

# Outside the core: working towards an industry recommended practice for supplemental journal materials

Increasingly, authors are submitting additional content along with their papers for publication. These supplemental materials can range in type from supporting narratives to datasets, to visualizations and executable programs. There is no consensus about how best to handle these materials: whether they should be reviewed, edited and marked-up by publishers; how to cite them; or how to preserve them. In partnership with the National Federation of Advanced Information Services (NFAIS), the National Information Standards Organization (NISO) has launched a project to develop a consensus-based recommended practice on how best to incorporate supplemental journal materials into the publication stream.



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## Background

There has always been a variety of additional content that authors have submitted along with their articles to the journal publisher. Previously, these items were rarely used in the journal production process, distributed to subscribers, or preserved. In most cases, the simple cost of distribution limited a publisher's willingness or ability to include these 'extras' from a research project. This era of journal publishing ended rather abruptly over the space of the last few years when it became increasingly clear that electronic delivery of the journal also opened up opportunities to include more robust content and to make it available at very low marginal costs. This expansion of related content is putting tremendous pressure on the publications process, bringing up many issues regarding identification, linking, formats and presentation. The dearth of standards and best practices in this area is requiring every publisher to reinvent the wheel, as they experiment with different approaches. In response to this situation, the National Information Standards Organization (NISO) and the National Federation of Advanced Information Services (NFAIS) have partnered to produce one or more 'Recommended Practices' for how publishers, libraries and other information providers should address the issues surrounding supplemental materials to journal articles.

## Supplemental materials and resulting challenges

These 'supplemental materials' come in a variety of forms and formats. Originally this content included documentation of the traditional research processes, manuals, tables and color images. Today the range of forms has expanded to include videos, sound files, datasets, application executable files, visualizations and 'open notebooks' that apply the concept of open access to the traditional 'lab notebook'. As the tools to create digital multimedia, applications and data mash-ups have become nearly ubiquitous, more researchers are exploring the options and opportunities of using formats that better present their research and conclusions than a narrative description. And they are raising expectation that these new formats will be included in some way with the traditionally published content.

This poses the first real question when discussing this topic: What exactly are we talking about? Supplemental content can be anything included with the traditional published article. The form of the content besides the article can vary tremendously and continues to expand as new content forms are created and used by researchers. For example, full color images in medicine have always been a necessity, but have not always been a possibility in black-and-white printing. However, they now are almost always available online, for

example, lab analysis images (zymography results) for an article in *Nature*<sup>1</sup>. Audio content is similarly increasingly attached to article content, such as an audio digest that appeared with an *American Journal of Psychiatry* issue<sup>2</sup>. Similarly in a newer format, videos of fluid dynamics experiments are the best way to communicate results, as exemplified by an animation and video of an experiment from *JoVE*<sup>3</sup>. A dataset and the associated analysis tool may be the research results that need to be communicated, such as in the example description of a dataset included with an article from *Journal of Statistics Education*<sup>4</sup>. Open notebook technologies are supposed to provide readers with the information necessary to reproduce the science described, as shown, for example, in Koch Lab's open notebooks<sup>5</sup>. There are many other similar examples.

The challenges for publishers are not only the obvious issues of a greater quantity of material to publish and multi-media formats to deal with. Consider the practice of peer review. With an increasing number of authors contributing supplemental materials along with their papers, the editors, editorial boards and peer reviewers are feeling obligated to review this content along with the article. This has had the impact of doubling or tripling the amount of time required to undertake a thorough review. This increases the workload for the editorial staff, without significantly improving the breadth or quality of the journal.

Another question that every editor needs to consider is whether these supplemental materials *should* be included just because the new technology would allow it. Whether this information adds to the understanding and scope of scholarship is quite a different question to be considered. Is the editorial time and energy worth the investment required to bring supplemental materials in conformance with the editorial standards of the journal articles, to format them appropriately for presentation and access, and to store them along with the journal article? This may not be something an industry best practice can address. However, most publishers will need to begin serious consideration of the trade-off between the associated costs and the opportunities afforded to other scholars as well as the expectations of the authors. It is conceivable that such decisions will need to be made on a journal-by-journal or even an article-by-article basis.

In her recent editorial for *Cell*, 'Taming Supplemental Materials', Editor-in-Chief, Emilie

Marcus, described authors' concerns about being compelled to include data, either by their self-imposed expectations from peers or to address questions arising from the review process. She continued that reviewers are compelled – from concerns for comprehensiveness and possibilities of incorrect or falsified data – to review not only the paper, but the underlying data as well. She ends by stating: "As with the paper itself, which has over time evolved a reasonable agreed upon standard and structure, it seems time to begin to define a similarly accepted standard for supplemental materials".

This situation led Sasha Schwarzman, Information Systems Analyst at American Geophysical Union (AGU), to conduct an informal survey in the fall of 2009 and distribute a white paper that focused on the question of 'how to handle supporting material in a scientific journal'. Schwarzman's paper<sup>7</sup>, which was distributed to a variety of technical listservs, generated a tremendous amount of attention during the CrossRef members meeting in October. During that meeting a decision was taken by NISO and NFAIS to arrange a follow-up roundtable of relevant stakeholders to further discuss the need for an industry-recommended practice on supplemental materials and to develop the scope for such an effort.

### Towards a recommended practice

On 22 January 2010, the roundtable discussion was held under the sponsorship of NISO and NFAIS and with meeting space and logistical support generously provided by The American Psychological Association (APA). Linda Beebe of APA facilitated the discussions that covered a range of topics regarding supplemental materials including peer review, markup, presentation, discovery, linking and preservation of these materials, as well as the role of publishers in this process. The consensus of the group was that work needed to be undertaken to develop community recommended practices for definitions of and methods for handling supplemental materials. There was also a sense that prompt action was required before publishers independently adopted diverse and possibly contradictory practices that might make consensus for industry best practices more difficult, if not impossible. A full report of the meeting is freely available on the NISO website.<sup>8</sup>

The roundtable group identified some general recommendations for inclusion in potential recommended practices. They thought it would be best to avoid strict definitions of what should be considered 'supplemental' since that could vary from one discipline to another. A key point that the group focused on was how to cite supplemental materials. It could be that 'citability' serves as a test for determining the inclusion of the supplemental material. Citing of datasets may need to be treated differently than citing of other supplemental materials. While the use of DOIs was considered useful for linking, metadata collection and citation, the group suggested that whether DOIs are used for separate components should be considered carefully, since there are complications and costs involved with DOI assignment for component pieces. The costs of processing and managing supplementary materials needs to be taken into consideration when developing recommended practices, as well as the need to educate editors about those costs. Finally, there is an absolute need for a common vocabulary of relevant terms.

Beyond these general recommendations, additional work elements that the recommended practices working group will need to address were identified. Clear, consistent indicators are needed to signal that supplemental materials exist, and where to find them – for discoverability by both readers and systems. The metadata needs for supplemental materials also need to be defined. Such metadata could include:

- file descriptions and requirements (video, PDF, JPG, any plug-in required for viewing/use)
- descriptive content (what it is and why it is included)
- bibliographic information (to support DOI registration, cataloging and discovery).

Finally, archiving and preservation needs must be addressed. To ensure that the resulting recommendations are effectively implemented, clearly defined specific stakeholder responsibilities (editor, peer reviewers, libraries and aggregators) for delivering and managing supplemental materials must be established.

To achieve the goal of creating such a 'Recommended Practice', the NISO and NFAIS leadership are following the roundtable group's recommendation that three groups be established to undertake the work. These groups will be:

*Stakeholders Interest Group* – This group will comprise stakeholders who would be directly affected by the recommendations and want to be kept apprised of the work, but would not be involved in the actual development of the Recommended Practice. Members of this group would serve as a source of feedback on document drafts and would provide community vetting of a final document.

*Business Working Group* – This small group (no more than 12–15 people) will develop the recommendations related to the semantic aspects of the Recommended Practice, such as definitions and roles.

*Technical Working Group* – This second small group will develop the recommendations around issues such as syntax, linking, interoperability, markup and metadata.

NFAIS's Board approved in March the partnership with NISO on this development project. NISO's Content and Collection Management Topic Committee unanimously approved the joint project in April. A call for participation has been distributed and the three groups are being formed. Interested parties are encouraged to contact Karen Wetzel (kwetzel@niso.org), NISO's Standards Program Manager or visit the NISO website and sign up at [http://www.niso.org/apps/group\\_public/document.php?document\\_id=4005](http://www.niso.org/apps/group_public/document.php?document_id=4005).

### **Related initiatives**

This work is not taking place in a vacuum and the group will be expected to reach out to groups in the community working on related issues. There are several relevant initiatives, mainly based out of the EU, such as the DataCite project from the German National Library of Science and Technology, in partnership with the International Council for Scientific and Technical Information (ICSTI) and recently joined by the L'Institut de l'Information Scientifique et Technique du CNRS (INIST-CNRS), the British Library and others. The International Association of STM Publishers has launched the Opportunities for Data Exchange (ODE) project with funding from the EU government. There is also a CODATA Task Group on Data Citation Standards and Practices being undertaken in

partnership with CENDI. While citation is one issue in this proposal, the work proposed would go well beyond simply citation structures. The NISO/NFAIS working group will do outreach to additional organizations as other relevant projects are identified.

## Conclusion

The expansion of availability and inclusions of supplemental materials represent the first tentative steps toward the 'Article of the Future'<sup>9</sup> that has been highly promoted by Elsevier and discussed throughout the scholarly community in the past year. It would be fair to say that this 'new' article is little more than a web-style presentation with the inclusion of some additional content or multimedia formats that previously had been excluded for space or format concerns in the print version. However, if this additional content is handled effectively using today's networked technology, it has the potential of fundamentally changing the scholarly communications process. The 'reading experience' could be far richer than simply reading a narrative description. For now, a Recommended Practice for supplemental journal materials will facilitate and simplify the inclusion of these materials with journal literature and define the needed processes for authors, publishers, libraries and users. In the not-too-distant future, though, we may be seeing a world in some fields where non-textual materials could be a core piece of disseminated research and the textual narrative becomes a supplement.

## References

1. Lab analysis images (zymography results) for an article in Nature:  
[www.nature.com/labinvest/journal/v86/n9/fig\\_tab/3700454f9.html#figure-title](http://www.nature.com/labinvest/journal/v86/n9/fig_tab/3700454f9.html#figure-title) (accessed 26 May 2010).
2. Audio digest of an *American Journal of Psychiatry* issue:  
<http://ajp.psychiatryonline.org/cgi/content/full/167/4/A36/DC1> (accessed 26 May 2010).
3. Animation and video of an experiment from *JoVE*:  
<http://www.jove.com/index/details.stp?id=2012> (accessed 26 May 2010).
4. Description of a dataset included with an article from *Journal of Statistics Education*:  
<http://www.amstat.org/publications/jse/datasets/baseball.txt> (accessed 26 May 2010).
5. Koch Lab's *open notebooks*:  
[http://www.openwetware.org/wiki/Koch\\_Lab:Notebooks](http://www.openwetware.org/wiki/Koch_Lab:Notebooks) (accessed 26 May 2010).
6. Marcus, E, Editorial, *Cell*, 2 October 2009, 139 (1)11. Available at  
[http://www.cell.com/issue?pii=S0092-8674\(09\)X0020-6](http://www.cell.com/issue?pii=S0092-8674(09)X0020-6) (accessed 26 May 2010).
7. Schwarzman, A (Sasha), *Supporting Material*, American Geophysical Union: November 3, 2009. Available at  
<http://www.agu.org/dtd/Presentations/sup-mat/> (accessed 26 May 2010).
8. <http://www.niso.org/topics/tl/supplementary/> (accessed 26 May 2010).
9. 'Article of the Future':  
<http://beta.cell.com/>

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