

# Publishing Croatian scientific journals: to e- or not to e-?

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Libellarium, VIII, 1 (2015): 93 – 100.

UDC: 004.91:[050:001](497.5)=111

DOI: <http://dx.doi.org/10.15291/libellarium.v8i1.217>

Professional paper

## Abstract

Electronic environment offers new possibilities for publishing research results in scientific journals – linking to other digital documents; connecting documents with their newer (or older) versions; publishing video/audio recordings, high resolution photos or 3D models; publishing in open access; controlling quality by open peer-review, etc. The results of research on Croatian scientific journals (from all scientific fields, all published in open access on Hrčak, the central portal of Croatian scientific journals) show that all journals, except one, publish articles as PDF files. Approximately one fourth of the journals use automated publishing systems. Majority of the journals publish active links to authors' e-mail addresses and some of them publish active links to online sources in the reference lists. Linking higher resolution photographs, tables or charts is not common practice in Croatian journals. In spite of the significant number of Croatian scientific electronic journals, their content is still static, not enriched by various possibilities offered by new technologies.

**KEYWORDS:** Croatia, electronic publishing, Hrčak portal, scientific journals.

## Introduction

Founders of first scientific journals 350 years ago were visionaries, enthusiasts and great intellectuals that recognized the right moment to introduce a new way of formal scientific communication. Journals and journal articles have become the most common way of disseminating research results in all scientific disciplines. The structure of journals and the editorial concepts have changed during the centuries, but the main functions of journals remained the same – registration of author's discoveries, certification of credibility, dissemination of research results and archiving of the records. The biggest change in the scientific journal publishing practice happened at the end of the 20<sup>th</sup> century.

In the late 1980s scientific journals faced a serious problem – the culmination of journal access crisis that evolved from raising subscription prices. Electronic

publishing seemed to be a possible solution – editing and publishing became easier and faster, there was an opportunity for scientific information to enhance its impact and, thus, enhance the science itself. New publishing and cost models emerged from the new media – open access, pay-per-view, crowd funding and bounded subscription being some of them. Also, electronic environment opened doors for new formats, new methods of controlling quality (both qualitative and quantitative) and new methods of technical support in the editorial process.

This paper will present some of the new possibilities that can be used for enhancing scientific journal publishing. In addition, the results of research on Croatian scientific journals will be presented to show if those journals use the advantages of electronic environment (and if so, which ones).

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## New possibilities for publishing in electronic environment

Since the first electronic journals were launched in the late 1980s, the layout of papers has stayed relatively unchanged if compared to printed journals. There are still many journals that are just electronic versions of the printed equivalents, and there are also many new, digitally born journals that imitate printed journals by publishing static content (mostly as PDFs).

Lately, more and more electronic journal editors and publishers have decided to use some of the new advantages of electronic publishing. One such example is the project *Article of the future* that focuses on redesigning article presentation (Zudilova-Seinstra et al. 2014). The most important design decisions of the project were optimal reading, content enrichments, additional content, clear navigation, clean design and customized view. For authors, benefits of those “new” articles will be extending the reach of research, giving more credibility and improving the impact. Such “articles of the future” should give readers the opportunity to interact, have a deeper insight, save time by getting more information in a new, user-friendly way.

In an effort to enrich the content of articles, some electronic journals publish video or audio recordings (e.g. Video Journal of Orthopaedics), 3D models (e.g. Journal of Archaeological Science), high resolution images (e.g. Photo Journal), links to other documents or newer versions of the same document (e.g. using CrossMark option), links to research data, altmetrics, etc.

The Semantic web (as an extension of the World Wide Web in which content can be expressed in a format that is readable and usable not only by humans, but also by machines) gives a new dimension to scientific journals, as well. New formats, such as XML, can become the basis for publication, allowing better interoperability (Brown and Boulderstone 2006, 271-273). A good example of interoperability is the Open Archives Initiative Protocol for Metadata harvesting (OAI-PMH). The protocol is designed as a means of transporting data, facilitating information exchange between data providers and service providers (Pinfield

2005, 125). OAI-PMH compliant software can ensure the interoperability of electronic archives (e.g. institutional repositories).

Another very important issue is the visibility and impact of research results. Electronically published scientific papers have enhanced visibility, accessibility and impact, especially if they are published in open access. There are numerous studies that show the open access citation advantage. Lawrence (2001, 521) proved that articles available online for free get, on average, 7 citations, while those published in a traditional way (i.e. in printed journals) get 2.7 citations. Harnad and Brody (2004) found out that open access articles get two to four times more citations than non-open access articles. Gentil-Beccot, Mele and Brooks (2009) showed how important ArXiv (the first e-print repository, launched in Los Alamos in 1991) is for enhancing the impact of articles in the field of physics. Kurtz et al. (2004) assert that open access is not the only reason for citation advantage – early advantage and quality bias are also very important for enhancing the visibility, access and impact of articles.

There are also new possibilities for controlling the quality. Although traditional peer-review process is still the most common method of quality control, other models have also been adopted. The interaction with readers is easy, through comments, blogs or social networking sites. Some electronic journals use an open peer-review process where the identity of the reviewers and/or full texts of the reviews are published along with the paper (e.g. open access journal F1000 Research). Readers can track manuscripts through the peer-review process, they can read reviews, as well as older and newer versions of the same articles, and they can leave their comments if they want. After-publication quantitative indicators can be based not only on traditional scientometrics but also on altmetrics. Altmetrics measures article impact based on interactions on the Social Web (Priem et al. 2010). Altmetric data can be shown in attractive ways, e.g. in so called altmetric donuts where the number of shares on social networking sites and blogs is displayed in a colourful circle, giving each service its colour (dark blue for Facebook, light blue for Twitter, yellow for blogs, etc.).

Electronic environment allows the use of various identifiers. This can solve problems with Web location changes and identification of authors or their institutions. International Standard Serial Number (ISSN) evolved in the print world but it is also used in an electronic environment; more and more journals use a Digital Object Identifier (DOI) for identifying articles and an International Standard Name Identifier (ISNI) or an ORCID to identify authors etc.

In the time-consuming publishing process, automated systems, such as Open Journal Systems (OJS), can be of a great help for editors and publishers. These systems enhance the editorial process by accelerating peer-review, facilitating copy editing and adding new value by gathering and publishing the statistics about article views, downloads, shares, etc.

There is also a possibility for deconstructing journals – publishers do not have to wait anymore for all articles of one issue to be prepared for publication. They can publish one article at a time, so that articles that had been accepted and edited first, can be published and thus accessed sooner. Another possibility (that may seem radical at the moment) is abandoning the concept of journals as brands – one paper could be in several virtual journals at the same time, users could create their own journals according to their interests (Rowland 2005). As Despot and Jakopec (2013) state, new information and communication technologies are developing very fast and it is impossible to predict future products and services. The use of smartphones and tablets for accessing and reading scientific articles will increase in the future, allowing new reading experiences.

In an electronic environment, scientific article content can be expanded, reader's experience can be enriched, and understanding can be enhanced – that is the basis for faster advancement of science. More and more possibilities will be available as a result of the development of new technologies. It is up to editors and publishers to decide which of the possibilities are useful for their journals, authors and readers. This research will show the current situation in Croatia, i.e. which advantages of electronic publishing Croatian publishers use to improve the visibility, impact, and clarity.

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## Aim, scope and methodology

The aim of the research is to find out if Croatian scientific journal publishers use some technological advantages when publishing electronically. The presumption is that the majority of electronic journals are still just the electronic versions of the printed editions. The results of this research could encourage publishers to use new formats, software and metrics.

At the end of November 2014, there were 374 journals on the Hrčak portal. From the list, only those journals that had been peer-reviewed and had at least one 2014 full-text issue were chosen for the sample. There were 136 journals in the sample. Web content analysis was used to answer the following questions:

1. Do the journals use automated publishing systems?
2. In which format are the articles published?
3. Do the articles have DOIs?
4. Are there links:
  - a. to the author's e-mail address;
  - b. to other documents;
  - c. to references within the documents;
  - d. to higher resolution images, tables, charts?
5. Have some of social networking sites been used?

## Results and discussion

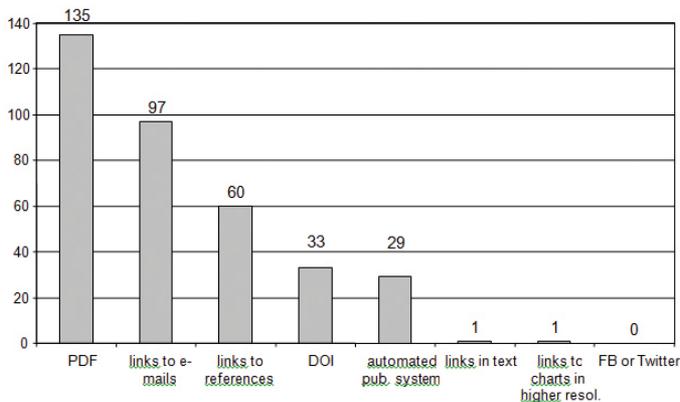
Out of 136 journals in the sample, 135 publish their articles as PDFs. Active links to e-mail addresses of at least one author are published in 97 journals (71%). Active links to sources in reference lists are published in 60 journals (44%), but in 23 of them the links are not formatted properly and cannot be opened (e.g. only the first line of the link is clickable, not the whole link). DOI is used by 33 journals (24%) and an automated publishing system by 29 journals (21%).

One journal publishes links to other sources, as well as links to “supplementary figures” in higher resolution, i.e. they are not visible in the published PDF file, so one needs to click on the link to open the figures in a new tab.

If we analyse some correlations, we can see that 16 journals (out of 29) that use the automated publishing system also use the DOIs. There are 29 journals (21%) in the sample that do not use any of the analysed advantages of electronic publishing (they do not publish active links, e-mails or high resolution images; they do not use automated publishing systems or the DOIs).

None of the journals from the sample have a Facebook or a Twitter page (although in November 2014 there were three Croatian journals that used Facebook, and one that used Twitter for its promotion, but they were not in the sample). An overview of the results is shown in Table 1.

Table 1. Number of Croatian scientific journals that use some of the new advantages of electronic publishing (N=136).



It is obvious that Croatian publishers intend to imitate printed journals by publishing their e-versions (PDFs). That is the simplest way to publish an e-journal. Some publishers use the possibility of publishing active links, but significant number of publishers does not pay enough attention to publish them correctly. Active links could be a help for readers, linking them directly to the sources. Inactive links do not have any purpose and they can confuse readers. Automated

publishing systems have many advantages and it is possible that the usage of the systems will increase among Croatian publishers.

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## Conclusion

Electronic publishing offers numerous benefits for scientific journals – new, user-friendly online formats that enrich the reading experience; use of new, non-static content such as 3D models or video recordings; linking (within the document or to other documents); publishing research data; using unique identifiers; use of automated publishing systems; new methods of validation (such as open peer-review and altmetrics), etc. Many journals still use static formats and a traditional, paper-based, layout. However, there are publishers that recognize these new advantages and try to use those that can improve the clarity, understanding and impact of their articles. Readers are changing as well and becoming more and more willing to accept new features.

Croatian scientific electronic journals still use PDFs with the same static content as the printed versions of journals. Nonetheless, the results of the research show slight trends of accepting some new practices such as publishing active links to e-mails and other documents, using automated publishing systems and Digital Object Identifiers.

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## Sažetak

### **Izdavanje hrvatskih znanstvenih časopisa: objavljivati u elektroničkom obliku ili ne?**

Elektronička sredina nudi brojne nove mogućnosti u području objavljivanja rezultata znanstvenih istraživanja. Osim što je objavljivanje brže i jednostavnije, moguće je objavljivati, primjerice, poveznice s drugim digitalnim dokumentima, video ili audio zapise, fotografije u visokim rezolucijama, trodimenzionalne modele, moguće je uvoditi nove načine kontrole kvalitete, omogućiti interakciju s čitateljima, automatizaciju izdavačkog procesa itd. Rad daje kratak pregled literature, kao i primjere stranih časopisa koji koriste neke od novih mogućnosti elektroničkog objavljivanja. Prikazuju se rezultati istraživanja hrvatskih znanstvenih časopisa. U uzorku je svih 136 recenziranih časopisa koji su do studenoga 2014. godine na Hrčku, portalu hrvatskih znanstvenih časopisa, imali dostupan najmanje jedan sveščić za tu godinu, s cjelovitim tekstovima radova. Cilj istraživanja bio je ustanoviti koje prednosti elektroničke sredine koriste hrvatski znanstveni časopisi. Na razini članaka prikupljeni su podaci o korištenju poveznica i formata, a na razina časopisa podaci o korištenju automatiziranih sustava za uređivanje, identifikatora i društvenih mreža. Analizom mrežnih

stranica časopisa ustanovljeno je da svi časopisi osim jednoga objavljuju članke u PDF formatu. PDF je statičan format i time se elektronički časopisi ne razlikuju bitno od tiskanih, već su samo njihove inačice. Približno dvije trećine časopisa objavljuje uz radove aktivne poveznice na elektroničke adrese barem jednog autora. Polovica časopisa objavljuju aktivne poveznice na reference u popisima literature. Ipak, ovdje treba spomenuti da dio časopisa to ne čini na ispravan način pa poveznice čitatelja ne dovode do dokumenta na koji se referira u tekstu. Oko jedne četvrtine časopisa koristi automatizirane sustave za uređivanje i objavljivanje što je bitno jer značajno olakšava posao urednicima, autorima i recenzentima te ubrzava proces prihvaćanja rukopisa i uređivanja članaka. Jedan časopis iz uzorka i u tekstu, a ne samo u referencama, objavljuje poveznice na mrežne stranice. Isti časopis objavljuje i poveznice na dokumente koji sadrže priloge (tablice ili slike) u većoj rezoluciji. U Hrvatskoj izlazi zadovoljavajući broj znanstvenih časopisa čiji su cjeloviti tekstovi besplatno dostupni, ali njihov sadržaj uglavnom je statičan i imitira tiskanu inačicu časopisa.

**KLJUČNE RIJEČI:** Hrvatska, elektroničko nakladništvo, portal Hrčak, znanstveni časopisi.