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New Value-Added Services for Electronic Journals in Classics

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Introduction

E-journals are undoubtedly less widespread in the Humanities than in the Scientific, Technical and Medical (STM) field. This is not just because of a lag in Humanities journals' development, but also because of the different extent to which electronic publishing technologies fit respectively the different nature and requirements of disciplines. Nevertheless, the benefits for traditional journals coming from electronic publishing in terms of knowledge dissemination and capability of reaching a wider audience are such evident that they cannot be ignored. Given these premises, the paper aims to design a new model for e-journals specifically tailored on classicists' needs.

In the first two sections I shall describe and examine the results of a survey that was carried out to assess the degree to which digital technologies are used in relation to serial publications in Classics. The survey was carried out with the support of the foundation ''Rinascimento Digitale''[1] and involved direct participation of several journal editors. Although only Italian journals were taken into exam-

[1] http://www.rinascimento-digitale.it.

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ination, the results were also consistent with those of related studies carried out in other countries (Sachini et al.; Ober et al.; Heath, Jubb, and Robey; Jöttkandt). The survey was useful to understand the current situation of Classics journals and thus to identify critical issues as well as opportunities to enhance the overall value of serial electronic publications in the Humanities (Waltham).

In the third section I propose two value-added services identified as a result of the survey, which are also intended to bootstrap the e-journal as a valuable medium for scholarly communication in this field. *Reference linking* and *semantic indexing* were seen as the services that could be provided by e-journal publishers that would also likely be considered as useful and desirable by the end users.

Finally, in the last section I analyse the main technical components needed for a working implementation of the e-journal model previously described in terms of its theoretical implications. The critical issues at each stage of production are addressed, including the management of the journal workflow in a digital environment, the automatic production of metadata, and the exposure of contents on the Web.

E-journal Publishing: the State of the Art of Classics in Italy

Survey Goal

The original purpose of the survey was to investigate the state of the art of e-journals in Italy. Given the low number of journals, however, that already have an electronic version whose editors actually participated to the survey, collected data about current e-journal features cannot be considered highly representative of the current situation. Nonetheless the survey is still illustrative since

it illuminates the obstacles and difficulties in providing electronic access to journal contents in this field, and it shows to what extent digital tools are being used in the editorial workflow.

As has been noted above the scope of this paper is restricted to one single national situation. However, let us have a quick look at the international scenario without any claim to comprehensiveness. It is not straightforward, indeed, to account for the state of the art of e-journals in Classics as a whole. Although it would be extremely useful, a single and up-to-date resource does not exist that lists electronic journals as well as electronic versions of traditional journals and provides information about the publication policy (subscription-based or open access). The section on e-journals in the Cristofori's *Rassegna Strumenti informatici per l'Antichità Classica*[2] was last updated back in 2006. The *Directory of Open Access Journals (DOAJ)*[3] does not extensively cover the discipline as was pointed out by M. Heath (*An author is an animal with two ends*). Finally, in this respect the *Ancient World Online (AWOL)*[4] at the time of writing contains 901 entries.

All this said, there are some current and past examples that are worth mentioning. The BMCR[5] is an electronic journal of reviews and purports to be ''the second oldest online scholarly journal in the humanities".[6] It is an example of the pioneering role that Classics played in relation to the use of new media. Unlike the BMCR, other early examples of born-digital journals such as Arachnion (Italy) [7] or Histos (UK)[8] did not last longer than four issues, although their websites are preserved for the historical record. Other electronic

[2] http://www.rassegna.unibo.it.
[3] http://www.doaj.org.
[4] http://ancientworldonline.blogspot.com.
[5] http://bmcr.brynmawr.edu.
[6] http://bmcr.brynmawr.edu/about.html.
[7] http://www.cisi.unito.it/arachne/arachne.html.
[8] http://www.dur.ac.uk/Classics/histos.

only journals that are still active include *Leeds International Classical Studies*[9] (UK) and *Plato*, the journal of the International Plato Society.[10]

Methodology

As a preliminary step, an analytic sample of journals was selected for the survey. The *Année Philologique* (APh) is the international reference bibliographic index for Classics and Philology. The *Centro Italiano dell' Année Philologique (CIAPh)*[11] is the national editorial board which reviews 276 serial publications published in Italy on a yearly basis as its contribution to the completion of APh's issues. The number of serials reviewed by the CIAPh, however, also includes academic bulletins that cannot strictly be considered journals. The initial list from the CIAPh was then filtered by using a qualitative index, the European Research Index for Humanities *European Research Index for Humanities (ERIH)*,[12] in order to select only those titles that are considered most valuable by scholars themselves *ERIH* basically provides a catalogue of journals with a classification by categories (i.e. "A", "B" and "C") depending on the compliance of a journal with a set of qualitative standards established by an international expert panel. What was finally obtained is a significant analytic sample consisting of 55 journals published in Italy and included in the ERIH index.

The main areas of interest covered by the survey were:

1. the features of the electronic version of the journal (when available);

[9] http://www.leeds.ac.uk/classics/lics/index.html.
[10] http://gramata.univ-paris1.fr/Plato.
[11] http://www.aristarchus.unige.it/ciaph.
[12] http://www.esf.org/research-areas/humanities/erih-european-reference-index-for-the-humanities.html.

2. the journal's copyright policy;

3. the use of electronic tools to support the editorial workflow;

4. willingness and obstacles to innovation.

The questionnaire consisted of 31 questions in total: 3 were open questions covering the fourth area listed above, while the remaining questions were multiple-choice. The survey was administered electronically to the editors of the journals in the sample during the month of January 2008.[13] A noteworthy detail is that – at that time – just 26 journals out of 55 were present on the Web either with an electronic version or at least with an institutional or descriptive web page.

Results

In terms of participation, 18 out of the 55 invited journal editors participated in the survey and completed the questionnaire. The log analysis revealed that in 18 cases the invitation was just ignored (i.e. the invitation link was not followed), in 8 cases the participant opened it but never started the completion process, and in 11 cases the questionnaire was just partially completed.

A first result from the survey seems contradictory and in some way paradoxical. Of the journals that responded to the survey, only 3 of the 18 were available electronically, despite the fact that all 18 journals support electronic submission of paper manuscripts and use commercial software to produce the journal version to be printed. Nonetheless electronic versions of journal papers were offered only in a few cases. This fact shows that despite the production workflow

[13] For the creation of the electronic forms I used the open source software LimeSurvey, http://www.limesurvey.org.

was already partly digital the preferred (and often the only) medium for publication still remained print.

From the answers to the questionnaire section on copyright policy it was determined that 9 journals out of 18 allowed their authors to publish paper pre-prints on the Web, and in 7 cases out of 18 the publication of a paper post-print was allowed. With regard to the publishing workflow, it was discovered that a document containing author guidelines was accessible electronically in just 5 cases out of 18, even though in all cases such a document was stated to exist. Finally, the results confirmed that Microsoft Word was accepted by all of the journals as a valid format for submission of paper manuscripts. The most commonly used Greek font for manuscript submission was quite surprisingly SuperGreek (accepted by 14 out 18 journals) and not – as one would expect given the number of visualisation and interoperability issues it helps to solve – any Unicode-encoded font (accepted only in 4 cases).

Understanding the Field

The survey let emerge a number of issues that were classified into four groups. A first group concerns the tension between *tradition* and *innovation* in relation to both the publication format and the editorial tradition.

In those rare cases where the journal is also published electronically, the electronic version still imitates the printed one leading to what was called "digital incunabulum" (Crane et al.). This tendency is also reflected by the software in use and by the data formats adopted both for submitting to and publishing the journal. Provided that even the Microsoft Word format can be used to encode additional information about the semantics or the logical structure of a document (for example by providing a template document show-

ing a consistent use of formatting styles that can then be properly transformed into mark-up), this happened in just one case out of 18. On the other hand, the PDF format – which substantially replicates behaviours and paradigms of the printed page – was found to be the most frequently used format for electronic publishing. It is clear now, however, that the opportunities of shifting to a fully electronic publishing environment could allow publishers to maximise the benefits of a digital workflow by producing both a print and an electronic version of a journal.

Another insight that emerged from the analysis of the three open questions was that the limited adoption of digital technologies was perceived as a factor that discouraged further investment into the realisation of e-journals in this field. Participants to the survey identified the following main difficulties of going digital: the weight of the editorial tradition, the problem of converting old journal issues to an electronic format, and the difficulty of establishing e-journals as authoritative, particularly those journals that do not have a solid tradition in print publishing.

A second group of issues concerns the tension between *precision* and *rapidity* of publication. The promptness of the publication process is not as urgent a need for humanists as it is for those in other disciplines. Indeed, the longer shelf-life of publications in the Humanities has at least two consequences: far less need for rapidity and a much greater degree of concern about the long-term preservation of electronic resources published on the Web. Rapidity is therefore simply regarded as a consequence of electronic publishing and not as one of its most desirable benefits. Furthermore, when editors were asked: "Do you believe that the rapidity of publication allowed by digital technologies negatively affects the overall accuracy of publications?", 5 out of 18 participants answered affirmatively, reflecting a die-hard and systematic prejudice that exists

among many Classics scholars regarding the benefits coming from the use of new technologies.

Instead of rapidity with regard to electronic resources, two other properties were perceived as crucial: long-term persistency and citation precision (or the capability of creating precise links both to and within resources, also known as link granularity). An electronic resource that does not allow users to precisely refer to its contents is considered useless in this field (Heath). Indeed, the precision of bibliographic and canonical references is often regarded by classicists as an indicator of the overall quality and scientific value of a publication. This is probably the main reason why a paginated data format (PDF) is still largely used to the detriment of a more expressive but un-paginated one (HTML), since the former allows one to use page numbering as citation schema (Fitzpatrick). As a result, the aforementioned APh – the reference analytical bibliographic index for Classics – does not provide links to electronic versions of printed papers even when they are available, nor does its online version.[14]

Another tension is the one between *broad* and *long term access*. Electronic journals were still largely perceived by the respondents as "for experts only" resources. As long as they are not reviewed (or at least referred to) by the reference bibliographic indexes, it will be very difficult to promote the production and use of e-journals in this field, and consequently to increase scholars' awareness about them.

Along with the issue of broader access there is the related challenge of digital preservation, or how effectively to provide long-term access to electronic resources. A resource which is widely accessible but extremely unstable or unreliable is not very useful. Indeed, since information ageing in the Humanities, as noted above, is typically higher than in other disciplines, the need to guarantee the accessibility of electronic resources over decades has become urgent.

[14] http://www.annee-philologique.com/aph.

This issue of long-term access also highlights the need for citations to resources to be precise and stable over time as well. Given the current lack of guarantees for the long-term persistence of cited electronic resources, the current citation practice is still (and inevitably) predominantly paper-oriented(Dalbello et al.).

Currently the most suitable solution for journal publishers appears to be WebCite®,[15] a tool that acts upon user requests by caching the cited resource and providing the user with a handy link to cite it. The project is part of the International Internet Preservation Consortium and its mission specifically includes long-term persistence for links and resources (Eysenbach). It has been adopted mainly by publishers in the Medicine field including the authoritative BioMed Central.

Finally, there appeared to be some problems in conciliating *open access* publishing with a sustainable economic model of journal publishing. Several editors mentioned open issues with publishers as an obstacle to going digital. These issues were mostly related to copyright, such as existing policies that do not allow an electronic version to be published. Open access was perceived by editors as a highly valuable goal to be pursued but at the same time was one that seemed to be hardly sustainable from an economic point of view. This perception fully reflects the ongoing debate and research about Open Access in the Humanities (Cassella), an issue that cannot be fully addressed in this paper. From this debate it also emerges how on the one hand Humanities fields have a hidden natural tendency to Gold Open Access but on the other hand are still not very far on the road towards achieving it.

A commonly held belief that was also observed among Italian editors was that the electronic version of a journal would cause economic damage by decreasing the revenues that came from print

[15] http://www.webcitation.org.

serial subscriptions. Several case studies (Sachini et al.; Iacono et al.; Heath, Jubb, and Robey; Jöttkandt) have recently demonstrated, however, that moving to an e-journal publishing model reduces production costs by rationalising and automating certain procedures typical of the editorial process. Moreover, the shift to an electronic publishing model represents a chance for journal publishers to become not just content providers but also service providers ("Moving out of Oldenbourg's long shadow: what is the future for society publishing?"; "Society Publishing, the Internet and Open Access: Shifting Mission-Orientation from Content Holding to Certification and Navigation Services?"). Once journal contents are made openly accessible, subscriptions can be offered to institutions or individuals to access advanced value-added services, such as those suggested in this paper.

Services that Matter

This survey clearly illustrated that Classics e-journals are not yet widespread and thus their use and growth needs to be bootstrapped. Even though some interesting and advanced projects exist (Sachini et al.; Ober et al.), they are in the minority. Use and awareness of e-journals, open archives and open access in general is still not nearly as widespread in the Humanities as it is in the STM disciplines, this fact can be observed also by looking at the practice of citing electronic resources in these field (Dalbello et al.).

My starting assumption in facing this problem is that a great part of the overall value (and benefit) of e-journals comes from those provided services that are considered useful by the final users. Indeed, the main difference between print and electronic journals lies in the layer of services provided to the user. Furthermore, providing effective services could allow e-journals to move out of the digital

incunabula stage. Another reason to focus on service providing is – as noted above – to potentially foster a business model that truly makes open access economically sustainable.

I focused on the identification of new value-added services, and in particular on navigation services, starting from the identified specific needs and critical requirements of this field. I believe that citations play a role of primary importance in the Humanities and particularly in Classics, a point that has been previously made by others (McCarty; Crane). As a preliminary, there is a need to distinguish between two kinds of references used in this field to cite relevant resources: 1) bibliographic references to monographs, commentaries, journal papers etc. (i.e. secondary sources); and 2) canonical references, namely short references that usually follow a logical rather than a physical citation scheme and are used in order to cite passages of ancient texts (i.e. primary sources). Given this distinction, canonical references are of primary importance for classicists since they refer to the research object itself (i.e. ancient texts). Therefore I propose two services that leverage different aspects of citations: 1) citations as navigation tool both through and between resources; 2) citations as access point to information and as index to resources. In the following subsections the main characteristics and implications for the proposed services are discussed.

Reference Linking

Reference linking is essentially the capability in a digital environment to move directly from a citation to the resource to which it refers. Reference linking for secondary sources (i.e. modern bibliographic resources) is a feature already provided by several library catalogues, specialised search engines and e-journals. Once an interesting bibliographic reference has been found, a user can sometimes directly access it if it is referred to from an electronic resource, or

they can check for the availability of an electronic copy at their own institution's library in the case of a print resource. From a more technical perspective, the DOI technology, the CrossRef initiative and the OpenURL standard protocol have all contributed in the last few years to the solid technical foundation upon which it is now possible to build a range of reference linking services for secondary sources (de Sompel and Beit-Arie).

Reference linking to Classical primary sources (i.e. ancient texts), however, remains a desirable but not yet available service. Digital Humanities researches as a whole are an attempt to address specific scholarly users' needs with new digital tools. I believe that browsing the links between texts remains for classicists a crucial feature to be provided and as such this problem needs to be addressed by research in this field. When looking at the current state of digital libraries, it is clear how there is a paucity of links between ancient and modern resources. For instance, editions of ancient texts available through Perseus, Google Books and the Internet Archive are not yet linked in any way to pertinent research papers stored in the Internet Archive itself or within JSTOR.

For a classicist it would nevertheless be useful when reading a passage by Homer or Aeschylus to have at hand a list of references to resources that discussed topics concerning that passage. Or in turn, while reading a research paper or a commentary a scholar might want to read the full text of a cited passage from an ancient work.

Recently, some work has been done to address this lack of standards and tools in order to provide such a reference linking ability for primary sources. Both the solutions that were proposed up to now leverage a network protocol for the implementation, respectively OpenURL and the *Canonical Text Services (CTS)* protocol. The first solution is an OpenURL-based system to link canonical works

in the Humanities which was identified to enhance the search interface of the Année Philologique online. Instead, the second solution leverages a more discipline-specific protocol to achieve the same functionality.

Indeed, the *CTS* protocol[16] (Smith) can rightly be considered the counterpart of OpenURL for Classical primary sources. This protocol basically provides a digital equivalent to print canonical references by making text repositories accessible through logical citation schemes. Texts within a *CTS* repository are accessible, and thus citable, by logical hierarchical levels such as book, section paragraph or poetic line. Other recent work has also examined the technical requirements necessary to implement this feature of reference linking by leveraging the *CTS* protocol and techniques to embed citation metadata within (X)HTML documents (Romanello, *A Semantic Linking System for Canonical References to Electronic Corpora*), as well as presenting an e-journal prototype where this feature is implemented ("A semantic linking framework to provide critical value-added services for E-journals on classics").

Semantic Indexing

The second feature I propose, semantic indexing, can be considered as a practical consequence of the first one. Once references are encoded for the purpose of reference linking, it becomes straightforward to leverage the available pieces of semantic information found within citations in order to index the resources themselves. In order to allow operations such as crawling and harvesting of web resources it is necessary to envisage a solution that embeds meaningful metadata about citations within web resources. Indexing the references to Classical primary sources found within documents

[16] http://cts3.sourceforge.net.

provides users with an additional and significant access point to information. Indeed, while traditional search engines usually perform string matching searches over documents, a semantic indexing system understands the semantics of citations no matter what strings are used to express them. In other words, semantic indexing allows users to access Classics e-journal contents as if they were using citations to ancient authors and works as grouping keys. In other disciplines, such as chemistry or genome research, references to chemical elements and compounds are normally extracted, classified and then employed to enhance user access to contents through the addition of semantic awareness.

Implementing an Innovative Classics E-journal

In this section the problem of how to devise a scalable implementation of such a Classics e-journal is examined, with a particular focus on the new proposed services, that is reference linking and semantic indexing. The whole publishing process is taken into consideration, from the editorial workflow management to the presentation and access of research contents on the Web. Indeed those aspects represent the main issues that are likely to be faced by a traditional print journal on the path of transition to an electronic publishing model.

Choosing a Platform to Manage the Editorial Workflow

As of this writing, several open source solutions exist in terms of e-journal publishing platform.[17] *Open Journal Systems (OJS)* (Willinsky), however, is the best fit in terms of the previously listed needs and technical requirements for a Classics e-journal. Firstly, *OJS* provides a plug-in mechanism that allows developers to extend its functionalities. In our case, this architectural detail enable us to implement new value-added services tailored to specific user needs as components that could be plugged into *OJS*' architecture.

Secondly, *OJS* supports batch operations (configurable through XML files) to import old journal issues. As both the case studies and our survey demonstrated, the ability to easily convert print journal back-runs into a digital format constituted a preliminary step of essential importance for a journal migrating to an electronic platform.

Moreover, the survey illustrated that the most frequently used format for journal submissions in the field of Classics is Microsoft Word, a proprietary data format. While allowing for the fact that our data refers only to Italian journals, it can be considered as a reasonable indicator of tendencies in the whole field. This situation compels us to find a trade-off solution between the optimum (XML structured encoding) and the current practice (the use of Microsoft Word). Indeed, in order to provide users with advanced services it is necessary to have some kind of structured information available.

The *OJS* framework provides *Lemon8-XML (L8X)* [18] for this purpose, a tool that converts word processor file formats into XML mark-up compliant with the Journal Publishing Tag Set defined by

[17] http://www.openoasis.org/index.php?option=com_content&view=article&id=353&Itemid=379.

[18] http://www.lemon8.org.

the US National Library of Medicine. To reach this goal, *OJS* applies a set of heuristics to detect and mark up logical sections of journal papers, such as title, abstract, sections, and references among others.

Encoding References (Semi-)Automatically

Since metadata production is both a time consuming and expensive task, providing value-added services in a scalable way means finding automatic procedures that can help with its creation. The metadata to be extracted from journal articles are canonical and modern bibliographic references since they are needed to provide semantic indexing and reference linking to both primary and secondary sources.

L8X, which is part of the OJS framework, supports integration with multiple citation parsers such as Paracite,[19] Freecite[20] and ParsCit[21] that aim to detect bibliographic references within scholarly papers (Suhonos). The output obtained from running those parsers is then combined with search results from freely-available online indexes in order to support manual correction of automatically detected metadata through a graphical user interface.[22] Provided that the above tools are mostly used to parse references within articles from the STM field, it is noteworthy that ParsCit was recently provided with some initial Humanities training datasets. Indeed, ParsCit employs a machine-learning approach whose main feature is the possibility of training the parser on data from different disciplines. As far as concerns the automatic extraction of canonical references from scholarly articles, this feature is not currently supported by any journal publishing platform. Its technical feasibility, however,

[19] http://paracite.eprints.org.
[20] http://freecite.library.brown.edu.
[21] http://aye.comp.nus.edu.sg/parsCit.
[22] http://pkp.sfu.ca/l8x/Lemon8-Architecture.pdf.

was demonstrated by recent work (Romanello et al.) that is leading to the implementation of a *Canonical References Extractor (CRefEx)*[23] based on a machine-learning approach. Such an extraction engine can be eventually integrated as a plug-in into the *OJS* architecture.

Enriching Web Resources with metadata Embedding

Embedding metadata within Web pages has at least two major practical results, first, it makes metadata discoverable by both web crawlers and search engines, and, second, it can be reused by scripts or applications running on the client side. In the case of the two services that I am proposing, the metadata that need to be embedded are those related to the modern and canonical bibliographic references that are contained in a given article. Moreover, the main search engines such as Yahoo! and Google have recently started crawling semantic information embedded within web pages in the form of either Microformats and RDFa. Microformats (Allsopp) and RDFa (Velez) are currently the most suitable and widely adopted techniques used to embed metadata within Web resources.

Some recent work conducted within the Microformats community boosted general interest about semantic metadata embedding techniques, many of which are now regarded as a practical way to realise the Semantic Web. Low interest was expressed by the Microformats community, however, regarding the development of non-commercial Microformats. The main difference between the two technologies is that while RDFa applies to any set of RDF-encoded data, Microformats are defined and need to be approved by a developers community. Therefore, RDFa seems to be a standard more compliant with the decentralised nature of the Web itself (Graf).

CoinS[24] is a widely adopted convention used for publishing bib-

[23] https://github.com/mromanello/CRefEx.

[24] OpenURL ContextObject in SPAN, http://ocoins.info.

liographic references in HTML using the OpenURL protocol and is very similar to Microformats even though it was not formally approved by the Microformats community. Zotero[25] is one of the most important applications that leverages CoinS-encoded references and it allows users to import them into their libraries. As far as concerns metadata about canonical references, the use of Microformats has been suggested by initial studies (Romanello, *A Semantic Linking System for Canonical References to Electronic Corpora*; "A semantic linking framework to provide critical value-added services for E-journals on classics"). However, the best solution is believed now to be employing RDFa to embed semantic information specified by means of an ontology. The described metadata embedding mechanism can be added to OJS as an export filtering option to produce a (X)HTML+RDFa output, or by extending its HTML rendering mechanism.

Conclusions

In this paper I attempted to draw attention on services that were observed to be desirable for users of the Classics field, and more generally on the importance of devising value-added services that actually fit scholars' needs. The hope for the immediate future is that Classics e-journals will move out of the incunabular stage by providing the users with features tailored to their needs.

[25] http://www.zotero.org.

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