

The art of abstracts

Including pictorial summaries of each article on the table-of-contents pages of a journal makes it just that little bit easier to browse — rather than search — the scientific literature.

The concept of a graphical abstract — a visual summary of a scientific paper that appears on a journal's table of contents (TOC) — will probably be familiar to most of the readers of this Editorial. Such images are commonplace in both the print and online TOC pages of many chemistry journals. In other disciplines, however, the graphical abstract is a much rarer phenomenon.

Consider, for example, the *Nature* journals — only *Nature Chemical Biology* and *Nature Chemistry* feature graphical abstracts. The other journals typically adorn the print/PDF versions of their TOC pages with eye-catching images associated with just a few of the papers in any given issue, but these pictures are there more for reasons of page design than anything else — after all, they are nowhere to be found in the online TOCs. Similarly, looking further afield at high-profile journals such as *Science* and *PNAS* also reveals a lack of graphical abstracts. It seems that outside of chemistry-specific publications, online TOC pages consist of row-upon-row of text — titles, author lists, publication dates and links.

With scientific publishers constantly striving to make the most of web technologies in their effort to present scholarly articles in new and innovative ways to their readers, the graphical abstract might be about to go mainstream. The Editorial in the first issue of *Cell* in 2010 announced¹ their 'Article of the Future' concept, describing changes in how research articles would be presented online — and this included the introduction of graphical abstracts. Other journals are also getting in on the act and there have been some positive responses^{2,3} in the blogosphere.

Far from being driven by the rise of the internet and the opportunities it affords scholarly publishing, the use of graphical abstracts in chemistry journals pre-dates the widespread adoption of the World Wide Web — by quite a long time in some cases. Graphical abstracts appeared as a regular feature in a chemistry journal in 1976, in the German-language *Angewandte Chemie* and then from 1977 in the international edition of the same journal. 'To the best of my knowledge, *Angewandte Chemie* was the first to provide this feature,' comments Peter Göllitz, its Editor-in-Chief since 1982. He also notes that 'a changing cover picture started around that time'. Other leading chemistry journals retained their

more formal — and somewhat staid — unchanging covers for many years and took their time to catch up with these publishing innovations, in what was (and some would say still is) a conservative industry.

Tetrahedron Letters introduced graphical abstracts in 1986, back in the days when articles could be published in English, French or German, and a large part of the front cover of the journal was devoted to the text-only version of the TOC. It wasn't until 1994 that graphical abstracts graced the pages of *Chemical Communications*, and readers of the *Journal of the American Chemical Society (JACS)* had to wait until 2002 before being presented with them.

A graphical abstract should be eye-catching and relatively simple to interpret.

Perhaps it is no surprise that chemistry embraced the graphical abstract so ardently — and did so before many other fields — because it is such a visual subject. In particular, much of chemistry, especially the organic and inorganic sub-disciplines, relates to structure. Taking just one example, the total synthesis of a natural product can come alive through an illustration of the target compound and some of the key intermediates; compare that with a 15-word title and a 100-or-so-word abstract trying to describe the same thing. In fact, depending on the complexity of the natural product in question, it might take most of those 100 words to just adequately describe its structure. In some cases a picture really is worth 1,000 words.

One of the main aims of a graphical abstract is to distil the take-home message of an article into an image that is not too cluttered, somewhat eye-catching, and relatively simple to interpret — graphical abstracts should not be abstract art. Of course, it is possible to go over the top — unintentionally or otherwise — and some graphical abstracts can grab the readers' attention for all the wrong reasons^{4,5}. It could be argued that any graphical abstract that makes us sit up and take notice has served its purpose, but that's only really the case if it makes us want to read the paper it is advertising.

Rather than simply copying the prettiest figure from the paper, the best graphical abstracts are often those that have been specifically created for the job. Moreover, there are practical considerations that are also very important when designing an effective image. Text should be kept to a minimum, but if there is any it should be possible to read it without a magnifying glass. Similarly, don't make your chemical structures so small that any meaningful information is lost in a haze of bonds and atom labels, and for articles with a physical chemistry slant, a clear schematic can sometimes be more useful than a graph or other raw data.

A common cry from today's researcher is that there is too much literature (and too many journals) and it is difficult to wade through everything. And because literature discovery is mostly driven by targeted searches, how are we going to find the really interesting stuff out there that we don't know to look for⁶? It will undoubtedly be very difficult in the digital age to replicate the experience of flipping through paper journals, but graphical abstracts can enhance online browsing. A reader is not limited to scanning for keywords or particular author names, but is presented with small graphical vignettes to skim through. Furthermore, such images are especially useful when they are included in a journal's RSS feed — and can be aggregated into community resources⁷.

The graphical abstract is well and truly established in chemistry, but times continue to change and some journals now include animations⁸ and video⁹. These developments not only sever the ties to the printed product, but also serve a slightly different function — and browsing is somewhat slowed. Nevertheless, the graphical abstract is here to stay and it is now finding its way in other disciplines. □

References

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