Scoping study for the JISC Scholarly Communications Group

Leah Halliday, 19 March 2001

1 Introduction

This is the report of a scoping study commissioned by the JISC to 'clarify what should be encompassed in the term "scholarly communication" for the purposes of the JISC Scholarly Communications Group (SCG). The JISC requested a paper that defines 'the meaning of scholarly communication by looking at various criteria and definitions of how to describe a scholarly publication'. Terms of reference for the study (Appendix 1) outline formats to be considered and characteristics that members of the SCG believe are key to the definition of a scholarly publication. The study consisted of desk research supplemented by the responses to a questionnaire (Appendix 2; hereafter referred to as the Questionnaire) of library and publisher representatives and of researchers of scholarly communication. The questionnaire was distributed to all (16) members of the SCG and to nine non-members. Eight of those responded; six members of the SCG and two non-members. These included three librarians, one publisher representative, two academic researchers, and two higher education administrators. Where appropriate, their responses are identified as L1, L2, L3, P1, R1, R2, A1 and A2 respectively.

2 Scholarly communication

The term 'scholarship' is defined, for the purposes of the UK research assessment exercise (RAE) as:

> the creation, development and maintenance of the intellectual infrastructure of subjects and disciplines, in forms such as dictionaries, scholarly editions, catalogues and contributions to major research databases (Higher Education Funding Councils 2001).

Thus, the end products of scholarship are publicly available information objects. The term 'intellectual infrastructure' also implies formality and permanence.

Scholarship is not an activity undertaken in isolation. Borgman explained that 'Scholarship is inherently a social process… research in all fields is incomplete until it is validated through review processes and shared with others'. Thus, scholarship necessarily involves communication. The term scholarly communication refers not to an output but to an iterative process in which scholarship is communicated, used and developed within a community (Kling and McKim 1999). Borgman defined and described scholarly communication as 'how scholars in any field … use and disseminate information through formal and informal channels' (Borgman 1990) but other writers commonly equate scholarly communication with a narrow segment of scholarly output, namely scholarly articles intended ultimately for publication in journals or similar formats (e.g. Alexander and Goodyear 2000, Bowen 1996, Buck *et al.* 1999, Graham 2000, Odlyzko 1999, Okerson 1998, Rohe 1998, Scarry 1999, Sosteric 1998). This is explicable in that it generally occurs within the context of a discussion of the 'crisis' in scholarly communication which refers to library costs associated largely with scholarly journals.

For the purposes of this paper, the term 'scholarship' is used in a wider sense so the end products of scholarship would include but would not be limited to journal articles that report original empirical research, review papers and opinion papers, monographs, multi-contributor editions, software and databases. It is not intended that this definition be restricted to specific media. The rate and way in which emerging media are used for scholarly communication will vary across scholarly communities. Whether a particular application is appropriate is best judged by those communities (see Covi 2000, Hurd 2000, Kling and McKim 2000, McCain 2000).

Graham divided the scholarly communication process into three stages: communication within informal networks, which now occurs largely using electronic media (see Gabbay 2000); the initial public dissemination of research through conferences and preprints; and finally, formal publication in 'prestigious journals' (Graham 2000). Although it limits the potential output of scholarly communication to publication in prestigious journals and this paper is concerned with a wider range of outputs, Graham's definition is useful for exploring the process of scholarly communication and considering the value of different types of information objects at different points on the continuum. The SCG requested that this document include a timeline indicating the sequence of communicative practices in scholarly communication. Graham provides the basis for this. While a generic model of scholarly communication would be useful, the variety of scholarly communication formats makes generalisation very difficult. Figure 1 is a graphic description of specific scholarly communication practices. Figure 1 is a timeline rather than a time cycle but there is no intention to suggest that the process be understood as linear. Feedback and review are integral to the scholarly communication process and all products of that process, i.e. publications, are also inputs at various stages. The matrix of relationships in scholarly communication is too complex to accommodate in a simple graphic such as Figure 1 but a more complex model is beyond the scope of this project.

3 Scholarly publishing

Scholarly publishing is a means of communicating scholarship within a community. In the context of electronic media, the term 'scholarly publication' commonly refers to all forms of online distribution of documents (Kling and McKim 1999, Borgman 2000). This reflects the conceptual blurring with regard to informal and formal modes of communication in an electronic environment referred to by Meadows in 1998. He defined informal modes of communication as 'often ephemeral and … made available to a restricted audience only' and formal modes as 'typically available over long periods of time to an extended audience'. He identified journals and books as 'archetypical examples of formal communications' (Meadows 1998). A contribution to an electronic discussion list with a substantial, international membership illustrates how electronic media blur this distinction. The message may be forwarded to numerous other forums and may be available in an archive of the discussion for a 'long period of time' yet few analysts would currently define it as a 'formal communication'. Nevertheless, a record of the informal discussion of an 'invisible college' may be deemed valuable to scholarship. The facility to capture that discussion raises the question of its status within the scholarly communication continuum and whether or not it is sufficiently valuable to warrant investment that ensures its preservation and long-term accessibility.

The distinction between formal and informal communication formats is more difficult when a document is designed as a permanent record of research. Examples include conference proceedings, preprints, theses, reports, journal articles, and monographs. All but the latter two are categorised as 'grey' in a print environment because they can be difficult for users to identify and to access. The electronic environment makes these more accessible thus moving them further along a scholarly publication continuum. Formats that are 'grey' in a print environment may, in an electronic environment, fulfil some of the functions of a scholarly publication more effectively than the archetypical formats to which Meadows referred. For example, it may be argued that an electronic preprint archive is a more effective vehicle for timely communication and for establishing chronological priority than a scholarly journal. Nevertheless, most preprints posted on www.arXiv.org, the biggest and best- established preprint archive are also submitted for publication in peer reviewed journals (Smith 2000) indicating that an electronic preprint does not fulfil all of the publication needs of the author. The fact that readers in subjects well served by preprint archives are reluctant to forgo access to journals suggests also that preprints do not fulfil all needs of the reader (Mahé *et al.* 2000, Smith 2000).

Electronic preprints exemplify the use of ICT to distribute a format that existed previously in print as a draft of a scholarly journal article. New technologies however, are facilitating the development of modes of communicating scholarship and recording that communication that have no print analogue and cannot readily be accommodated by existing scholarly publishing systems (Lynch 1999). Examples that already have a significant impact on scholarly communities are scientific databases such as GenBank and the Protein Information Resource (McCain 2000) and collaborative, evolving resources such as subject-specific web sites that combine access to primary source materials, analysis and commentary (Lynch 1999). More complex examples are collaboratories described by Lynch as

> Environments [that] variously combine videoconferencing, synchronous and asynchronous text-based messaging, shared control of scientific instrumentation, access to data (from observational sensors, simulations, or data archives), analysis and visualisation tools, shared whiteboards, literature databases, and authoring tools (Lynch 1999).

Lynch explained that

> These systems also document the research and knowledge creation process … it's important to note that events and activities that take place in these collaboratories can be stored, reviewed, replayed and annotated.

These are examples of new formats for recording scholarly communication that present problems of description and organisation, certification and validation, acquisition, and preservation. For example, Lynch stated that

> the materials involved are not only dynamic but also represent complex, interlinked and autonomously evolving works, which present major conceptual challenges to traditional descriptive practices (Lynch 1999).

Clearly, scholarly communication and scholarly publication in the 21st century cannot be understood exclusively with reference to or through analogy to print practices but all stakeholders require to distinguish between informal communication and formal communication or publication. This requires a flexible definition that can be applied to emerging formats.

The questionnaire distributed for this study asked respondents to select the necessary and sufficient criteria for a definition of scholarly publication. None of the suggested criteria were selected by all respondents. P1 refused to answer Question 1 and only R2 and L2 selected a single necessary criterion. These were that 'the relevant community is notified of [the document's] existence' (R2) and that 'it be refereed to ensure quality' (L2)[1]. Of the remaining five respondents, four or more considered it essential that the document be: durably recorded on some medium; reliably accessible and retrievable over time; and publicly available. Three or more considered it essential that there be a commitment not to withdraw it; and that the author intends that the work be made publicly available over the long term. Four or more of the remaining five respondents also considered it unnecessary that a scholarly publication: is immutable; can be accessed by readers at any reasonable time of day; is covered by at least one abstracting and indexing service; is equal to or longer than a minimum length; that metadata describing the work be publicly available; and long-term archival preservation be guaranteed. Three or more considered it unnecessary that the information object reports the result of original research; Thus, the characteristics that respondents to the Questionnaire consider most important relate to the accessibility of a publication (see conclusion).

4 Functions of a scholarly publication

Two recent journal articles are useful for exploring the definition of 'scholarly publication'. The first is a paper produced by an international working group (IWG) of publishers and representatives from the higher education community that convened in 1999 on behalf of the International Association of STM Publishers to 'develop a position paper on how to define a scientific paper in the electronic era' (IWG 2000). The second is an analytical approach to scholarly electronic publishing that explores that concept with reference to the three 'dimensions' of scholarly publication as a 'communicative practise within a community' (Kling and McKim 1999). Although these papers refer to scholarly articles or research papers, they are useful also for exploring the definition of scholarly publishing in a wider sense. For the purposes of this document, no assumption is made about the medium or format of scholarly publications.

The IWG definition of 'publication' was designed to 'assist the orderly development of scientific knowledge'. It acknowledged a continuum of scholarly communication formats in a networked environment and attempted to identify the most important 'fixed point's so that the status of

---

[1] Although the question asked about a 'scholarly publication', L2, in common with many writers on the subject, explicitly framed her/his answer with reference to scholarly journals.

> L2: I would be reluctant to say that anything really was essential because the journal format is a very flexible format. I think that's why it's survived for so long. Once you start saying one particular feature is essential, there's a danger that you restrict the publication.

information can be clarified. The IWG aimed to distinguish between informal communication and publication and outlined the following as criteria for qualification as the latter:

> It must be publicly available.
>
> The relevant community must be made aware of its existence.
>
> A system for long-term access and retrieval must be in place (e.g. Handle).
>
> It must not be changed (technical protection and/or certification are desirable).
>
> It must not be removed (unless legally unavoidable).
>
> It must be unambiguously identified (e.g. by a SICI or DOI).
>
> It must have a bibliographic record (metadata) containing certain minimal information.
>
> Archiving and long-term preservation must be provided for.

The IWG considered documents that fail to fulfil these criteria as 'not published' and thus not suitable for citation or as the basis of claims of priority or professional evaluation. It outlined in detail the criteria for identification as a 'first publication' and those for a 'definitive publication'. Essentially, the former becomes the latter when it has been evaluated and certified by the author's peers.

The IWG definition arises from what the group perceived to be the function of scientific publication.

> Publication is the hard currency of science. It is the primary yardstick for establishing priority of discovery, making the status of a publication a critical factor in resolving priority disputes or intellectual property claims. Academic tenure and promotion decisions are based in large part on publication in peer reviewed journals or scholarly books. To make these decisions fairly and with confidence, scientists and their institutions need assurances of what counts as a legitimate publication. The status of a published electronic document is critical in determining the trust that fellow scientists will have in it … scientists need to know the status of the information they encounter, whether they need to refer to it, critique it, or build on it to advance their own work. The document also needs to persist since in science identifying a clear context for later responses is essential to maintain the quality and integrity of subsequent scientific discourse.

This definition emphasises the certified record and its role in career advancement at least as much as the communicative function of a document. Whilst acknowledging the other functions, Kling and McKim explored the concept of scholarly publishing as ‘a communicative practice within a community’ i.e. ‘an activity engaged in by scholars who primarily want their reports to be widely read and credited by their target audience’(1999). Kling and McKim’s focus on community, authors and target audience emphasised use as much as production. They framed scholarly communication as a social process rather than a production process. They conceptualised ‘effective publication’ with reference to three ‘dimensions’ which serve both authors and reader: publicity, access and trustworthiness.

Trustworthiness is determined primarily by peer review but also by the reputation of the publisher, by the reader’s knowledge of the researcher (Kling and McKim 1999) and the reputation of the researcher’s institution, and in the case of journal publication, the reputation of the journal title is important. Sometimes the source of research funding is also an indication of trustworthiness. Research funded by, e.g. a pharmaceutical company is often less credible than publicly funded research (Borgman 2000). In non-reviewed or weakly reviewed outlets, the reputation of the author may be relatively more important (Kling and McKim 1999). For example, it has been suggested that people using eprint archives tend to read only papers by authors that they know by reputation (Lesk 1997)[2]. This list of characteristics indicates that trustworthiness arises from a combination of institutionalised practices and the reader’s personal knowledge. In the absence of the former, researchers must rely on the latter.
Publicity refers to the degree to which ‘primary and secondary audiences are made aware of [the information object’s] availability’. Access means that an information object ‘can be readily located and obtained by interested scholars’ in perpetuity. The minimum requirement for access is that it has a stable identifier (Kling and McKim 1999). Also ‘long-term, stable accessibility

[2] This suggestion is not uncontroversial. With reference to the suggestion that those using electronic preprints, the following comments were made by respondents.
R2: ‘It seems that those who may wish to denigrate the ability of academics to absorb new works are often unattributable. They should focus on the real needs of scholarly information which are to save time, reduce information overload and, in some cases, to assure the integrity of works. Services built on eprint archives could serve these needs very well.
L1: I think that they [preprint archives] provide a function at the start of the process in terms of intelligence but I don’t believe that … scholarly publication can survive without an element of peer review.
L2: I don’t think what you’ve highlighted is a problem with eprint archives per se. It’s a problem with the way that academics read material anyway.

requires active stewardship, and is more reliable to the extent that stewardship is institutionalised' (Task Force on Archiving of Digital Information 1996 cited in Kling and McKim 1999).

Using this analysis as a framework, it is clear that some forms of scholarly communication are more effectively published in an electronic environment than they were in print. For example, various forms of grey literature such as theses, dissertations and research and technical reports and preprints of journal articles are more accessible to potential readers in electronic form than in print. In a print environment, grey literature is difficult to identify and to access. While stable access to electronic versions over time depends on active, institutionalised stewardship, access in the short term is improved. The trustworthiness of these resources tends not to be improved by electronic availability however. While theses and some research reports are subject to rigorous peer review, preprints, by their nature, have yet to be reviewed; the delivery medium does not change this. The degree of publicity for these materials varies. Preprint archives such as arXiv.org (www.arXiv.org) provide services for alerting users of all new submissions on a weekly basis, databases of electronic theses and research reports, e.g. the Networked Digital Library of Theses and Dissertations (NDLTD) (NDLTD 2001, Fox 1999), tend not to provide current awareness services. Publicity may also be improved by intermediary services such as subject-based gateways that index the internet. Thus, while access to these 'grey' documents is improved in the electronic environment, none fulfils Kling and McKim's three criteria for 'effective publication'.

Kling and McKim's framework suggests that, in a print environment, to communicate research results most effectively to readers within a scholarly community, an author should publish in one of Meadows' archetypical formal communication formats. While other formats on the continuum fulfil one or two of Kling and McKim's 'dimensions', printed scholarly journal articles and monographs fulfil all three. In an electronic environment, this need not change as long as the subscription base includes a substantial proportion of the targeted audience and there is an institutional commitment to preserve and archive these formats over the long term (Kling and McKim 1999). Clearly, the electronic environment facilitates publication in a wider range of media. This is likely to result in greater variety of formal formats. This document cannot predict what these formats will be but Kling and McKim's framework is useful for determining the degree to which a new or adapted format is a scholarly publication or formal communication. The remit of the IWG was significantly different from that of Kling and McKim but its definition of a publication fulfils Kling and McKim's dimensions.

Together these documents explore the functions of scholarly publications and identify the mechanisms by which these functions are fulfilled. In a print environment, these functions tend to have been fulfilled best by documents that are published and distributed by established publishers. In an electronic environment, this need not necessarily be the case.

The framework facilitates analysis of the degree to which 'alternative' formats are 'scholarly publications' and thus is useful for identifying the means by which these formats may be supplemented to promote their status to that of 'scholarly publications', i.e. documents that meet all of the publication needs of scholarly communities.

5 A continuum of publishing formats

Most of the respondents to the Questionnaire agreed that the term 'grey literature' refers to documents that are difficult to identify and access. In recent years, a variety of formats that, in print, were 'grey' – e.g. theses, preprints, research reports, and conference proceedings – have been made more accessible by being posted on the internet, i.e. they have been made whiter. The characteristics of these formats and the degree and manner to which these conform to a definition of scholarly publication vary . What they still have in common is the fact that, regardless of their relative status on a continuum of scholarly publications, these formats are all frequently the basis of formal publications; journal articles and monographs. Thus initiatives that make grey literature more accessible duplicate the efforts of scholarly publishers to varying degrees. The two formats overlap on the continuum of scholarly publications.

Publication in a second format is useful only to the degree that this fulfils functions not fulfilled by first. For example, electronic preprint publication may be most effective for timely communication and for establishing chronological priority while publication in a peer reviewed journal is required for certification (Harnad 1999a, 1999b, Smith 2000) Where the extent and structure of a format is similar, e.g. as for preprints and journal articles, or for theses and monographs, it may be more efficient to supplement the functions of the service delivering the informal format so that it fulfils Kling and McKim's criteria for 'effective publication' than to duplicate publication formats.

A1, A2, and R2 (above) consider this possible with reference to eprint archives. A2's response implies that an eprint archive will necessarily be available to institutions that cannot currently afford to subscribe to related journals. This clearly depends on the economic model on which the development, maintenance and delivery of the eprint archive is based.

> A1: The absence of scholarly journals need not equate with the absence of peer reviewing processes. Similarly, the organisation of eprint archives could readily replace the function of journal titles in guiding academics to relevant bodies of work. Indeed, they may offer distinct advantages in assisting academic inquiry though the opportunity to develop more effective search tools.

> A2: A well-designed, authoritatively run, eprint archive with peer review and indexed by appropriate secondary sources could probably replace and expand the communication function of scholarly journals by widening the range of potential readers (third world, small institutions, researchers for whose institutions the journal would not be mainstream etc.).

While not all functions need to be the responsibility of a single agency, functions should not be disaggregated and distributed in a manner that results in unnecessary duplication of effort.
In instances where the format of an information object is significantly altered for subsequent publication, e.g. where the content of a thesis is the basis of a journal article, both documents may be useful as the thesis will be much longer and more detailed than the journal article.

The IWG considered it essential that a reader of one format be aware of the existence of another. Questionnaire respondents agreed that this is important but did not consider it essential. It can most effectively be achieved through creation, maintenance and dissemination of accurate and comprehensive metadata (IWG 2000). When versions are created and published by different bodies, e.g. universities and publishers, responsibility for maintaining accurate metadata about all versions is not clear. The IWG considered it an institutional responsibility rather than the responsibility of individual authors. Generally, respondents to the Questionnaire considered this the responsibility of the publisher but in the case of preprints, two of them (L1 and L2) said that the author should be responsible. R2 considers the responsibility to lie with 'The owner or maintainer of the origin or source page of any version of the data'. These responses imply distributed metadata about different versions rather than a single file detailing all versions. R1 recognised this and suggested that accurate and useful metadata will be rare in future and L3 suggested that this may be a role for the information professions.

> R1: This is where the publisher can really add value. The publisher could have as part of their value-adding process, the addition of consistent metadata. If publishers no longer are active or cannot invest in this sort of thing, it ought to be the author, but whether authors will do it reliably is a very moot point. I think we're going to have some pretty crude searching going on. I think good metadata

will exist for a minority of items. For the majority, you'll just have to do some pretty crude, free-text searching.

> L3: I cannot see authors producing standardised metadata, except in a closed community. This may be a task for 'library-type' staff or for indexers such as usually work for abstract and indexing services (though this would have cost implications).

6 Networked communication and publishing formats

One way in which authors of scholarly publications contextualise their work within a field is through citation. In an electronic environment, citations can be hyperlinked to the cited papers. The culmination of this linking facility was described recently as 'the holy grail for content providers and users alike …a seamless, integrated, transparent network that allows searchers to link quickly and painlessly to any document they seek' (Grogg and Tenopir 2000)[3]. In a seamlessly integrated hyperlinked environment, the visibility and thus value attached to specific titles is likely to be reduced. It has been suggested that the journal format is a consequence of the technology used, i.e. printing (Barry and Richardson 1997). This suggestion would be contested by publishers who consider the format to be functionally important, i.e. they consider a journal title to be a 'brand' that carries a number of messages about the subject and value of the content published therein (Bide 1997, Morris 1998). Question 3 in the Questionnaire proposed the following definition of a scholarly journal and invited respondents to comment.

> A scholarly journal functions to communicate, validate and certify, to establish priority, to contextualise research within a specific field through citation of earlier work, and as a formal record of research results. It also filters the best and most relevant content in a specific field.

To this definition, P1 added

> (a) branding – collecting together articles in a recognisable 'envelope' which conveys signals of both relevance and quality, and (b) quantity control – obvious in print but also important electronically. The journal (in most cases – not quite all!) selects a quantity of material which the reader can actually cope with.

---

[3] Added to the technical challenges associated with achieving this, e.g. link maintenance, are those associated with commercial access restrictions. Digital object identifiers and CrossRef aim to facilitate ecommerce in digital content but ecommerce may be incompatible with seamless integration (Hitchcock *et al.* 1998).

The value to authors and readers of specific titles as brands is contentious. It may be more important in some disciplines than others. One of the SPARC-supported journals has demonstrated that the principle value of any specific titles is related to the editor and editorial board rather than the brand *per se.* In 1998, the editor of a Kluwer title, *Evolutionary Ecology,* Michael Rosenzweig, left that journal due to 'indefensible price rises' and launched a competitor title *Evolutionary Ecology Research* with SPARC support. His editorial board joined him and 90% of authors whose papers awaited publication in the Kluwer journal withdrew them and submitted them instead to *Evolutionary Ecology Research* which broke even within the first year[4] (Rosenzweig 1999).

The suggestion that journal titles are useful for controlling quantity makes a virtue of the need to control page extents in print. A print journal receiving a volume of submissions that it cannot accommodate increases the rejection rate by revising editorial policy. Thus, high quality content that may otherwise be accepted is rejected. This is not necessarily a positive contribution to scholarly publication. While readers need effective tools for navigating and filtering published content, all high-quality research deserves effective publication. R2's response to question 3 in the Questionnaire is apposite here. S/he said:

> The primary function of a journal is to package and market a body of work. You can imbue it with the above characteristics to varying degrees depending on the nature of the journal you want to market.

The networked environment has the potential to change the structure and format of scholarly publication in many other ways. One of which is by facilitating development of documents through more dynamic interaction with reference to specific documents. Several respondents referred to such changes.

> R2: If done in a timely manner, i.e. as soon as possible after the research has been done, [the facility to append comments to a scholarly work] has very profound implications to improve the quality of dialogue and thus of research. It is important to note that it is this possibility of timeliness that's new, and by association the degree of informality in feedback. The environment to stimulate immediate feedback and debate on formal papers needs to be crafted very carefully. It is not enough to be electronic.

[4] A new journal generally takes around seven years to break even.

L1: This potentially makes publications more dynamic … the whole concept of a stable publication in the way that we've known it in a print environment could potentially be undermined … I think the number of different versions of a publication is the biggest implication here.

A1: Intention by the author to disseminate the work in a durable form is certainly highly desirable and should be regarded as best practice in scholarly communication. However, it would be unfortunate if this were to constrain more interactive or developmental forms of publication where work is published in order to attract comment and discussion with a view to a future definitive version. The two are not necessarily incompatible provided that the purpose of the publication is clearly articulated and that that purpose is retained along with the item itself.

Networked communication also facilitates collaboration and discussion on a much broader scale than was possible in a print environment This presents the potential for 'community' authored information objects whose status and function must be accommodated within scholarly communication systems.

6.1 From scholarly publications to 'services'

While many publishers insist that journals as brands are important, the largest commercial scholarly publishers appear to be undermining the individual journal title by bundling titles together and offering libraries a service rather than a collection of products. This is an attempt to add value as an alternative to reducing prices. The value of the additional content received in a large bundle is unclear and bundling may even support weak titles that otherwise are not viable. While financial benefits may accrue, e.g. if inter-library loan requests reduce because library users have access to a much wider range of content than previously, there is, as yet, no evidence to demonstrate this. Furthermore, libraries incur costs associated with these large collections of titles that have not been individually selected. Many libraries catalogue all titles or create individual links from library web sites (L. Halliday, unpublished research) so titles that have not been specifically selected add costs that may not be justified. Another problem with bundled deals is that the licences often prohibit cancellation. Libraries that accept this term undermine the potential of initiatives like SPARC and ELSS that aim to create low-cost alternatives to expensive journals. If cancellation is prohibited, the library cannot support these initiatives by replacing the expensive titles with the low-cost alternatives. They must continue to subscribe to the former (Frazier 2001).

Clearly, publisher-added value is worth paying for only if it valuable to the research community. R1 expressed this in her/his response to question 4:

I think publishers should be focusing on adding value and thus being able to justify a price that is acceptable. It is added value in terms of the perceptions of the readers. Unless they can do that the implications are that publishers may get squeezed out.

7 Publication context

The facility to link between documents presents opportunities for repackaging and repositioning content within a networked environment. An author may submit work for publication in a specific context but it may subsequently be linked in a context that s/he has not anticipated. R1 gave as an example, a medical researcher who finds that a tobacco company has links from its site to her paper. The author may object to this - it is an infringement of her moral rights – but she would have to know about the link to do so. Links may also disaggregate content in a manner that the author may not sanction, for example by providing access to a specific figure or table as a discrete information object. L2 suggested that this is an issue on which authors require training so that they may avoid the type of scenario described by R1 and so that they ensure that publishers do not repackage their work or sell discrete elements of it without specific permission. Authors should restrict the rights granted to publishers when they submit their work for publication. A1 also warned of problems in this regard.

A1: Loss of control. Fear of context of whole piece being lost through hyperlinked segmentation. Need for more careful design of publications.

8 Learning scholarly communication

Scholarly communication practices are learned within a community (Covi 2000, Kling and McKim 2000). This is important because communities of scholars have developed different ways of resolving issues of legitimacy and trust in traditional media. These concerns are protected when the media are computerised. Value-adding features may be appended but the basic legitimising features remain intact (Kling and McKim 2000). For example, the development of a thriving preprint culture in high-energy physics is related to a variety of characteristics of that community, characteristics that are absent in other disciplines such as chemistry (Till 2001). Thus, attempts to generalise communication practices across all disciplines in an electronic environment may be at best unhelpful and may waste resources spent on attempting to establish new practices in inappropriate disciplines. Respondents to the Questionnaire were divided on this issue. Half of them agreed that scholarly communication should not be treated as a homogeneous practice as behaviour varies between communities or disciplines. R2's response accords roughly with the view that all disciplines can benefit by adopting free, open access to preprints. A1, A2 and L3 also identified benefits of considering issues of 'scholarly communication' as a whole.

> A1: Provided variations are remembered, there may, indeed, be benefits in identifying and sharing good practice…Probably, the old 'just because you can do something doesn't mean that you should' applies here. Nevertheless, heterogeneity is sometimes used by academics (by no means exclusively) as a cloak for unwillingness or unfamiliarity. Remember the Luddites!

> A2: It must be possible and should be the goal to develop systems which have inbuilt flexibility to allow all disciplines to archive their material in a way suitable to their traditions and way of working, but compatible and interoperable with those f other disciplines – diversity within a common framework.

> L3: I think it is true to a degree that, at present, there is a tendency to see these as a single kind of product, even if some will be discipline-based and others will be institutionally-based. At the same time (a) there is some similarity across many disciplines and a worry about technological determinism should not hold back development, and (b) is the alternative worse? There may be a danger of the paralysis of analysis in this question. As someone said in another context: 'follow the light you have, and pray for more light'. I think we can move ahead in this way and at the same time look for other solutions in areas where this approach may not be appropriate.

The suitability of any format or practice to a particular community requires careful consideration.

The primary stakeholders in scholarly publication are authors and readers. To a significant degree, these are drawn from the same community. Neither group is routinely aware of the system-wide economic structure of scholarly publishing. Many researchers as authors support an economic structure that effectively deprives them, as readers, of access to all of the research papers that they need. Furthermore, as authors, they fuel publication of a volume of content that, as readers, they have difficulty managing (Meadows 1998). Authors represent the most significant source of demand for publications. Attempts to address the system-wide problem must include authors. Institutional commitment to fulfil the functions of 'effective' scholarly publishing is also required. Publication that may depend on goodwill and the voluntary contributions of individuals does not instil confidence in authors (see Gomes and Meadows 1998, Kling and McKim 1999).

The point at which scholars learn scholarly communication practices is the point at which alternative behaviours might best be inculcated. For example, when Virginia Tech imposed mandatory submission of theses and dissertations in electronic form, they used that opportunity to teach (post)graduate students about the scholarly communication system and to equip them with the skills to create scholarly documents in standardised, electronic form (Fox 1999). Initiatives directed at postgraduate students have the potential routinely to inform a new generation of scholars about the scholarly communication system, the assignment of copyright and related issues and to train them in the production and self publication of electronic scholarly documents as they learn scholarly communication practices.

9 Conclusion

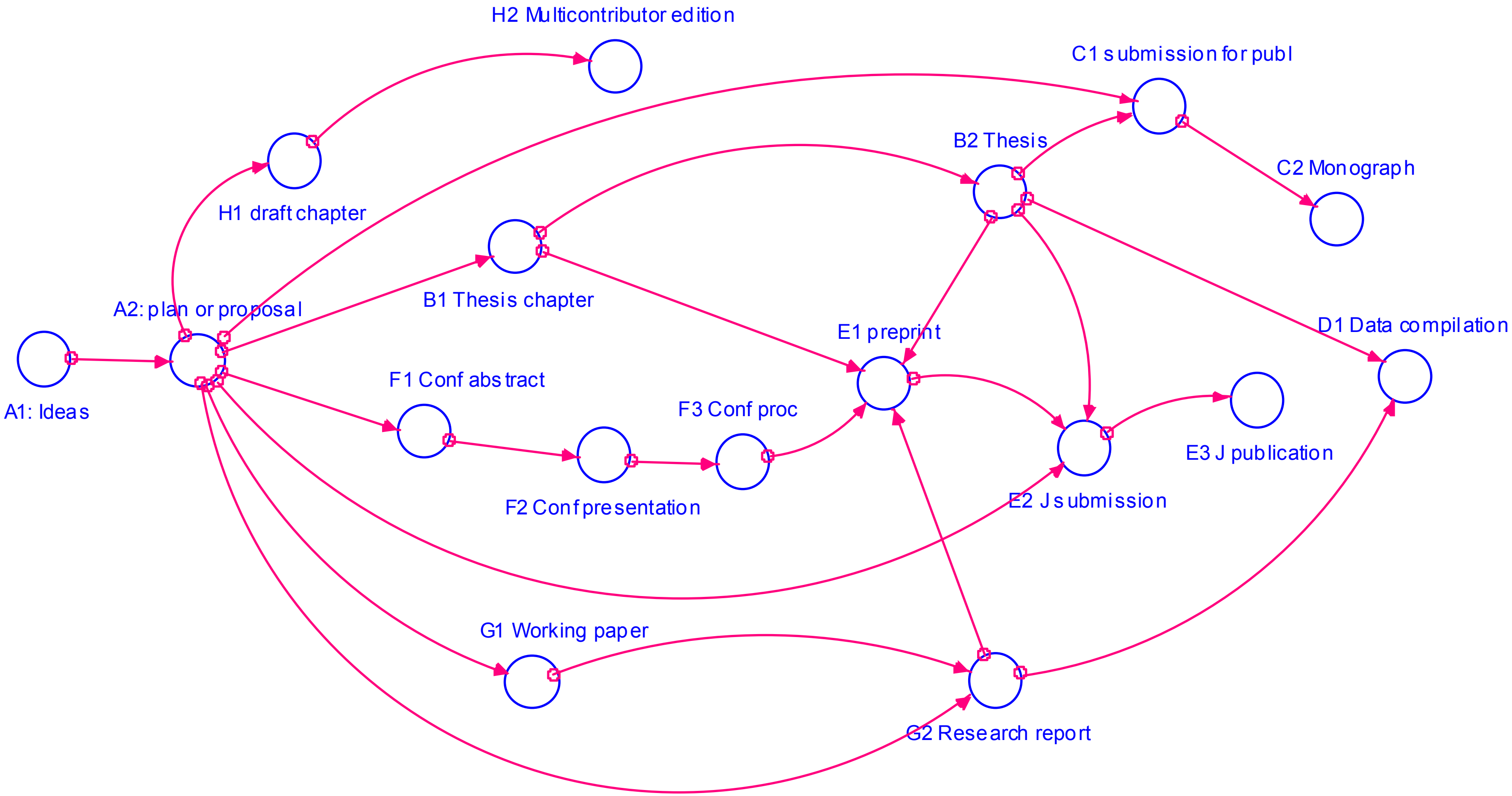
The remit of this study (as outlined in the terms of reference) was to provide a working definition of 'scholarly publication'[5]. The framework provided by Kling and McKim supplemented by the IWG definition and the criteria of respondents to the Questionnaire was used to generate the following definition which divides criteria into those that are: essential (E); Highly desirable (HD); and preferable (P). Thus, a scholarly publication requires:

- Trustworthiness
  - Publications should not be changed (<u>HD</u>).
  - Different versions should be clearly identified (<u>HD</u>).
  - To satisfy all potential interest, trustworthiness should be based on 'institutionalised' measures such as peer review rather than on personal knowledge (<u>HD</u>).
  - Each publication should have at least one identifiable author (<u>P</u>).
- Publicity
  - The potential audience must be made aware that the publication exists (<u>HD</u>).
  - The publication should have metadata containing a minimum set of information, preferably including information about all versions (<u>P</u>).
- Accessibility: the document must be readily obtained by those who wish to use it.
  - The author must intend that the publication be made publicly available in a durable form over the long term (<u>E</u>).

[5] When reviewing the draft, the SCG also requested that this document identify what is not a scholarly publication. As the definition is intended for application to any information object regardless of the medium in which it is delivered, identification of specific formats as 'scholarly publications' or 'not scholarly publications' would be inappropriate. Thus, an information object is not a scholarly publication if it does not fulfil the essential criteria outlined above for a definition of 'scholarly publication'.

- The publication must be durably recorded on some medium (E).
- The publication must be reliably accessible and retrievable over time (E)
- There should be a commitment not to withdraw the publication (E).
- The publication must be publicly available, i.e. available to any member of the public on demand as of right, whether for payment of a fee or not. (E).
- The publication should have stable identifiers (HD).

Figure 1


H2 Multicontributor edition
C1 submission for publ
B2 Thesis
C2 Monograph
H1 draft chapter
B1 Thesis chapter
A2: plan or proposal
E1 preprint
D1 Data compilation
A1: Ideas
F1 Conf abstract
F3 Conf proc
E3 J publication
F2 Conf presentation
E2 J submission
G1 Working paper
G2 Research report

The following characters are used to refer to the definition of ‘scholarly publication’ outlined below: *, trustworthiness; §, publicity; +, accessibility.

Figure 1: a timeline of scholarly communication formats.

None of the formats represented in Figure 1 is necessarily the work of an individual. They may result from collaboration. Any IO may be the output of dynamic, evolving interaction and thus, the stages may be more fluid than Figure 1 suggests. It is conceivable that the number of interactants involved in creating such a work increases from A1 outwards and thus, that the degree of ownership of any individual or group is increasingly difficult to identify*. However, to qualify as a ‘scholarly publication’ an IO must be captured in a durable, unchanging form*+. Thus, even if the IO continues to evolve, the ‘scholarly publication’ is a fixed ‘snapshot’ of that IO. The point at which an IO is captured in a durable, unchanging form often coincides with a degree certification*, e.g. B2 is complete when it has been successfully defended by the author(s) in a viva, C1 is usually significantly different from B2 and is subject to peer review, and the following are often or usually peer reviewed to some degree: E3, F3, G2, and contributions to H2.

A1–H1, A1–F1, A1–B2, A1–G1: between these stages of development, there is often informal communication between the author(s)/creator(s) and a limited number of colleagues selected by her/him/them, about the content of the information object (IO). Occasionally, an author(s)/creator(s) will widen this communication to all members of a relevant discussion forum. This communication may inform revision of the IO.

The size of the potential audience and number of commentators on H1, B1, F1, E1, or G1 varies depending on how the IO is distributed. Any one of these IOs may be restricted to colleagues selected by the author(s)/creator(s) or may be available to all comers on the internet via an individual or institutional web site+. The latter introduces the potential for uninvited certification or comment, e.g. any of these IO’s may be indexed by a (perhaps subject- or industry-specific) portal§. Anything that is distributed beyond the author’s selected colleagues is, to a degree, non-retractable as the author is less able to restrict copying and storage of copies+.

The audience for B2, F2, F3, and G2 is beyond the control of the author but it still may be difficult for an interested party to access these IOs+. B2 will not be withdrawn+ but publication may be limited to availability of a single copy in a single library+ and although it is likely to be indexed in some form, potential users may not be aware of its existence§. Access to a digital thesis is not necessarily geographically restricted+ and if the thesis is included in a library with institutional stewardship such as those involved in the Digital Library of Internet Theses and Dissertations (DLITD) project, associated metadata will exist online and thus the potential for interested users to find the work is increased§. F2 may be ephemeral in that the presentation is made to those present at a specific time and place or it may be broadcast as a multimedia IO and captured and made available for future use+. F3 may be available to all comers on the internet or availability may be limited to the number of copies printed and bound+ Publicity for F2 and F3 varies. If F2 is captured and is available on the internet, it may be indexed on the internet or interested parties may be alerted to its existence via relevant email discussion lists§. These possibilities also apply to F3 but, in addition, it may be indexed by a recognised abstracting and indexing (A&I) service§. G2 may be very difficult to identify and access if it is provided to and stored by a grant-funding body in print form. Availability on the internet increases accessibility+ and introduces the possibility that the report will be indexed by relevant portals§. The funding body may also make associated metadata available online thus increasing the potential for interested readers to find the report§.

B2–C1 is similar in some respects to the period before submission of a journal. The author(s)/creator(s) may circulate the work to colleagues for comments but it is understood, at this stage, that the work has not been published and should not be cited. At C1 and E2, a work is submitted for certification and feedback from selected peers. The work may be revised in response to peer review. Neither C1 or E2 is a publication. Both C2 and E3 fulfil all criteria for publication. Additional, emerging formats are likely to fulfil these formats in future.

D1 is a compilation of data associated with other IOs. For example, a thesis may be the basis of one or more journal articles and the associated data may be deposited in a relevant data compilation. Although the data are distinct from the article, acceptance of the latter for publication may, in some instances, be conditional on deposit of relevant data. Data are trustworthy to the same degree as peer-reviewed articles, with which they are associated as, it is expected that reviewers interrogate the data as part of the review process. Data from reports and theses are also trustworthy to the extent that the reviewed source documents are trustworthy. Not all data in a compilation are subject to peer-review however, so the trustworthiness of specific elements may be greater than that of the data compilation as a whole*. Immutability, however, is not a feature of data compilations. The compilation evolves and data are often updated. Thus, the accession number cited in a journal article may refer to data that have been replaced post publication*. Some data compilations are so significant to researchers in the relevant field(s) that all (post)graduate students are routinely made aware of their existence by colleagues and supervisors§. The compilations are often available free of charge on the internet and thus are accessible by a significant proportion of the potential audience – clearly, those without robust internet access cannot use such compilations+. Data compilations are often maintained institutionally and have associated metadata that are searchable on the internet§. Thus, some data compilations fulfil the criteria for publicity outlined below. The stability and durability of data compilations is unclear but institutional stewardship increases the likelihood that they will be available over the longer term+.

References: scoping study for the JISC Scholarly Communications Group

Alexander, A. and Goodyear, M. The development of BioOne: changing the role of research libraries in scholarly communication. *Journal of Electronic Publishing,* 2000, 5(3), www.press.umich.edu/jep/05-03/alexander.html (visited 23 February 2001).

Barry, T. and Richardson, J. Death of the Journal – will it be replaced by document delivery? Paper presented to the CAUSE in Australasia '97, Melbourne, April 1997, www.bond.edu/au/Library/ipr/cause/cause97.html (visited 14 February 2001).

Bide, M. The primary scientific journal. In: *From N to X: the Impact of Online Networks on the Publishing Value Chain,* 1997, VISTA Computer Services, Chapter 7, p. 46.

Borgman, C. L. (ed.) *Scholarly Communication and Bibliometrics,* 1990, Newbury Park, CA: Sage Publications, pp.13–14.

Borgman, C. L. Digital libraries and the continuum of scholarly communication, *Journal of Documentation,* 2000, 56(4), 412–430.

Bowen, W. G. JSTOR and the economics of scholarly communication. In: *The Economics of Information in the Networked Environment. Proceedings of the Conference Challenging the Marketplace Solutions to Problems in the Economics of Information* (eds, M. A. Butler and B. R. Kingma), Washington DC, 18–19 September 1995, Washington DC: ARL, 1996, pp. 23–34.

Buck, A. M., Flagan, R. C., and Coles, B. Scholars Forum: a New Model for Scholarly Communication, http://library.caltech.edu/publications/scholarsForum/ (visited 23 February 2001).

Covi, L. Debunking the myth of the Nintendo generation: how doctoral students introduce new electronic communication practices into university research, *Journal of the American Society for Information Science,* 2000, 51(14), 1284–1294.

Fox, E. A. Networked Library of Theses and Dissertations, *Nature Web Matters,* 1999, http://www.nature.com/nature/webmatters/library/library.html (visited 9 February 2001).

Frazier, K. The librarian's dilemma, *D-Lib Magazine,* March 2001, http://www.dlib.org/dlib/march01/frazier/03frazier.html (visited 19 March 2001).

Gabbay, S. Connecting minds: computer-mediated communication in scientific work, *Journal of the American Society for Information Science,* 2000, 51 (14), 1295–1305.

Gomes, S. and Meadows, J. Perceptions of electronic journals in British Universities, *Scholarly Publishing,* 1998, 29 (3), 174–181.

Graham, T. Scholarly communication, *Serials,* 2000, 13(1), 3–11.

Grogg, J. E. and Tenopir, C. Linking to full text in scholarly journals: here a link, there a link, everywhere a link. *Searcher,* 8 (10), www.infotoday.com/searcher/nov00/grogg&tenopir.htm (visited 14 February 2001).

Harnad, S. Online journals and financial firewalls, *Nature,* 1999a, 395, 127–128.

Harnad, S. Free at Last: The Future of Peer-Reviewed Journals. D-Lib Magazine 1999b 5(12) December 1999b http://www.dlib.org/dlib/december99/12harnad.html

Higher Education Funding Councils. *RAE 2001, Annex A: Definition of Research*, www.rae.ac.uk/PanGuide/guideann.htm (visited 22 February 2001).

Hitchcock, S., Carr, L., Hall, W., Harris, S., Probets, S., Evans, D. and Brailsford, D. Linking electronic journals: lessons from the Open Journals Project, *D-Lib Magazine,* December 1998, www.dlib.org/dlib/december98/12hitchcock.html (visited 10 February 2001).

Hurd, J. M. The transformation of scientific communication: a model for 2020. *Journal of the American Society for Information Science,* 2000, 51(14), 1279–1283.

International Working Group. Defining and certifying electronic publication in Science, *Learned Publishing,* 2000, 13(4), 251–257.

Kling, R. and McKim, G. Scholarly communication and the continuum of electronic publishing, *Journal of the American Society for Information Science,* 1999,50(10), 890–906.

Kling, R. and McKim, G. Not just a matter of time: field differences and the shaping of electronic media in supporting scientific communication, *Journal of the American Society for Information Science,* 2000, 51 (4), 1306–1320.

Lesk, M. *Practical Digital Libraries: Books, Bytes and Bucks*. Morgan Kauffman, 1997.

Lynch, C. On the threshold of discontinuity: the new genres of scholarly communication and the role of the research library, paper given at ACRL National Conference, Detroit, 9 April 1999, http://www.ala.org/acrl/clynch.html (visited 9 March 2001).

McCain, K. W. Sharing digitised research-related infomration on the world wide web, *Journal of the American Society for Information Science,* 2000, 51(14), 1321–1327.

McKnight, C. and Price, S. A survey of author attitudes and skills in relation to article publishing in paper and electronic journals, *Journal of Documentation,* 1999, 55 (5), 556–576.

Mahé, A., Andrys, C. and Chartron, G. How French research scientists are making use of electronic journals: a case study conducted at Pierre et Marie Curie University and Denis Diderot University, *Journal of Information Science,* 2000, 26 (5), 291–302.

Meadows, A. J. *Communicating Research,* 1998, San Diego: Academic Press, p. ix.

Morris, S. Learned journals the communication of research, *Learned Publishing,* 1998, 11 (4), 253–257. (Available from Catchword at http://www.catchword.com/alpsp/09531513/v11n4/contp1-1.htm).

National Digital Library of Theses and Dissertations, home page, http://www.ndltd.org/info/index.htm (visited 10 February 2001).

Okerson, A. (1998) Scholarly communication and the licensing of electronic publications. In: *The Impact of Electronic Publishing on the Academic Community* (ed. by I. Butterworth), pp. 110–117. London: Portland Press.

Rohe, T. A. How does electronic publishing affect the scholarly communication process, *Journal of Electronic Publishing,* 1998, 3(3), www.press.umich.edu/jep/03-03/rohe.html (visited 22 February 2001).

Rozenzweig, M. L. Reclaiming what we own: expanding competition in scholarly publishing. Plenary address to the ninth conference of the association of college and research libraries, Detroit, Michigan, 11 April 1999, www.arl.org/sparc/rosenzweig.html (visited 15 February 2001).

Smith, A. E. The journal as an overlay on preprint databases, *Learned Publishing* 2001, 14 (1), 43–48. (Available from Catchword at http://www.catchword.com/alpsp/09531513/v14n1/contp1-1.htm).

Sosteric, M. At the speed of thought: pursuing non-commercial alternatives to scholarly communication. *ARL: a Bimonthly Newsletter for Research Library Issues and Actions*, 1998, October, 17–19.

Task Force on Archiving of Digital Information. *Preserving Digital Information,* Commission on Preservation and Access and the Research Libraries Group, 1996, http://www.rlg.org/ArchTF/tfadi.index.htm (visited 15 February 2001).

Till, J. E. Predecessors of preprint servers, *Learned Publishing,* 2001, 14 (1), 7–14. . (Available from Catchword at http://www.catchword.com/alpsp/09531513/v14n1/contp1-1.htm).

Wittenberg, K. The electronic publishing initiative at Columbia (EPIC): a university based collaboration in digital scholarly communication, *Learned Publishing,* 2001, 14 (1), 29–32. . (Available from Catchword at http://www.catchword.com/alpsp/09531513/v14n1/contp1-1.htm).

Appendix 1: Terms of Reference

The JISC is seeking to commission a scoping study to clarify what should be encompassed in the term "scholarly communications" for the purposes of its Scholarly Communications Group. The remit of this group is to take forward relevant issues relating to electronic journals, e-prints,archiving, IPR, assessment and new publishing paradigms. The Group hopes to consider ways to support emerging behaviours, for example by ensuring greater accessibility to information and by making information available in different and new ways.

The discussion paper produced will define the meaning of scholarly communication, by looking at various criteria and definitions of how to describe a scholarly publication including:

- the existence of formal records
- availability in the public domain
- peer recognition
- intention of the scholar to publish
- costs/potential costs.

The study will consider the distinction between scholarly and publication and consider some of the issues. It is hoped that the study will map the key areas for the initial focus of the Scholarly Communications Group where the work of the Group could help to make an impact on the future process.

Appendix 2: Questions on scholarly communication and scholarly publication for selected stakeholders

Defining scholarly publication

1a. Which of the following are <u>NECESSARY</u> to define something as a scholarly publication? (Please indicate priority by numbering those that you include in your definition)

That it reports the result of original research

That it has at least one identifiable author.

That it be durably recorded on some medium.

That it be reliably accessible and retrievable over time.

That it is immutable.

That it is publicly available.

That it can be accessed by readers at any reasonable time on any day.

That it is certified as authentic and cannot be changed after publication.

That it has a persistent and unambiguous identifier.

That metadata describing the work are publicly available.

That it is covered by at least one abstracting and indexing service.

That there is a commitment to providing continuing access and retrievability.

That the relevant community is notified of its existence and availability.

That there is a commitment not to withdraw the document.

That the metadata refer to all versions of the document and identify the definitive version.

That it be refereed to ensure quality.

That the certified version cannot be altered.

V1

That long-term archival preservation is guaranteed.

That it be internally consistent and in a standard style and format (e.g. that references are standard and correct to facilitate hyperlinking).

That the audience is not necessarily known or identifiable to the author and/or publisher.

That the author intends that the work be made publicly available in a durable form over the long term.

That it is equal to or longer than a minimum length (if so, how long should it be?).

1b. Which of the following are <u>SUFFICIENT</u> to define something as a scholarly publication?

(Please indicate priority by numbering those that you include in your definition)

That it reports the result of original research

That it has at least one identifiable author.

That it be durably recorded on some medium.

That it be reliably accessible and retrievable over time.

That it is immutable.

That it is publicly available.

That it can be accessed by readers at any reasonable time on any day.

That it is certified as authentic and cannot be changed after publication.

That it has a persistent and unambiguous identifier.

That metadata describing the work are publicly available.

That it is covered by at least one abstracting and indexing service.

That there is a commitment to providing continuing access and retrievability.

That the relevant community is notified of its existence and availability.

That there is a commitment not to withdraw the document.

That the metadata refer to all versions of the document and identify the definitive version.

That it be refereed to ensure quality.

That the certified version cannot be altered.

That long-term archival preservation is guaranteed.

That it be internally consistent and in a standard style and format (e.g. that references are standard and correct to facilitate hyperlinking).

That the audience is not necessarily known or identifiable to the author and/or publisher.

That the author intends that the work be made publicly available in a durable form over the long term.

That it is equal to or longer than a minimum length (if so, how long should it be?).

1c. Please comment on the last two questions.

2. Is it possible to preserve and archive the web of hyperlinks in scholarly publications? What are the implications of this for your definition of scholarly publication?

Functions of a scholarly journal

3. A scholarly journal functions to communicate, validate and certify, to establish priority, to contextualise research within a specific field through citation of earlier work, and as a formal record of research results. It also filters the best and most relevant content in a specific field. Please comment on this description.

PEER REVIEW

4. A combination of initiatives such as eprint archives and NEAR (National Electronic Archive Repository) threaten to reduce the publisher role to that of co-ordinating peer

review. Given that price of journals is based on perceived value rather than cost, this may not reduce the price to the scholarly community. If the price that the scholarly community is prepared to pay for peer review is significantly lower than the price currently paid for a journal, co-ordination of peer review may not be commercially viable for publishers. What are the implications for scholarly publishing?

5. Peer review is based on quality rather than popularity at the time of publication. Papers often remain in the archive unused for years before they are discovered and contribute considerably to scholarship. Publication based on this selection process is incompatible with libraries' desire to purchase only those articles that their users need. Please comment.

A continuum of scholarly publishing formats

6. It has been suggested that in the absence of a filtering mechanisms such as peer review and a journal title, academics using eprint archives read only papers of authors that they know. Can eprint archives replace the communication function of scholarly journals in a research community?

7. Is it appropriate that peer reviewed journal articles cite preprints? Why?

8. Is it necessary, when accessing the certified, definitive version of a scholarly publication, to know that other versions exist and/or to know the form in which it was first made available to the public?

9. In a print environment grey literature is difficult to identify and difficult to access. In an electronic environment research reports, theses and preprints are freely available on

the internet and are often indexed by subject-specific portals or by libraries. How grey are these electronic publications?

10a. In an electronic environment readers may append comments and/or criticisms to scholarly works. What are the implications of this for scholarly publication?
10b. Are these comments and/or criticisms scholarly works, are they elements of the work to which they are appended or neither?

11. Is it possible/desirable to retract work that has been published?
If so, what type of publications should be retractable (e.g. pre-print, conference proceedings, peer-reviewed journal article).

12. What are the implications for scholarly communication of making work available free of charge to a global audience (and potentially to mass media) before it has been validated and certified (e.g. as preprints, conference proceedings)?

13. Browsing in a print environment facilitates serendipitous discovery which may facilitate creativity. Is this facility lost in an electronic environment and, if so, what are the implications for scholarly communication?

Metadata

14. Who should be responsible for ensuring that accurate and standardised metadata about a publication are publicly available and are altered e.g. when errata are published? (Please refer to different types of publication, e.g. preprints, conference proceedings, grey literature, journal articles).

Heterogeneous practices in scholarly communication

15. Scholarly communication practices are heterogeneous across disciplines, e.g. some disciplines have a well-developed pre-print culture while others do not, some disciplines rely more heavily than others on conference proceedings to communicate results. What are the implications for scholarly publishing? Is it useful to discuss scholarly communication and/or scholarly publication as if these are homogenous activities?

16. Initiatives that aim to encourage the development of eprint archives across all STM disciplines reflect technological determinism and fail to recognise heterogeneity across scholarly communities. Please comment.

Publishing context

17. In a hyperlinked environment, it is easy to repackage and reposition content by collecting bundles of links. What are the implications of this for authors?

18. The electronic environment facilitates analysis of use of individual documents so that most frequently used documents can be readily identified. It also facilitates collaborative filtering. What are the implications of this for scholarly communication?

19. Please comment further on any issue raised or on any issue not raised that you consider relevant.