

THE ROQUADE PROJECT : A GRADUAL REVOLUTION IN ACADEMIC PUBLISHING

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Abstract:

Due to a number of problems the traditional scientific journal has become an obstacle for efficient scientific communication. A number of initiatives has been started to realise other ways of scientific publishing, using modern information technology. In several disciplines, however, a relatively large number of scientists still are reluctant to make use of completely new ways of publishing.

The extraordinary aspect of the Roquade project is marked by the fact that it offers a variety of possibilities, which together constitute an expeditious way for gradually changing the publication behaviour of scientists. This project, initiated by the university libraries of the Dutch universities of Delft and Utrecht, aims at creating an infrastructure that conglomerates the swiftness of publication which hitherto could only be realised by grey publishing, with quality judgement without the serious delay of the traditional review procedures.

Roquade offers a wide number of facilities to a broad audience, based on a common organisational and technical infrastructure:

- A publication site, with a peer review process before as well as after publication,
- traditional electronic publishing, replacing the traditional publishing process: digital journals, dissertations and conference collections,
- co-publishing: digital publication services in co-operation with publishers,
- the publishing of grey literature.

The variety of possibilities offers authors and organisations an easy way to gradually increase their degree of innovation. They can start with a digital version of a traditional journal, gradually make more and more use of the technical possibilities (add data, sound, videos), gradually dropping the concept of an issue/volume, gradually change from peer review beforehand to peer review after publication.

1. Introduction.

There is an anecdote about an Irishman who, when a lost stranger asked him the way, answered: 'Well, if I were you I would not start from here.' A similar reply is possible in answer to the question in what direction academic publishing is heading. When discussing future developments we must realise that we are not in some Archimedean point in time from which we can view the future objectively. The point we are presently at has partly been determined by these very developments and our present position could even turn out to be a rather unfavourable one for an analysis of the future. Our realising the relativity of this circumstance would of course not be of any remedy, but it may help us in further attempts to shape our future.

We will illustrate this with the help of two analyses. First, we will look at the history and evolution of the scientific journal, in order to draw a conclusion about its present position and

value (chapter 2). Next, we will examine the so-called information chain and the influence of technological developments on this phenomenon (chapter 3). On the basis of these analyses we will argue the need for an innovative project such as Roquade (chapter 4). Chapter 5 describes the project in more detail. Chapter 6, finally, presents some general conclusions and remarks.

2. The evolution of the scientific journal.

In order to make clear the historic perspective of academic publishing we must go back more than 330 years. *Journal des Savants* is the name of the world's oldest scientific journal. It was first published in 1665. In the same year, a second journal was published: *Philosophical Transactions*. The content of both periodicals was not in Latin but in the vernacular language, a remarkable feature in that age.

Why were these scientific journals founded? A major fact was the steadily increasing number of researchers. Similarly important was the influence of Francis Bacon who had successfully advocated the cause of systematic and empirical scientific inquiry and who had emphasised the significance of exploring written sources. In order to expedite the process of building on each other's findings as well as to avoid duplication of efforts scientists keep abreast of the results achieved and collected by colleagues. Bacon aimed at gathering library, laboratory and fieldwork. Of course, there were books. But as a carrier of scientific information the book has always had a number of disadvantages. Its most significant drawback - an aspect that is related to its volume - is its tardiness, due to the precious time lost in its production. The book as such is also distinguished by a certain definiteness. Therefore it tends to be less suitable for discourses on detailed investigations, especially if the subject requires the facility of additions, comments and reply.

It was particularly these aspects that were of great importance to Bacon and his colleagues. Objections to the book as a means for propagating concise, relevant information were originally expressed by physicists, physicians and technicians. Increasing international contacts among scientists urgently called for a platform on which they could reveal and discuss the results of their research. Basically, they wanted to formalise their rather unstructured correspondence in a medium that was neither a book nor a letter. The scientific journal was the answer. Initially, the *Journal des Savants* was even a weekly magazine. The rapidly growing number of scientific periodicals indicated the need for them (1).

The need for communication among scholars has always been the very *raison d'être* of the scientific magazine. A board of editors was introduced to judge the quality of the contributions and the results they reveal. A hierarchy gradually emerged owing to differences in evaluations: some boards were more critical than others were because they decided to introduce stricter selection criteria. Some journals acquired a more solid reputation than others did.

Consequently, scientists started deriving their stature from the reputation of the journal to which they contributed and readers were aware of the difference in quality. The distinction in quality even led to the rise of a ranking system. Gradually the ranking system began to play a significant role in the evaluation of scientific results, a role that is now firmly established. Important tools in the evaluation of articles are the so-called quotation indexes. These indexes are based on the quotation frequency of articles and on the reputation of the magazines in which they are cited. Bibliometry, of which these indexes are a basic element, has even grown into a separate discipline. As a result, scientific journals tend to become a separate factor in the evaluation of academic research programs. Oddly enough, those who are in favour of the current scientific journal regard this factor as the main argument for its continuing existence.

But have we any reason to be content with the present state of the scientific periodical? We are all familiar with the adage 'publish or perish' and we have noticed the growth in the number of scientific papers effectuated by it. As a consequence of this growth, considerable problems and bottlenecks impede the existing system. (2)

1. The system is sluggish: it takes at least six months, sometimes up to a year and a half, before a submitted paper is actually published.
2. There is increasing doubt about the system's reliability, particularly since reviewers may take advantage of their prior knowledge.
3. The system is becoming unaffordable because of enormous price increases that often supersede the general price index. These price rises lead to the cancelling of subscriptions which in turn cause new increases, eventually evolving in almost monopoly-like situations.

Furthermore, we must be aware of the fact that, in addition to these price increases, universities have to pay for these publications more than once, because they fund:

- the salary of university staff members who write all these articles and papers;
- the salary of the reviewer who, at the request of the publisher, judges whether the articles are suitable for publication;
- the publication's purchase price;
- the archiving of the publications.

It can no longer be denied: the current scientific magazine hardly deserves the title of communication medium if one considers the amount of time that elapses between the submission and publication of an article.

Of course, the scientists themselves have acknowledged this. They are beginning to publish their pre-prints on the Internet. In fact, an article's eventual publication in a magazine has become more of a formality during which a quality certificate is assigned a posteriori. In response to this course of events a number of publishers have declared their intention to obstruct the electronic distribution of pre-prints simply by introducing new copyright rules. In other words, if you want to submit an article to a magazine you must first agree not to distribute an electronic pre-print version.

It is the world turned upside down: publishers of scientific journals who are inhibiting the exchange of information among scholars. The conclusion, therefore, must be that the present scientific journal is an obstacle for communication among scalars and, thus, denies its original *raison d'être*.

3. The information chain.

Another viewpoint, from which academic publishing can be analysed, is the viewpoint of the so-called information chain. An accepted definition of the information chain is as follows: 'An infrastructure consisting of a chain of groups which each fulfil one or more functions in the process of information supply by using the available means.' (3)

This chain is usually represented graphically. The traditional representation used to be comparatively simple. At the moment, though, its representations seem to become more and more complicated, since it is under the pressure of an ever expanding information stream and a range of technological developments. It looks as if the chain may explode.

This metaphor of an exploding chain or cycle is inappropriate, however. The chain is not bursting at all. What is exploding is the amount of information due to the way it is being

transferred. The functions in the traditional information chain, however, i.e. production, distribution, acquisition and knowledge consumption, can all be carried out at a so-called integrated work site. In this context the image of an imploding chain would be more suitable: the system is starting to contract due to the pressure of the environment.

Does this mean publishers could vanish? Or, to mention another significant party, that such a prospect awaits the libraries?

These questions are not relevant since the traditional division of information chain into clearly defined separate functions for publishers and libraries is no longer self-evident. In other words, the role the library and the publisher have is no longer definite. Instead, another question becomes relevant, i.e. how will these parties react to an imploding information chain? It is quite difficult to predict what new stable situation will emerge and subsequently consolidate itself as a result of current technological developments. It is simpler to analyse the situation of transition.

Let us look more closely at the publisher's role. The publisher's main function is the distribution of information. Traditionally he has been engaged in the specific activities of gathering, quality certification, registration and diffusion. On the path from producer to consumer of information the publisher's added value has chiefly been in certification and distribution.

Yet, what are these 'specialities' in a situation when information for the most part is being supplied electronically? Some publishers have suggested the libraries' feature functions, i.e. securing the collection's accessibility and the supplying of user support, could then come within their range. This is, of course, a possibility. On the other hand, why should other parties, like the libraries, refrain from taking on activities like quality certification and distribution of information?

In the past the distribution of information was not considered to be an obvious task for the library. It presumed a marketing-orientated view, a requirement libraries could only meet to limited extent, even with the greatest of efforts.

Moreover, it has always been thought of as an uncertain business, an aspect which subvention providers tend to dislike. The distribution of information in digital form, though, is regarded as a less hazardous operation from a financial point of view, because it makes use of the already existing infrastructure (network) of the academic community. As to quality certification, a specially appointed panel consisting of information producers and consumers usually takes care of this procedure. More closely observed, panel members turn out to be researchers employed by the universities. Eventually, the publishers appear only to be responsible for arranging the whole circuit, a job that could just as easily be taken over and carried out by the universities themselves. For the present we may therefore conclude that, in future, the publisher's added value may no longer be self-evident.

Thus, the configuration of functions within the information chain is subject to change, whilst all parties involved are struggling to find their position in it. For instance, all kinds of arrangements are being made between universities and publishers on how they could explore their new roles harmoniously. There is a considerable danger, however, that they will remain stuck in the traditional chain.

This risk becomes clearer as we try to describe the information chain's development by means of the so-called synergy model (4). This model, borrowed from chemical theories on dissipative structures, is often applied to organisations and systems.

According to the synergy model the control of processes within an organisation is stable, until the configuration is agitated by marked interior or exterior factors alien to the accepted pattern. Should the disturbances increase in number and extent, an unstable situation will arise

during which all sorts of events could occur that the ruling order does not allow for. This situation could be characterised as one of chaos. But sooner or later out of the chaos a new order will emerge, an order that can secure a new stability under altered circumstances. If, however, a new order fails to arise, the result will be regression: stagnating development and a more or less random disintegration of structure.

In view of the developments in the field of information provision, this would imply the necessity of innovative and creative experimenting with new roles instead of an adherence to traditional patterns. Any strong attempt to preserve the old structure will not only impede development as such, but will also expose it to increasing danger of arbitrary disintegration.

Our conclusion is that, in order to create a new stability in the process of information provision, a certain degree of chaos should be facilitated. Therefore, the parties in the information chain should take innovative initiatives that also involve the roles of other parties concerned. A good example of such an initiative is a university library's support for electronic publishing

Creating new structures is relatively simple as far as organisational and logistic aspects of the information chain are concerned. However, two obstacles can be observed:

1. The present system of quality judgement, which is based on established, traditional journals; authors derive their status from the journals in which they publish.
2. The reticence of many academics with new models of publishing and the use of information technology. The first point can probably only be solved over a number of years. Offering the authors a variety of possibilities, thus facilitating a gradual revolution, can solve the second point.

4. Bringing about a gradual revolution.

What trends can be observed presently for academic publishing and, especially, for scientific periodicals?

In the first place, there are journals available in an electronic as well as in a paper version. In a period of transition this may be useful because it allows publishers and researchers to acquire a certain degree of experience. In the long run, however, this will lead to a superfluous duplication of efforts.

Secondly, exclusively electronic magazines are emerging. They involve procedures similar to paper journals, but require a much shorter production time.

The next step, one that has already been taken in several places, is this. Universities and other 'learned societies' are installing document servers to make publications available on a global scale. Having started as pre-print distribution, some of these initiatives are evolving into electronic archives of complete scientific disciplines. (5) (6)

Eventually they could develop into the effective and efficient system described by Leo Waaiers (2). As soon as an article is completed it is made available on one of the servers mentioned, where it is stored carrying its publication date as a feature. It is accessible to everybody. And everybody can print it, refer to it or quote from it, while the copyright is the authors'.

The publications can be evaluated and commented upon, also revised versions can be issued. Every publisher can select any article he wishes and publish it in an electronic or paper journal. For readers who prefer a qualification this selection would be the equivalent of a

certificate. The most significant difference with the present situation would be swifter communication and a quality selection afterwards.

In the present situation an author who wants his article published, is confronted with a dilemma. If he wants speedy publication, he has to seek his destination in so-called grey literature. If, on the other hand, quality is more important, he needs to address a traditional publisher and thus accepts a lingering publication process.

In the model described above, this dilemma could be solved. But it appears that a lot of academics are conservative when it comes to publishing their results. This is understandable, because of the role traditional journals play in quality assessment procedures. But their attitude cannot be explained solely from this aspect. They are also reluctant to take part in innovative experiments that are in their eyes risky. There is more willingness to participate in projects more close to the traditional publishing process, such as an electronic variant of a traditional journal.

This fact is the basis for the Roquade project, started by the University Libraries of Utrecht and Delft in the Netherlands. The project aims at setting up an infrastructure for electronic publishing. Its mission is the enhancement of scientific communication by offering scholars an extended variety of facilities and organisational structures, aiming at gradually changing the publishing manner of scientists. The *raison d'être* of this mission is the fact that a relatively large number of scientists is still indecisive as to using new ways of publishing in order to make the issuing of their research results independent from the monopoly of commercial publishers. Thus Roquade presents the academic community with an infrastructure for electronic publishing, which facilitates a gradual revolution from traditional publishing to very innovative models. Close co-operation with similar organisations therefore constitutes a crucial factor in Roquade's mission.

Thus, the main points of departure are the author's interests. The project is directed towards all disciplines and concerns Dutch publications as well as international initiatives.

5. The Roquade project.

This chapter describes the project in more detail.

5.1 The main structure of the project.

To understand the main structure of the project it is necessary to realise that Roquade consists of:

1. A number of subsidiary projects with a variety of possibilities:
 - A moderated pre-print service for grey literature.
 - Electronic substitution for traditional publishing.
 - A publication site with peer review.
2. A subsidiary project aiming at a technical and organisational infrastructure which is common for all variants.

The first variant consists of a moderated pre-print service for grey literature. In this subsidiary project, grey literature is defined as publications which are elementary moderated but do not have a formal stamp of approval. In this case, dispatch prevails above time-consuming quality judgement.

The second variant can be described as electronic substitution for traditional publishing. Two categories of publications can be distinguished:

- Dissertations and conference collections.
- Scientific journals.

There are two subsidiary projects concerned with scientific journals:

- Publishing new and already existing electronic journals: this means providing support to editors who prefer the traditional form of electronic publishing, in which the electronic journal is an electronic 'copy' of the traditional paper journal.
- Co-publishing: setting up a series of digital publication services for publishers, for instance for electronic versions of already existing paper journals.

It appears that most of the editors, who are interested in setting up an electronic journal, want to start in a more or less traditional way, which involves mainly text and pictures. The concept of 'volumes/issues' which is typical for the paper journal, is maintained in the starting phase. As with the traditional paper journal, peer review takes place before publication. Gradually, all kinds of additions and alterations are possible:

- one can drop the concept of issues, presenting publications as soon as they are ready to be published;
- research data can be added;
- multimedia can be used as enrichment of the publication.

The third variant is a publication site with peer review. The main aspect of this variant is initiating a series of peer review processes, before as well as after publication, thereby using as much as possible experience and knowledge gathered in traditional and digital academic publishing processes. Subsequently, the traditional process of peer reviewing is to be transformed into several new types, thereby preserving the traditional advantages as much as possible. Simultaneously, the benefits of the new medium and organisation should be exploited to a far-reaching extent.

In this variant it is possible to combine rapidity and peer review by peer review after publication. Also there is the possibility to experiment with different forms of quality assessment.

Looking at these variants, the main feature of the Roquade project becomes clear: a gradual transition from less innovative solutions (for instance a publication site for grey literature or a traditional looking electronic journal) to more innovative solutions (such as a publication site with peer review after publication) is possible and, in some cases, even natural.

5.2 The phases of the project.

In the project the following phases can be distinguished.

1. The preparation phase.

This phase consists of analysis and user survey, assignment of project activities and preparing co-operation with similar initiatives and organisations.

2. The starting-up phase.

The main elements of the starting-up phase are:

- Setting up the infrastructure:
 - the organisation and the production process,
 - availability and presentation,

- archiving and storage,
 - security and authorisation.
 - Pilots for each variant:
 - moderated pre-print service for grey literature: facilitating the transition to variants with peer review,
 - starting new electronic journals (at least two),
 - co-publishing initiatives (at least two),
 - publication site with peer review for one or two selected disciplines.
 - Financing.
 - Evaluation.
3. **The development phase.**
 This phase aims at adaptation and further expansion of the organisation, on the basis of the experiences in the pilot projects. The result should be a viable organisation with a good reputation.
4. **Expansion phase**
 This phase consists of scale enlargement:
- regarding offered materials: initiatives for enlarging the number of offered journals, articles and grey literature, raising the number of disciplines, setting up new initiatives for collaboration;
 - regarding audience by means of focused PR activities.

At present (July 1999) the state of affairs is as follows. Preparations are started for setting up the infrastructure and several possibilities for financial support are being looked at. Two new electronic journals (International Journal of Integrated Care and Simulation Theory and Practice) are in the preparation phase, as well as four initiatives for co-publishing, which involve co-operation with a commercial publisher, a learned society and a university outside the Netherlands. With two disciplines the organisation of a publication site with peer review after publication is being started.

6. Conclusion

As indicated in the beginning of this paper, it is impossible to predict what the future for academic publishing will look like. Furthermore, it is rather shortsighted to declare a standard for what the future should look like. Therefore, one should not impose one preferred model onto scientific communication. The academic community should take initiatives that, in a flexible way, facilitate new structures in scientific information processes, which are favourable for the academic community itself. Roquade is such an initiative. The project will have benefits for the academic community, as well as for the libraries that take the initiative.

Its intended benefits for the academics (both authors and readers) are:

- **Rapidity.**
 Swift communication of research results is possible thanks to the system of peer reviewing after pre-print publication. This system is facilitated by sophisticated authentication tools, authorisation, time-stamping of publications as well the organisation of a dialogue between the author and the reviewer who is to secure the author's copyrights and privacy.
- **Quality.**
 Swiftness does not exclude quality in this system of peer reviewing after publication.

- Transparency of the reviewing and publishing process.
The author is familiar with the track his paper is going through. Consequently, he will also know the stage his paper is in, at any given moment.
- Positive attitude of scientists towards digital publishing.
Several initiatives have been started to realise different ways of scientific publishing making use of modern information technology. A relatively large number of scientists, however, are still hesitant towards using innovative publishing ways thus becoming dependent of the commercial publishing monopoly. The unusual aspect of the Roquade project is marked by the fact that it offers a broad variety of possibilities that can facilitate a gradual change in the publication manner of scientists.
- Technological innovations.
Innovative Web publication tools enhancing effective presentation of research results. Multimedia and networked information sources as well as communication possibilities among researchers are to be implemented. Naturally, the well-known benefits of the electronic medium will be also effectuated. These include storage, indexing, archiving, conservation, permanent access, and links to relevant information sources, browsing and retrieval by means of search engines. In view of the infrastructure and facilities' accessibility, flexibility and adaptability, Roquade is to make use of standard tools and protocols. For this purpose, high-quality and innovative off-the-shelf technologies will be employed (and evaluated during various phases of the project).
- Fair price.
Absence of profit targets, no charge of costs concerning the present infrastructure, just the specific production and facilities costs need to be calculated upon the completion of the project. This will result in low subscription rates (e.g. for journals and separate articles) as well as free access (e.g. to grey literature or dissertations).
- Usage statistics.
The authors will be provided with statistics regarding reading frequency. This information is protected in order to secure the author's privacy.

The intended benefits for the library are:

- Opportunities for applying gained experience of digital publishing and for exploiting the existing infrastructure in order to support the information and communication requirements of researchers.
- Better position in negotiations with publishers active in all fields in order to slow down the rising of subscription rates as well as improving financial benefits for the academic community in the long run.
- International co-operation.

Finally, the following aspects of Roquade should be highlighted, because they distinguish the project from other initiatives in this field.

- The fact that it offers a whole range of potentials that together constitutes an expeditious way for gradually changing the publication behaviour of scientists.
- The innovative peer review model: peer-reviewing system after the pre-print publication.

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