How does the article of the future look like?

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Last year Elsevier started the Article 2.0 Contest and asked for the best ideas on how research articles should be presented on the web. The winners were announced March 31:

- Inigo Surguy from 67 Bricks won first prize. His application used enhanced content navigation and allowed adding semantic data to the article as well as commenting on specific parts of the article.
- Jacek Ambroziak from Ambrosoft won second prize for an application that uses server-side and client-side technology to read journal articles on the Android mobile platform.
- Stuart Chalk from the University of North Florida won third prize. The link to his application is broken, but his idea was that research articles are non-linear and he provided customized interfaces on how the article is presented.

This week Cell Press and Elsevier announced the Article of the Future project, again a project on how scientific articles should be presented online. It is not clear of how the material submitted in the Article 2.0 contest was used to create the Article of the Future prototypes. Some key features of the prototypes are:

- Tabbed browsing of article sections
- hierarchical presentation of text and figures
- graphical abstract and research highlights
- integrated audio and video
- real-time reference analyses

Two sample articles are provided by Cell Press (here and here). They are a good starting point to discuss what works and what doesn't. And I don't want to get into the discussion of whether naming this project Article of the Future is a little bit overambitious for the small changes that were proposed in the prototypes. Here are my thoughts on some of the features that might be useful in displaying research articles online (a lot of them have already been implemented by one journal or another):

Navigation

Navigation to a specific section (e.g. discussion) is an obvious feature that many journals have implemented. This navigation should also work as links from the outside, and should also allow direct linking to a figure or table.

Abstract

The traditional abstract can be extended for the online version of a manuscript. This could be an easier to read summary of the article or an audio or video abstract. Abstracts are important teasers to read the fulltext paper, and the current format might not be appropriate for everyone.

Integration of figures and tables

Most journals don't fully integrate figures and tables in their online papers, but rather put them on a separate page and link to them. This is similar to the PDF version of a paper, where figures often have to be placed away from the text section discussing them. The online version of a paper should allow viewing the figures and tables in parallel to reading the next, preferably by using a two column layout. Supplementary information should be integrated in a similar manner.

References

Going back and forth between the citation in the text and the reference at the end of the article is one of the annoyances of the traditional paper format. Online papers should make this easier, e.g. by displaying the full reference when hovering over the citation. A separate column for the references could also work, but three columns (text, figures, and references) might confuse the typical reader. The reference section should include links to the referenced paper, preferably using the DOI. Additional information about these references (e.g. links to PubMed, links to the full text, number of citations) could also be provided. A "return to text" is a nice touch at Biomed Central.

Related content

Other papers citing the article should be listed and linked to. Showing related articles would be helpful, but I have yet to see a working implementation of that feature (maybe with the help of services such as CiteULike or Mendeley?). A good starting point would be to include other articles by the same authors and articles that are cited by the paper. Links to blog posts and other online content (e.g. on Twitter or FriendFeed) talking about the article would be very helpful, but that is difficult to do. Linking to the places that bookmark the article (e.g. on CiteULike, Connotea, 2collab) is a good starting point to find other users with related interests. Therefore it is also helpful to make it easy to share the

article using these services (as they all use bookmarklets for that, this is more about providing good import filters).

Article Publication History

The publication history of the article (submission and acceptance dates, as well as reviewer comments, etc.) provides interesting addition information about a paper, and is for example provided by BioMed Central journals.

Comments and usage statistics

Comments should be possible not only at the end of the article, but also within specific sections (such as notes in PLoS journals). And comments should be implemented using an API, allowing viewing and adding comments from within other services. Usage statistics are another way to look at the popularity of a paper, and should soon be available for the PLoS journals.

Semantic markup

This is an area where I would expect the biggest changes to the current format – papers currently have little or no support for this and that is a shame. Here is an example of a semantically enhanced PLoS Neglected Tropical Diseases article. Another example is semantic markup used by Nature Chemistry, as discussed in this blog post by Egon Willighagen.

Kent Anderson over at the scholarly kitchen blog (The Article of the Future – Just Lipstick Again?) and Marshall Kirkpatrick at ReadWriteWeb (Elsevier's Prototype: Is This The Scientific Article of the Future?) also wrote about this. And this was discussed on FriendFeed and in the Good Paper Journal Club.