital Publishing Forum – Epub 3: <http://idpf.org/epub/30>. Date accessed: September 4, 2013.

[10] Touch Press: <http://www.touchpress.com>. Date accessed: September 4, 2013.

[11] iBooks Author: Publishing and distribution FAQ: <http://support.apple.com/kb/HT5071>. Date accessed: September 4, 2013.

[12] See examples: <http://xposre.nl/rips.html>.

[13] Calibre: <http://calibre-ebook.com/>. Date accessed: September 4, 2013.

[14] For example the well-known program Tidy (<http://www.w3.org/People/Raggett/tidy/>) or an online tool as Word to Clean HTML: <http://word2cleanhtml.com/>. Date accessed: September 4, 2013.

[15] XMLmind: <http://www.xmlmind.com>. Date accessed: September 4, 2013.

[16] Xpos're – Rich Internet Publications: <http://xposre.nl/rips.html>.

[17] See <http://xposre.nl/rips.html>.

Works Cited

- Aalbersberg 2012** Aalbersberg, J., F. Heeman, H. Koers and E. Zudilova-Seinstra. "Elsevier's Article of the Future: enhancing the user experience and integrating data through applications". *Insights* 25: 1 (2012), pp. 33-43.
- Alsudani 2009** Alsudani, F., and M. Casey. "The effect of aesthetics on web credibility". Presented at *The 23rd British HCI Group Annual Conference on People and Computers: Celebrating People and Technology*, sponsored by British Computer Society (2009).
- Bentum2009** Bentum, M. van, A. Hogenaar and D. Vierkant. "Enhanced Scientific Communication by Aggregated Publications Environments (ESCAPE)". *EPUB 2009* (2009). <http://conferences.aepic.it/index.php/elpub/elpub2009/paper/view/108/48>.
- Bernard 2002** Bernard, M., M. Fernandez and S. Hull. "The Effects of Line Length on Children and Adults' Online Reading Performance". *Usability News* 4: 2 (2002). <http://usabilitynews.org/the-effects-of-line-length-on-children-and-adults-online-reading-performance/>.
- Borgman 2007** Borgman, Christine L. *Scholarship in the Digital Age: Information, Infrastructure and the Internet*. Cambridge: MIT Press, 2007.
- Breure 2011** Breure, L., H. Voorbij and M. Hoogerwerf. "Rich Internet Publications: Show What You Tell". *Journal of Digital Information* 12: 1 (2011). <http://journals.tdl.org/jodi/article/view/1606/1738>.
- Dietrich 2012** Dietrich, C., and J. Sayers. "After the Document Model for Scholarly Communication: Some Considerations for Authoring with Rich Media". *Digital Studies / Le champs numérique* 3: 2 (2012).
- Dillon 1989** Dillon, A., J. Richardson and C. McKnight. "The Human factors of journal usage and the design of electronic text". *Interacting with Computers* 1: 2 (1989), pp. 183-189.
- Dyson 2004** Dyson, M.C. "How physical text layout affects reading from screen". *Behaviour & Information Technology* 23: 6 (2004), pp. 377-393. http://images3.wikia.nocookie.net/__cb20060729105544/psychology/images/e/eb/Dyson,_M_C_%282004%29.pdf.
- Force 11** Bourne, P.E., T. Clark, R. Dale, A. de Waard, I. Herman, E.H. Hovy and D. Shotton, eds. *Force11 White Paper: Improving The Future of Research Communications and e-Scholarship*. 2012. http://force11.org/sites/default/files/book_attachments/Force11Manifesto20120219.pdf.
- Gerber 2009** Gerber, A., and J. Hunter. "A Compound Object Authoring and Publishing Tool for Literary Scholars Based on the IFLA-FRBR Model". *The International Journal of Digital Curation* 4: 2 (2009), pp. 28-42. <http://www.ijdc.net/index.php/ijdc/article/view/116/119>.
- Hunter 2007** Hunter, J., and K. Cheung. "Provenance Explorer – a graphical interface for constructing scientific publication packages from provenance trails". *International Journal on Digital Libraries* 7: 1-2 (2007), pp. 99-107. <http://dx.doi.org/10.1007/s00799-007-0018-5>.
- Jankowski 2009** Jankowski, Nicholas W., ed. *e-Research: Transformation in Scholarly Practice*. New York: Routledge, 2009. <http://scholarly-transformations.virtualknowledgestudio.nl/>.
- Kjellberg 2010** Kjellberg, S. "I am a blogging researcher: Motivations for blogging in a scholarly context". *First Monday* 15: 8 (2010). <http://firstmonday.org/ojs/index.php/fm/article/view/2962/2580>.
- Lagoze 2007** Lagoze, C., and H. van de Sompel. *Compound information objects: The OAI-ORE perspective*. *Open Archives Initiative – Object Reuse and Exchange*. 2007.

<http://www.openarchives.org/ore/documents/CompoundObjects-200705.html>.

Nimwegen 1999 Nimwegen, C., M. Pouw and H. van Oostendorp. "The influence of structure and reading-manipulation on usability of hypertexts". *Interacting with Computers* 12 (1999), pp. 7-21.

Pettifer 2011 Pettofer, S., et al. "Ceci n'est pas un hamburger: modelling and representing the scholarly article". *Learned Publishing* 24 (2011), pp. 207-220. <http://dx.doi.org/10.1087/20110309>.

Phillips 2009 Phillips, C., and B.S. Chaparro. *Visual Appeal vs. Usability: Which One Influences User Perceptions of a Website More? Software Usability Research Laboratory*. Wichita State University, 2009. <http://usabilitynews.org/visual-appeal-vs-usability-which-one-influences-user-perceptions-of-a-website-more/>.

Puschmann 2012 Puschmann, C., and M. Mahr. "Scholarly Blogging: A New Form of Publishing or Science Journalism 2.0?". In A. Tokar, et al., ed., *Science and the Internet*. Düsseldorf: 2012. pp. 171-181.

Santosa 2011 Santosa, P.I. "User's Preference of Web Page Length". *International Journal of Research and Reviews in Computer Science (IJRRCS)* 2: 1 (2011), pp. 180-185.

Tatum 2011 Tatum, C. *Augmenting WordPress for Enhanced Publication. Digital Scholarship*. June 10 2011. <http://digital-scholarship.ehumanities.nl/epubs/augmenting-wordpress-for-enhanced-publication/>.

Wouters 2012 Wouters, P., A. Beaulieu, A. Scharnhorst and S. Wyatt, eds. *Virtual Knowledge: Experimenting in the Humanities and the Social Sciences*. Cambridge: MIT Press, 2012.

Ziegler 2011 Ziegler, A., et al. "Effectively incorporating selected multimedia content into medical publications". *BMC Medicine* 9: 17 (2011). <http://www.biomedcentral.com/1741-7015/9/17>.



This work is licensed under a Creative Commons Attribution-NonCommercial 4.0 International License.