

NSDL & Educational Publishers Workshop
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Columbia University

Workshop Report

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EXECUTIVE SUMMARY

On October 8th a workshop was held at Columbia University that brought together representatives from educational publishing firms and the NSF's National Science Digital Library (NSDL). This report summarizes the discussions at the workshop in terms of the *collaborative opportunities* for publishers and the NSDL that were considered in the workshop sessions, as well as the *risks* and *uncertainties* associated with investing in and realizing these possibilities. The final section also enumerates some *action items*, many of which were motivated by the opportunities and risks.

Most of the opportunities for partnership discussed in the plenaries and breakout sessions concerned ways to share content and services—and the tools, platforms and standards that underpin them—although business models and digital-rights management (DRM) issues were also on the agenda. The content-sharing options mainly considered how publisher's digital content could be distributed through the NSDL, but also outlined ways NSDL collections could be part of educational publishers' ebooks and collateral digital materials. Specific topics included: selective free contributions from publishers to NSDL collections; NSDL as a possible redistribution or reselling site for publishers' for-fee products; linking authorized NSDL resources into publishers' collateral materials and products; the role of NSDL as an information commons for publishers; and establishing a shared set of standards for new tools and services. Some of the opportunities appear risky, uncertain or costly to realize. On the other hand, several look quite feasible and well within the scope of a targeted testbed project or two.

For these to succeed, though, a number of challenges may need to be overcome, and risks mitigated. The conclusion at the workshop was that, at least in the near-term the biggest challenges were not technical ones related to DRM, or even the prospects of direct competition between educational publishers and the NSDL—although these will surely have to be the topic of focused conversations as the NSDL matures, and as specific partnering opportunities between publishers and the NSDL evolve. In contrast to these challenges that, somewhat surprisingly, generated little controversy at the workshop, the apparently simple question “What is the NSDL?” loomed large. Several perspectives on NSDL were outlined. Each of these was backed by a compelling vision, but the multiple perspectives also led to confusion in communicating the mission and directions of the NSDL. In part, this accounted for the frequency with which publisher representatives at the workshop asked questions such as “Who is the end user?”, “What is the NSDL's brand identity?”.

Although the question “What is the NSDL?” was not fully answered at the workshop, discussions did nevertheless underscore that NSDL and educational publishers have very different products, production processes, and management practices. Educational publishers primarily craft high production-value materials that are digital versions of traditional print works, such as books, monographs and journals. On the other hand, much of the NSDL's content comes from innovative electronic self-publishing sources—digital materials, for instance, developed teachers and faculty for their own purposes, then shared through the NSDL. Publishers and the NSDL also differ on several other business dimensions, including: how materials are created and acquired (NSDL generally

waits for teams to contribute collections, while publishers assess market needs and commission authors to write products that meet them); the comparative size of resources (NSDL materials are usually more granular; publishers' content is larger-scale "modules not objects"); production and acquisition costs (most NSDL materials are relatively low-cost, whereas publishers more often include more costly value-added services, such as review); and preservation, sustainability and management policies.

These differences can work to the benefit of both publishers and the NSDL. For example, granular "grass-roots" digital objects often found in NSDL collections, can be a good complement to educational publishers ebooks, and therefore might be incorporated into their digital collateral materials or context. On the other hand, the differences can sometimes be problematic, in particular, in the areas of quality-control, preservation, and branding. For instance, the NSDL's largely distributed management and governance model imposes only "broad filters"—minimal vetting and review policies—on collections. For this reason, in the near-term, the NSDL may not be able to establish a high-quality brand. This may be a problem for publishers who will want to align their high-quality proprietary content with similarly vetted open collections. On the other hand, it may be quite consistent with NSDL's core values, if they embrace an open commons, inclusivity, and the right of local communities to determine their own standards for review and acceptability.

The opportunities and risks enumerated at the workshop suggest a number action items. Some are already in process; others can be done with current resources; yet others will need additional support and will probably be done by representatives of the NSDL's Core Integration (CI) project, or groups other than the team that put together the workshop. The most urgent items are general *information gathering* and sharing tasks. The presumption is that any specific relationships between NSDL and publishers (or any other stakeholders) must be built upon a good general mutual understanding of what the other party is doing and what its mission, goals and business plans are. The workshop identified several of those informational needs and suggested ways of addressing them. The other action items are about *planning*; they lay the groundwork for possible specific joint projects, based on this information and the workshop discussions.

Was the workshop productive? To cut to the bottom line, Karen Hunter, from Elsevier, in her plenary talk, mentioned three alternatives for near-term NSDL-publisher relationships: wait and see, exploration, and aggressive involvement. We think the consensus was at least to engage in substantial exploration, which will mean "establishing a working group among scientific publishers (not-for-profit and commercial) to see if there is a fit and how it might work".

OVERVIEW

This report is a summary of the results of a one-day workshop, sponsored by the Sustainability Standing Committee, which brought together educational publishers and National Science Digital Library (NSDL) representatives at Columbia University on October 8, 2002.¹ The workshop began with plenary sessions in the morning (to provide an overview of the NSDL and publishers' digital activities), followed by breakout sessions in the afternoon (to discuss selected issues in depth). One basic premise of the workshop was that to fulfill its mission as a truly national science digital library, the NSDL must come to terms with publishers, and represent their resources, as well as free and open items. Furthermore, the NSDL community has much to learn from publishers, concerning effective and scalable business models for distributing content. But we also believe NSDL can offer important ideas to the traditional educational publishing community, regarding, for instance, innovative content models and relationships with new providers of small-scale digital products. These were among the main topics discussed at the workshop.

The report does not chronicle in detail the workshop plenary or breakout sessions that addressed these issues discussions.² Rather, it outlines the *collaborative opportunities* for publishers and the NSDL that were considered in the workshop sessions, as well as the *risks* and *uncertainties* associated with investing in and realizing these possibilities. The overall approach in this summary of possible opportunities is inclusive rather than selective—better, at this early juncture, we believe, to consider options for partnering with publishers that might be ultimately discounted than to miss one that ultimately is important. Furthermore, since the workshop discussions were freewheeling, the authors have taken some liberties to fill in a few blanks, and to add some points that seemed to be implied in conversations.

The main goal in all of this was not to present a definitive analysis of the opportunities, but rather to provide a foundation for continuing discussions and plans between the educational publisher community and the NSDL. For that reason, the final section also enumerates some *action items*, many of which were motivated by the opportunities and risks, and some of which are already underway. A more detailed discussion of action items can be found in a separate [NSDL/Educational Publishers](#)

¹ Thanks to all plenary speakers and breakout session facilitators for their help in putting on the workshop and reporting the results. Plenary speakers are noted by name on [documents page](#) of the publisher's website. Since the breakout session leaders are not, we thank them by name here for their support, and feedback on early drafts of the report: Rachael Bower, Katherine Hanson, Mike Luby, Brandon Muramatsu, Ron Vetter and Dick Ward.

² For many of these details, see the [NSDL/Educational Publishers website](#), which includes background information on the workshop (the overview, participants and topics), descriptions of the NSDL (lists of projects and links to papers published about the NSDL), workshop presentations and references, and products (including this report and a working document of NSDL/Educational Publishers action items). Various website mailing-list threads also address selected workshop topics, and the site lists all participants—also mentioned here in Appendix I).

[Working Document](#) that, unlike this workshop summary, will evolve over time as NSDL/Educational publishers plans and projects take shape.³

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CONTEXT: OPPORTUNITIES IN GENERAL

The workshop was originally planned to address three main related topics (see the [NSDL/Educational Publishers workshop agenda](#) for details):

- A. content- and service-sharing possibilities;
- B. alternative business-model options for NSDL, in light of publishers’ models, and their changes, as they’ve gone increasingly towards digital products and services; and
- C. digital-rights management (DRM), including interoperability and standards.

For several reasons, however, digital-rights management (topic C), was never discussed in detail. The plenary presentation on this subject (by David Millman) answered a number of questions publishers posed concerning how access to their materials would be controlled, if they were redistributed or resold through NSDL collections. Furthermore, a comprehensive discussion of these issues, in any case, probably should be preceded by an examination of the business benefits, both to publishers and the NSDL, of such redistribution. At that time, a focused meeting of technical representatives of publishers and NSDL, to work out exactly how DRM would be implemented, would probably be justified (see Action Items and Recommendations, below).

In addition, business alternatives (topic B) were only discussed at a high level at the workshop; there was no conversation about specific models. Again, this is probably sensible, because detailed discussions need to be preceded by a broader review of how the NSDL and publishers could work together on services and content—and by NSDL clarifying to publishers, and other stakeholders (and perhaps itself) what its business focuses will be, since good business plans require such a targeted vision.

For this reason, most of the opportunities for partnership discussed in the workshop plenaries and breakout sessions, and reviewed below, primarily concern ways to share content, services—and the tools, platforms and standards that underpin them (topic A)—rather than specific business models. However, many of these collaborative opportunities, do, in fact, imply a kind of business relationship, if not a specific model. This was the level of discussion in the business model breakout group, and for that

³ The results of the workshop also could (and probably should) be the basis for technical or policy papers on the prospects and problems associated with merging open NSDL content with publishers’ proprietary materials. However this report is not such a paper.

reason, the topics they discussed were actually very similar to those addressed in the content/services sharing breakout sessions; accordingly they will be reviewed together. Furthermore, the risks and uncertainties addressed by the two breakout sessions—most notably ones surrounding the very clearly perceived need to clarify “What is NSDL?”—were also similar. Therefore, these challenges, too, will be discussed together, rather than in separate breakout session reviews.

SPECIFIC OPPORTUNITIES

The opportunities outlined here are only broad categories of relationships, not specific partnering plans. Most of the opportunities discussed in the workshop plenary and breakout sessions addressed content sharing—primarily making publisher materials available in NSDL, or (less discussed) connecting NSDL materials to publisher sites and products. However, other opportunities also addressed how NSDL and publishers might collaborate on service development, and how to coordinate the technical standards used for content and services, to facilitate such sharing. It was clear in the discussions that some of the opportunities are much less likely to be feasible (and are more vague) than others, at least in the near-term, given the constraints, resources and priorities of publishers and the NSDL. Nevertheless, will we review a number of alternatives here, in keeping with the policy, noted above, of enumerating options rather liberally.

Selective contributions from publishers to NSDL collections

One of the most discussed models for partnering between publishers and the NSDL envisioned publishers contributing selected materials or collections to the NSDL, assuming these would be open, and freely available for browsing and downloading by end-users—just as most current NSDL collections now are. No specific publishers or collections were targeted, but it was clear that a number of representatives would consider in-depth discussions with the NSDL along these lines.

In some respects, this relationship is potentially the least risky and least costly opportunity because it would not require a full range of digital-rights management (DRM) and related control technologies to be fully operational in the NSDL. However, in both breakout sessions, publishers indicated there would still be important requirements, especially related to *branding* of materials. At a minimum, it would be important that the end-users know the materials came from a specific publisher, and could be used freely only for educational non-profit uses—that is, copyright and copyright conditions would need to be clearly associated with resource access.

These are similar to brand-preservation doubts that some current NSDL collections have voiced to the NSDL Core Integration (CI) team. Although most NSDL collections provide free access to their materials, if end-users gain access to such resources through the NSDL it is natural that the contributing collection would want some compensation for losing the attention of users who might have, in the past, accessed these materials directly—say, through the website of the collection itself. Open collections are often paid with “eyeballs” and reputation, rather than money, and they do not want to lose this value when the NSDL becomes a portal that provides access to their materials. The CI has anticipated this need, for example through the adoption of collection- and item-level

metadata schemas and policies that ensure end-users get clear information about the originating collection for a resource, and the copyright conditions the collection owners impose on it. The same solutions that work for the current NSDL collections should also apply successfully to publisher-contributed collections.

To further facilitate control, some publishers at the workshop also suggested a hybrid approach to sharing, in which a limited set of their materials was actually represented in NSDL collections, but at some point interested users were linked back to publishers sites and content. For example, initial searches and browsing, possibly even downloads, of publishers collections would be controlled through NSDL; however, at some juncture control of the interaction might be transferred to publishers' sites (see below on "Portals and linking relationships").

An issue related to brand, which also came up in discussion of other opportunities, concerned the granularity of the digital materials publishers might contribute to the NSDL. On the one hand, publishers typically specialize in relatively large scale digital resources, from ebooks to journal articles to modules; on the other hand, NSDL collections are typically smaller-scale digital objects (as one publisher put it, "digital objects, not digital modules"). The question of the right the grain-size of publishers' collections in the NSDL therefore arose in several discussions at the workshop.

There are many indications that demand is growing for granular digital materials, and that most publishers are beginning to manage many of their digital assets—if not yet sell them directly—as linkable small-scale resources. This may encourage the contribution of such materials to the NSDL. However, the costs of small-scale objects (and their cataloging and maintenance) may be relatively high, and this may represent a barrier to sharing them with the NSDL on a large scale. Therefore, ways of offsetting the costs of putting together collections for the NSDL are important, and came up for some discussion in several workshop sessions. Most importantly, these costs might be balanced by various marketing benefits to publishers of such contributions. This value would be significantly enhanced if publishers could obtain rich data on resource usage—who accessed their materials, how frequently, how they were used, and so on. Again, these issues have come up in discussions with existing NSDL collections, and the CI (and possibly individual NSDL projects, that, for instance, are designing personalized library services) are planning to supply tools that provide such information.

Aggregation portal and redistribution

Another opportunity discussed in workshop breakout sessions was that publishers could enter into a relationship with NSDL to resell digital materials, not unlike ones they have with other third party distributors, such as NewsStand and ebrary. Even more ambitious would be for NSDL to become an aggregator for a number of publishers' educational offerings—a kind of AutoByTel for digital libraries and education, as one participant put it. Like the previous opportunity, this would be a relationship where materials from publishers were represented through NSDL portals; the difference between this and selective contributions is that this option assumes payment for the publishers materials, whereas contributed resources would be free.

Several options for aggregation and redistribution seem possible, analogous to the sharing alternatives mentioned in connection with selective contributions. A number of different levels of granularity of resources might be provided, for instance. Furthermore, the NSDL could provide marketing services for educational publishers without becoming full-fledged distributors. For example, NSDL collections might not resell materials, but might provide sponsored links to recommended proprietary content, indexed, say by subject area—much as Google now does. Some users object to such sponsored links on free sites; however, NSDL's endorsement could be viewed as a sign that the links are to high-quality educationally-relevant materials, not merely connections to advertisers who are willing to spend a lot of money.

Each of these options has the same potential benefits and risks, such as cost for metadata creation, and brand preservation, that were discussed in connection with selective contributions, above. An additional concern is that effective digital-rights management and control now becomes issues, and publishers are looking at approaches here that are not necessarily the same as NSDL's (based primarily on Shibboleth).

A broader non-technical challenge, however, relates to the NSDL's comparative advantage in partnering with publishers for such services. Many publishers already have their own distribution channels (several, in the case of large firms); what differentiating value would NSDL add to this mix? It is possible that the NSDL could be a highly desirable distribution channel to some markets—if, for instance, the NSDL becomes a trusted source of digital resources and services to academics, faculty and educators. But that, in turn, may depend on NSDL having a reputation or brand that is associated with high-quality materials. Whether and how the NSDL can achieve such brand recognition was the subject of several workshop discussions (see below).

An associated potential drawback of NSDL as a distributor relates, paradoxically, to one of its strengths. Part of the NSDL's mission, as a national initiative, entails that it serve a very broad audience. Its geographical and cultural scope is countrywide, of course, and inclusive across a wide range of demographics (K to gray, among other things). However, most successful distributors work with very focused markets (e.g., ebrary offers services primarily to libraries). So the question naturally arises as to whether the NSDL will need to adopt a similarly focused strategy if it becomes a distributor of publishers' materials—and, if so, what that focus will be and how it will be determined. Such targeted focus is not necessarily inconsistent with the NSDL's inclusive values and broad charter. But it may mean, for example, that specific NSDL-authorized projects or collections—not the NSDL as a whole—will work with selected educational publishers to market and distribute publishers' products to their targeted audiences. This is one of several cases that arose at the workshop where the NSDL, as an organization, was potentially cast in the role of a middleman, providing brokering or management services, and representing the interests of specific projects or collections that would work directly with publishers.

Collateral materials for publisher contexts

Several publishers (notably Karen Hunter from Elsevier) observed that while their main products still tend to be articles and books (electronic or paper), these increasingly come with collateral digital materials ranging from large website communities, such as

BioMedNet, to smaller adjuncts for textbooks. In the case of the large sites, many have come, in a sense, to eclipse the online journals they embed. But even smaller collateral sites can be extensive and expensive to create and maintain. For example, one of the authors just reviewed the third edition of *Internet Literacy*, and, while the book itself is less than 400 static pages, the companion website includes many hundreds of web pages, plus links to a roughly equal number of external web-based resources that can change on a daily basis. These are clearly challenging to compile (who does the quality control?) and to manage (who checks to see if the resources change, or disappear?).

This suggests several related opportunities for the NSDL. Could NSDL be a trusted source of materials and links for such contextual or collateral material? More ambitiously, could NSDL actively participate with publishers in developing these value-added services and contexts? Furthermore, while such contexts are important (now viewed as essential, not optional), cost-controls and pricing models are admitted challenges for publishers—can NSDL help meet them?

In contrast to the opportunities noted above, this is one where contributions would flow from the NSDL to publishers, rather than the converse: instead of representing links to, and metadata for, publishers materials in the NSDL, here links to NSDL materials would be found in publishers products—or in jointly created sites based on NSDL collections.

A number of factors could make this an appealing opportunity. On the one hand, many NSDL collections specialize in the small-scale digital resources from which such collateral sites are often constructed. On the other, the NSDL, as an umbrella organization, might be able offer to publishers the assurance they would require—or at least greatly value—that these materials would be high-quality, well-documented and persistent. However, all this presupposes that the NSDL has institutionalized quality-control and preservation policies. But this is not currently the case.

NSDL links in publishers primary content

This is a variant of the previous opportunity, but in this case publishers would not restrict their connections to NSDL collections to the collateral or contextual materials they provide with digital journals and texts. Rather, they would also put links to NSDL content directly in the primary publications themselves. Obviously, for such a relationship to work, NSDL quality-control policies, which would be important even for collateral-content services to flourish, now become absolutely critical. Challenges to ensuring such standards, at a central NSDL-institution wide level, are discussed below. However, a related problem would also need to be addressed.

This opportunity illustrates a somewhat different model of interacting with NSDL collections than has been considered in the past: instead of viewing NSDL as a set of portals where users would come to access content of participating collections, here NSDL resource links would be embedded in external digital content, namely in publishers online journals and digital materials. There are a number of technical models for organizing such collaborative linking (e.g., see CrossRef and DOIs), and clearly publishers and the NSDL would need to agree on (or harmonize) standards, especially since both have invested considerable effort in this area.

Regardless of which technical approach is adopted, however, several broad challenges confront this opportunity. In particular, to participate in such a project the NSDL would need to assure the stability and persistence of its resources. This is an area where NSDL as an organization is just getting off the ground, and many of the smaller and newer collections have not yet thought deeply about longevity. Some of the more mature individual NSDL collections, however, have established digital maintenance and preservation policies. This again brings up the question of whether these NSDL collections should simply participate directly with publishers in such projects, and whether NSDL as an organization might have a central (middleman) role in coordinating all such partnerships.

“Flea market” for new publisher content

Would publishers value the ability to go through the many informal, often "grass-roots" NSDL collections—frequently contributed by instructors and academics—to look for resources they could turn into products? This, too, would be a model in which content is shared from NSDL collections into the publication process, rather than the converse. It was dubbed the “flea market” model (“garage sale” might also do), by one publisher who was apparently quite familiar with the idea. Admittedly, most such materials have limited value, and will end up being shared only by a small group of like-minded teachers and learners. But will there be enough diamonds in the rough, that publishers can polish into marketable products, to justify the search?

Most of the publishers thought not. One reason might be that the high “noise to signal” ratio of home-grown digital materials, as many NSDL collections are, might raise the costs of finding the diamonds to an unacceptably high level. NSDL review policies (see below) could improve this ratio and lessen costs, although perhaps only a little. However, cost was not seen as the main obstacle to this opportunity. Instead, the problem is that publishers’ production models are not consistent with the flea-market approach: it begins top-down, with a known market need, commissioning authors to write to that need—rather than starting with a bottom-up search for good (raw) resources, leading to finished products.

Nevertheless, there may be some interest, at least on the part of smaller digital publishers, in a relationship like this. First, some do operate, in part, using a flea-market model; for example, BigChalk offers access to thousands of juried web resources as part of its service packages. Furthermore, the movement towards more granular, modular, resources may mean there will be, in the future, a better market for the learning objects like the ones we now seen in NSDL collections. An example of such an opportunity came up in discussions with a small publisher after the workshop. Many of them, like large publishers, commission authors to write books and ebooks. However, unlike large publishers, smaller houses rarely have a large repository of digital assets on which their authors can draw, to create their publications and collateral materials. Could NSDL provide such a service to a federation of small digital publishers?

The problem of quality control is an important factor in weighing this opportunity, as it is in all those where the NSDL might provide content for publishers’ products. The lower the quality of NSDL collections and resources—or the higher the difficulty of finding first-rate content in the collections—the less attractive such partnering

opportunities will be. In discussion of this opportunity, it was noted that a flea market might seem more feasible if professional associations or societies provided third-party support in vetting—and possibly in creating and improving—the digital resources now in selected NSDL collections. Such partnerships might ensure quality control in the context of other opportunities, as well as this one.

Commons for new tools and services for publishers and the DL community

If the NSDL is an unlikely source for new content, migrating from small, often informal collections created by faculty to publishers' production cycles, what about using it as a platform or testbed to experiment with and develop new value-added library services and tools? This, in part, is what the NSDL (or more precisely, the CI) now offers to NSDL projects, on a modest scale. Such an opportunity has less to do with specific tools than with the ability of the NSDL to offer a *commons*—an open standards-based development platform and toolset for learning resources—that supports a networked environment for rapid prototyping of new digital resource and library services.

NSDL may be appealing as a testbed environment not only because it will provide an infrastructure that enables new digital library ideas and services prototyped and shared relatively rapidly and efficiently. It can also offer information about important markets to educational publishers. Assuming prototype products that are beta-tested in the commons, for example, are used by a significant population of K12 or post-secondary educators, publishers may obtain valuable data on their service preferences—just as they now glean information on a number of professional populations through the various online communities they support, such as MDConsult, BioMedNet and ChemWeb.

One concern, however, is cost. Developing new services and tools, even prototypes, is not cheap: who would pay for this? Beyond the cost of supporting the incubator development process, of course, there would be considerable costs to actually turn prototypes into products and bring them to market; but, at least for now, presumably that is not in NSDL's scope. A related point is that many big publishers have more money to invest in the creation of such new services (and are already doing so—e.g., Elsevier with CrossRef, MDConsult, BioMedNet, etc., as mentioned above) than does the NSDL. What can NSDL offer in partnership with educational publishers that they can't already provide for themselves?

Perhaps NSDL's comparative advantage is that it could provide a first-rate R&D site through which prototypes of such proprietary services could be developed. The NSDL is, after all, packed with teams and individuals that possess world-class skills in designing, prototyping, and evaluating (but not necessarily perfecting, marketing or selling) teaching and learning technologies. Much of this expertise can be shared with publishers through the information commons that is the NSDL.

Clearinghouse for public materials

This opportunity came to light through a couple of comments from publishers after the workshop. It was noted that there are lots of valuable public materials that publishers would like to access and use in products (Mike Johnson from Wadsworth mentioned digital images). Publishers want to use many of these as objects in digital productions,

and the biggest challenges are not only finding them but clearing copyright cost-effectively. Could NSDL be a clearinghouse that aggregates access to such collections, providing not only value-added organization, but also streamlining copyright clearing processes?

One concern regarding this option is that it might compete directly with some publishers, such as BigChalk, who are already providers of juried publicly accessible websites. Recent news appears to reinforce this concern. In a controversial decision, the Department of Energy has shut down PubScience, a popular site that provided indexing and abstracting services for science journals. The smoke has yet to clear on this, but it seems safe to say that one of the main reasons for the shutdown was “that [with PubScience] the department is duplicating technical information services that are already available from the private sector” (see the [Department of Energy Report](#)). In fact, there may be regulations that prohibit the public sector from competing with private firms in this area. If PubScience was committing a mortal offense, then an NSF-sponsored clearinghouse, such as the one sketched above, would surely be running the same risk. This risk may go away if, however, if, instead of directly distributing these materials, the NSDL just played the role of a middle-man—finding public databases and providing a copyright-clearance support for educational publishers who would ultimately deliver the information services. But is this a viable business opportunity for the NSDL?

Another problem is that, while this service seems valuable—whether it is best provided publicly or privately—NSDL doesn’t normally operate in a way that would strongly encourage this to happen. The NSF may issue an RFP that solicits such projects, but typically does not narrowly target either specific content (in this case, potentially valuable public datasets collections) or services (such as copyright-clearance streamlining). Rather, it waits for teams to submit proposals that would carry out such work; but if none do, the Foundation generally has no recourse but to wait until the next proposal cycle.

Standards setting and coordinating

From one of the several perspectives outlined at the workshop (see Challenges and Risks below), the NSDL is a collection of collections; from another perspective it is a community that encompasses developers of collections, users and other stakeholders; from yet another it is a commons, comprising a platform and collection of tools for DL developers and users of all kinds. One key aspect of such a commons is a set of open standards, available to everyone—from small grass-roots self-publishing ventures to large traditional publishing business—that permits them to create learning resources and environments and share them.

NSDL is already developing such a commons and its associated standards and tools; publishers are involved in several similar efforts, such as DOI and CrossRef. The question behind this opportunity is whether the NSDL and educational publishers can work together to assemble these, or can agree on consistent standards, and then use them to develop shared services and materials. Clearly, there are many areas, from descriptive metadata to digital object identifiers to authentication and authorization, where a failure to adopt the same standards, or at least ones that can interoperate, will threaten information-sharing opportunities discussed at the workshop and mentioned above. To

put a positive spin on this, the question is whether we now have an opportunity not only to establish shared standards, but also to design one or two focused projects that demonstrate the synergistic value of these to the NSDL and educational publishers.

The main concern here is that both the NSDL and various publisher-supported groups have been active in the technical standards arena, and have already established preferences for certain ones. At this point we may not know enough about what choices have been made, whether they are compatible, and how firmly rooted they are. Questions include: Can we assess these choices and harmonize? What are the costs and benefits of doing so (and not)? And, are proprietary standards a high priority for publishers? Satisfactorily answering these questions probably would not pose insurmountable problems, but they would require some focused discussions and technical meetings (see Action Items and Recommendations, below).

Sustainability Opportunities inspired by Digital Promise

As the previous sections outline, the workshop brought to light a number of partnering opportunities for the NSDL and educational publishers—some admittedly very speculative, but others entirely realistic. However, one basic purpose of the workshop was to deepen the NSDL’s understanding of various options for growing and sustaining itself into the future. We need to keep in mind that the opportunities outlined at the workshop, though promising, represent only one facet of a full sustainability strategy.

The presentation by Larry Grossman on [Digital Promise and the Digital Opportunity Investment Trust](#) (DOIT), although not strictly about business opportunities with the educational publishing community, highlighted important sustainability alternatives that need to be considered in future NSDL workshops and meetings. In particular, the DOIT suggests the possibility that the NSDL could be supported by a significant infusion of public funds, well beyond the visionary, yet small scale, investment that NSF is making to get the initiative started. Such public support for the NSDL is by no means guaranteed, but it is certainly not without precedent. As the Digital Promise [report](#), notes “at critical turning points in the eighteenth, nineteenth, and twentieth centuries, America’s future was transformed by three bold public investments in an educated citizenry”. The NSDL, as a lynch-pin of a new national learning infrastructure, surely could be a key part of a fourth wave of investment.

CHALLENGES AND RISKS

A number of challenges and risks have been mentioned above in connection with specific NSDL/ Educational publisher opportunities; here we address such problems more broadly, especially ones that affect a number of opportunities. Many of these can be resolved very directly (see Action Items and Recommendations, below). On the other hand, others reflect features of the way the NSDL is organized that will be difficult to change. However, even these can be anticipated and considered in future planning.

Direct competition with publishers

When we began planning the workshop, it was clear that NSDL might eventually compete with publishers, in part since it sometimes plays roles typically associated with

publishers, in part because publishers now sometimes play roles typically associated with libraries, and in part because both now can provide services that resemble those of online bookstores. Some of the smaller web-based publishers, such as BigChalk, probably represent the most direct competition—for example, their large collection of juried websites resembles MERLOT and other mature NSDL collections. However, as the list of opportunities above attest, the workshop also provided plenty of evidence that there are still lots of collaborative options to focus on, even with the most competitive publishers. The consensus at the workshop, then, appeared to be that the best strategy for dealing with potential competitive relationships between publishers and the NSDL was to focus on collaborative opportunities first, and address competitive problems on a primarily when they change from being theoretical worries into real frictions.

Digital rights management and access control

Another assumption we held prior to the workshop was that digital-rights management (DRM) would be among the biggest topics of conversation. But, as noted above, it turned out not to be the main one that concerned publishers at the meeting, partly because some of their initial concerns and questions were answered in the thorough plenary presentation on NSDL access management by David Millman. However, like competition, this topic should be revisited in the future. DRM issues will need to be addressed, at a technical and policy level, once NSDL and publisher relationships advance to the point where materials are being shared across sites (see Action Items and Recommendations, below).

Answering the question “What is the NSDL?”

In contrast to the previous challenges that, somewhat surprisingly, generated little controversy at the workshop, the apparently simple question “What is the NSDL?” loomed large. Publishers, like other stakeholders, naturally wanted to get a clear idea of what NSDL was, what it had accomplished to date, and where it wanted to go as an enterprise. Materials provided prior to the workshop offered some useful background information on these topics. However, at the workshop several different perspectives on NSDL were articulated:

- NSDL as a collection of collections;
- NSDL as “one library many portals”;
- NSDL as a community that encompasses developers of collections, as well as users and other stakeholders; and
- NSDL as a commons comprising a platform and collection of tools for developers and users of digital library services and collections

Each of these is a compelling vision, each is important; but the multiple perspectives also lead to confusions in communicating the mission and directions of NSDL to prospective partners and stakeholders. In part, this accounts for the frequency with which publisher representatives at the workshop asked questions such as “Who is the end user?”, “What is the NSDL’s brand identity?”.

The different perspectives also encourage (or discourage) different partnering opportunities. For example, viewing NSDL as a collection of collections naturally invites sharing content from publishers to NSDL; viewing NSDL as a commons encourages

sharing of standards and collaborative service development. On the other hand, the multiple perspectives also might impede some possible cooperative ventures. For instance it appears that publishers found it difficult to suggest concrete business models for the NSDL, since it is now viewed so broadly, and has not articulated a “market niche” or specific target audience. More generally, the multiple perspectives make it difficult to communicate to publishers (and others) the conditions for participation in NSDL. Each perspective suggests different ones, and taken together they gave rise to a number of additional questions posed by publisher representatives at the workshop, including “What makes NSDL compelling to work with?” and “What is the opportunity-cost of collaborating?”.

All this suggests several action items to clarify the different roles and missions of NSDL (for examples, FAQs that answer the above questions and more; see Action Items and Recommendations, below). It also suggests that the first relationships between publishers and the NSDL might be a set of relatively short-term experiments (that reflect the different NSDL perspectives), rather than a single narrowly targeted, and relatively costly venture (that assumes the NSDL has a single business focus).

Differences in products, processes, management and missions

Although the question “What is the NSDL?” was not fully answered at the workshop, discussions did nevertheless underscore that NSDL and educational publishers, have, for the most part, very different production processes, products and management practices. Educational publishers, for the most part, continue to craft high production-value materials that are digital versions of traditional print works, such as books, monographs and journals. On the other hand, much of the NSDL’s content comes from innovative electronic self-publishing sources—digital materials, for instance, developed teachers and faculty for their own purposes, then shared through the NSDL. Publishers and the NSDL also differ on several other business dimensions, including: (i) how materials are created and acquired (NSDL generally waits for teams to submit proposals that would provide collections or services; publishers generally assess market needs and commission authors to write products that meet them); (ii) comparative size of resources (NSDL materially are usually more granular; publishers’ content is larger-scale— “modules not objects”); (iii) production and acquisition costs (most NSDL materials are relatively low cost, publishers more often include more costly value-added services, such as review); and (iv) preservation, sustainability and management policies.

These differences can work to the benefit of both publishers and the NSDL. For example, as suggested above, granular grass-roots digital objects provided by NSDL collections could be a good complement to educational publishers' ebooks, and therefore might be incorporated into their digital collateral materials or context. On the other hand, the differences can sometimes be problematic, as the following sections outline.

Granularity

NSDL collections often comprise small-scale granular digital resources (rather than large-scale modules or etexts); consequently, if content were shared from publishers into NSDL, it would be natural to consider disaggregating these large-scale resources. Publishers are becoming increasingly comfortable with smaller scale objects. However,

sharing these materials into NSDL collections still poses a number of challenges, including:

- deciding which granular objects will be shared, since publishers may manage small-scale objects, but often do not market them at that level;
- charging for them (if they are not freely shared), since pricing models for small-scale resources are not well-established;
- economically creating metadata for them, because publishers' descriptions for granular objects may not provide the metadata that NSDL collections will need;
- and branding (discussed more below).

On top of all this, there continues to be justifiable debate over whether users will build their own courses or modules from scratch using small learning objects. Publishers believe—and the current data on learning objects bear this out—that most faculty want pre-packaged content that they can tailor, relatively simply, to their needs, not hundreds of digital pieces they must cobble together. If this continues to be the case, then collaborative experiments in which granular educational publishers' materials are simply added into NSDL collections may not lead to many interesting results—for the publishers, the NSDL, or end-users. At the very least, considerable thought will need to be devoted to constructing tools that facilitate finding high-quality granular objects, modifying them as needed, and composing them into larger modules. Only a few NSDL projects are now addressing this important topic.

Branding

Branding concerns were raised at the workshop in connection with several opportunities for collaboration. First, many publishers will want to ensure the digital resources they share with NSDL—either free or for fee—maintain their brand identity. This may be especially problematic if the larger-scale resources they typically market are disaggregated into granular objects and then represented in the NSDL.

Branding questions also arose in connection with NSDL collections, as well as publisher materials. On the one hand, educational publisher representatives at the workshop indicated strongly that they would be more likely to contribute resources to the NSDL if it had a well-regarded brand. By the same token, if publishers consider including NSDL content in their products, they would similarly want NSDL to be associated with high-quality resources. However, this may be difficult for the NSDL to control on a broad scale, as we discuss below.

Quality control

For the most part, NSDL follows a distributed control and governance model that imposes only “broad filters”—minimal vetting and review policies—on collections. NSDL does impose some centralized control of metadata and other technical standards—but no significant content standards are in place at this time. The technical mechanisms for expressing quality-related information, such as reviews and annotations, are being developed by the CI, and are also under discussion by the NSDL Content Standing Committee and the Services and Tools Workgroup. However, the NSDL policy committee (PC) has not yet established prescriptive guidelines for using them.

This is not to say quality is low in NSDL collections. The K12 NSDL community, for example, has taken quality control very seriously, and many of the large and mature NSDL collections, such as EarthScape and MERLOT, have rigorous review processes in place. Nevertheless, since these policies are not established and maintained centrally, NSDL collections are of variable quality. For this reason, in the near-term, the NSDL may not be able to establish a high-quality brand—without substantial governance and policy changes. This may be a problem for publishers who will want to align their high-quality proprietary content with similarly vetted open collections. On the other hand, it may be quite consistent with NSDL’s core values, if they embrace an open commons, inclusivity, and the right of local communities to determine their own standards for review and acceptability.

Stability and preservation

One more consequence of the fact that the NSDL is a collection of collections, with highly distributed control, is that while some collections are stable, others may change on a regular basis. More importantly, few have yet established strong digital preservation policies. For some of the relationships with educational publishers outlined above, this may not be an important problem; however, for others it definitely would be.

For instance, presumably any plan to provide NSDL-based collateral materials for publishers ebooks, or links to NSDL objects and collections directly in such products, would require that these NSDL materials be well-maintained for an indefinite period of time. Readers who purchased (or licensed) a new electronic textbook would have a right to expect, when they clicked on a link, say, to “featured NSDL collection materials” in the references section of a digital chapter, that they would next see an array of high-quality materials—not a “404 File Not Found” message.

Again, some of the technical mechanisms to facilitate this are being put in place by the NSDL. The NSDL CI is outlining technical plans to ensure the longevity and preservation of resources, and, working with the Metadata and Standard Workgroup, the CI has also established metadata harvesting policies and protocols, which should ensure stable access to resource descriptions. But, just as with review and quality control, specific preservation policies and plans for implementing them are, at this time, more under the control of individual projects and collections, not the CI or the emerging NSDL governance structure.

There is a related sustainability and stability problem, however, that is even more fundamental, and it relates to the way the NSDL funds projects. Many of the collections that now populate the NSDL are created and supported through NSF grants that typically run only a few years. At the end of that time, or after a couple of funding cycles at most, collections and projects are faced with the prospect of either finding new sources of funding, or disbanding. From many perspectives, this is a good thing. NSF is generally seen as a source of seed money for new ideas; most agree it should not be in the business of supporting collections indefinitely—not even the most successful ones. On the other hand, however, educational publishers justifiably expect their content partners, including the NSDL, to have a long-term plan for maintaining its resources and assets. For that matter, the American public will surely have a similar expectation that a *national* library is highly stable and reliable. All this means that in the near future the NSDL will need to

address business transition plans of its collections and projects. This was not a topic of extensive discussion at the workshop, but it will clearly affect partnering options with educational publishers going forward.

Portals and linking relationships

As discussed, perhaps the most obvious model for collaborating with publishers would be to invite their collections into NSDL; but an equally attractive option for publishers might be to embed NSDL collection materials in their ebooks, modules, or the contextual material they now increasingly provide with their products. This is appealing for publishers partly because it may be a convenient way for them to manage their brand (exporting materials and/or metadata to NSDL may limit their control of the user experience). However, this way of exposing NSDL materials, although interesting, does not seem to be one that has been considered much yet: the predominant model has been mainly “one library many portals”. That is, to get NSDL materials, you go to an NSDL portal.

Some of the opportunities discussed above suggest, on the other hand, that NSDL materials might not be accessed through the library’s portals, but, for example, through links embedded in the portals and products of publishers, and perhaps in any number of other websites. Of course, from a technical perspective, the simplest approach to such linkages—just providing a url for the NSDL content in publishers’ products—would be trivial to implement. But, allowing such “deep linking” into NSDL materials might be unappealing from the NSDL’s perspective for a number of reasons. Most importantly, it could bypass the NSDL altogether. The link, for example, might be to an object in a collection that is conceptually part of NSDL, but is physically a distinct library, such as MERLOT, EarthScape or iLumina. A simple url linkage would conceal the conceptual relationship to the NSDL that this object enjoys.

More sophisticated linking approaches (for example, using DOIs, OpenURLs or different methods of expressing metadata for reference linking) would not necessarily run afoul of this problem. But policies that would support such an approach for citing NSDL materials in external sites have not been articulated in detail yet. They will need to be, if NSDL materials are not just accessed through NSDL portals. More generally, this suggests the need for yet another answer to the question “What is NSDL?” If NSDL content is not identified by where you get it (NSDL portals), how is it identified? And how does the NSDL control access to its materials, if not through portals?

ACTION ITEMS AND RECOMMENDATIONS

The opportunities and risks enumerated above suggest a number action items. Some are already in process; others can be done with resources currently available to the team that put together the workshop; yet others will need additional support and will probably be done by representatives of the NSDL's CI, or by groups other than workshop organizers. Because the action items represent works in progress, in contrast to this report, which is a summary of the workshop deliberations, they will be managed in a separate working document (a version of this can currently be found at http://publishers.comm.nsdlib.org/doc_tracker/docs_download.php?id=297). Here we

only summarize only the highlights of this document, without information on the current status of each item.

As with other sections of the report, this may error on the side of being too wide-ranging, rather than too selective. That said, the list really only scratches the surface of possible tasks and collaborative relationships between educational publishers and the NSDL. A number of ambitious partnerships are possible, of course, ranging from joint development business ventures to broad-scale marketing and distribution plans. But these are for later; small first steps are probably best for now.

The main activities suggested at the workshop fall into two categories, informational and planning. As of this writing, many of the informational tasks have been addressed, while planning tasks are still being formulated and refined.

- *Informational.* Representatives from the educational publishing community at the workshop felt that they would have benefited from a clearer understanding of what the NSDL comprises, as well as its mission and goals. Several perspectives on the NSDL were outlined; but it was unclear which ones should inform future relationships with publishers—or how they should do so. Similarly, NSDL representatives might have been aided by more information about publishers' digital initiatives. The overall presumption of these action items is that any partnering relationship between NSDL and educational publishers needs to be founded on a good mutual understanding of the prior work and present goals of all participants.
- *Planning.* Several tasks specifically related to developing joint projects, or follow-on discussions that might lead to such activities, were also mentioned at the workshop. Accomplishing these action items will depend on the resources of NSDL and publishers; their input will be essential to developing a formative plan going forward. Although it is unclear how many of these can be accomplished in the near-term, a number of options are listed here, in part to provide a foundation for future discussions and priority-setting tasks.

The following table enumerates specific informational and planning tasks that arose from the workshop:

Informational
• Provide background information on NSDL: A Program overview document
• Provide background information on NSDL: Glossary of NSDL terms and FAQ
• Include contact list with photos of workshop participants
• Provide a clear statement of NSDL mission, goals and perspectives (NSDL as a collection of collections, as portals, as a community of developers, and as an open standards-based commons)
• Provide background on current publisher activities relevant to NSDL, and mentioned at workshop
Planning
• Plan a briefing for publishers and their technical staff re: topics such as DRM and shared authentication and authorization standards
• Develop several possible scenarios and terms of participation in NSDL by educational

Informational
publishers; discuss and refine with publishers
<ul style="list-style-type: none"> • Outline one or two experiments in which a few publishers work with the NSDL on specific projects (e.g., they might contribute selected collections and metadata to NSDL); recruit publishers to help plan and implement this
<ul style="list-style-type: none"> • Solicit publisher feedback of NSDL portal after it launches in December 2002
<ul style="list-style-type: none"> • Consider a follow-up briefing with educational publishers by Jan-Feb 2003

CONCLUSIONS

In describing current trends in academic electronic publishing, Cliff Lynch recently said⁴:

There are two rather separate things going on, that occasionally get jumbled together under the guise of electronic publishing even though they have rather different characteristics. On one side of the fence we see the changes in the traditional business of scholarly publishing—which includes the journals, monographs, and other kinds of materials that we are all familiar with—this is the incremental evolution of print publishing to the digital world.

On the other side, we have new works of digital authorship and truly new electronic publishing models. Here is where we see an investigation of the transformative potential of digital media. Both sides can be legitimately talked about as electronic scholarly communications, but often, discussions of scholarly publishing in the digital realm focus too narrowly on one side or the other.

From one perspective, the NSDL can be viewed as a part of the evolving new world of electronic publishing, not only in terms of the innovative digital genres its collections offer, but also in terms of the methods it is experimenting with to manage the maintenance, distribution and preservation of resources. As Lynch notes, the traditional scholarly publishing business has been able to sustain itself by carving out an economically viable position in a system that includes libraries, bookstores, universities, government agencies and foundations, as well as the end-points of the system—the authors and readers. By contrast, the new electronic publishing community, including the NSDL, has yet to prove it is sustainable, in part because it has thus far not found a stable place in that system—nor has it helped transform the system in a way that would enable it to fit in.

From this perspective, the NSDL/Educational publishers' workshop can be seen as a first step in thinking about how the NSDL, as a representative of new models of digital publishing, can sustain itself, not through competition with the traditional educational publishing community, but rather through partnerships. The NSDL's ambitious vision, in truth, requires this kind of collaboration, since it wants to become, over the next decade, the premier provider of digital resources for science education. This will require the NSDL not only to nurture and provide a home for new genres of electronic publication. It will also need to offer a portal to digital versions of traditional materials, such as electronic books and journals. And to do all this the NSDL will need to collaborate with the established publishing industry.

⁴ See "Academic Publishing in the Digital Realm: An Interview with Clifford Lynch", originally published in the 12/01/02 issue of *Syllabus*, also online at <http://www.syllabus.com/article.asp?id=6983>.

The differences in these two broadly different approaches to communicating and disseminating knowledge imply, naturally, challenges to such collaborations. However, the workshop suggested a number of promising areas where partnerships could be built and projects initiated. Some of the opportunities might appear risky, uncertain or costly at this time. On the other hand, several look quite feasible and well within the scope of a targeted testbed project or two. For these to succeed, though, a number of challenges may need to be overcome, and risks mitigated. The action items just reviewed outline some of the first steps that can be taken to address these needs.

Perhaps the most important task to consider next, however, is the simplest. This first meeting accomplished its main goal of bringing key participants to the table and laying out the issues. Based on the interest we saw at the workshop, we agree with Karen Hunter, from Elsevier, who said that the next step in a serious exploration would be to establish a working group, made up of a set of interested educational publishers and NSDL representatives, to take a few of the opportunities summarized here to the next level.

APPENDIX I

The following table lists all Workshop participants and their affiliations. Consult the [NSDL/Educational Publishers Website](#) for more details on the meeting, agenda, presentations, as well as working documents and email threads.

Name	Group
Anne Murphy	Digital Promise, Project Director, Washington D.C.
Art Block, Editorial Group Director for Science and Mathematics at Glencoe	McGraw-Hill
Barry Beckerman	LCX
Bill Graves	Collegis
Brandon Muramatsu	MERLOT, NSDL Content Committee
Carl Lagoze	CI, NSDL Technical Committee
Carol Fawcett	Xanadu and ADL
Chaim Schlezing, Sr. VP BritannicaSchool	Encyclopaedia Britannica, Inc.
Daniel Rogers, Vice President and Editorial Director for Science	Houghton Mifflin Co-McDougal Littell, Inc.
Darren McIntyre	Maple
Dave Fulker	CI Director
Dave McArthur	NSDL Sustainability Committee, iLumina Project
Dick Ward	University of North Carolina at Wilmington, iLumina Project
Don Albers	MAA
Ellen Hoffman	Michigan Teacher Network, NSDL Policy Committee
Heidi Freund	McGraw-Hill
Howard Burrows	ESIP Federation, NSDL Policy Committee, Sustainability Committee
Jake Schlumpf, Vice President, Products	bigchalk.com
Jerry Lyons	Knowledge-Base
John Saylor	Cornell, NSDL Director Collection Development
Joyce Ray, Director	Office of Library Services, IMLS
Karen Hunter, Senior Vice President, Strategy	Elsevier Science
Kate Wittenberg	CI, Columbia, NSDL Sustainability Committee
Katherine Hanson	Gender Science Digital Library, NSDL Sustainability Committee
Kaye Howe	CI Deputy Director, NSDL Community Services Committee
Lang Moore	Duke University, MathDL
Lawrence Grossman	Digital Promise, Columbia
Lee Zia	NSF-NSDL Program Director

Name	Group
Lisa Spicko, VP k-12 Marketing	Gale Group
Mark Schneiderman	SIIA
Michael Johnson, Vice-President and Editor-In-Chief for Brooks/Cole and Duxbury Press	Wadsworth Publishing Co.
Michael Smolens	3BillionBooks
Mike Luby	Columbia, NSDL Sustainability Committee
Peter Wiesner	IEEE
Rachael Bower	Internet Scout Project, NSDL Sustainability Committee
Rick Johnson, SPARC Enterprise Director	SPARC
Ron Vetter	University of North Carolina at Wilmington, iLumina Project
Sally Cheney, V.P., New Product Development	Chelsea House Publishers
Sarah Giersch	Collegis, NSDL Educational Impact Committee, Sustainability Committee, iLumina Project
Sean Devine	O'Reilly/Pearson Safari joint venture
Steve Rasmussen	Key Curriculum Press
Steve Weimar	MathForum