



NSDL Reflections Project

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“NSDL-Style” Networks: Connecting Across Audiences & Disciplines

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December 9, 2009

Introduction

I begin my personal reflection about NSDL with an analogy that I don't mean to strain too much but it seems to me that Chicago-style pizza and “NSDL-style” networks share some key characteristics. Both are faithful to core elements of two staples which play a part of modern life in many areas of the world. However, like Chicago's adaptation of pizza, NSDL-Style networking gains recognition in its own right because of its new and unique contributions to a standard fare in 21st century society (i.e., bringing together different “ingredients” to assemble a new style of networks). While multi-institutional, multidisciplinary networks are recognized as necessary components as we move into cyber-enabled STEM research and learning, NSDL introduced me to a new “flavor” (ok, I promise -- I'll cease...).

My views about “NSDL-style networks” are based upon my experiences and observations from participation in the Evaluation Committee and as a Pathway. In both arenas I've had the opportunity to meet and work with people from a very wide range of expertise that I likely wouldn't have met, had it not been for my involvement in the NSDL.

Different Backgrounds and Different Approaches

It's not unusual these days to be part of organizations where people from many different backgrounds come together. What seems unique to me is that NSDL embraces its heterogeneity as well as actively strives to ensure that both individual NSDL projects and the overall program benefit from it. In support of EHR's mission of excellence, the NSDL seeks to bring together all areas, all levels, and all settings in STEM. As projects are welcomed into the NSDL, people with different expertise (e.g., computer science, domain sciences, education, informal learning, information sciences, learning sciences, outreach, publishing), funded in different tracks (e.g., Pathways, Integrative Services, Research, and Tools) are supportively encouraged to learn from each other and work together for greater impact. NSDL leadership has initiated many approaches (e.g., regular and special topic conference calls, “birds of a feather” gathering, mentoring) to identify and foster collaboration among the many distributed projects. NSDL's common social, governance, and technical framework, brings together its projects representing complementary parts of the STEM community. Through the NSDL framework, these diverse participants cooperate, exchange successful practices, and, where similar concerns exist, together forge fresh

ideas and joint efforts for benefits to the individual projects' community, the STEM community, and the NSDL program overall.

I think people and organizations try new approaches because of need, opportunity, and leadership and so, NSF, the NSDL Program Director, and the Core Integration team (CI) have provided support and guidance to tackle needs and maximize opportunities as the NSDL program and its projects have evolved. In its role as a recognized global leader, NSF consistently sponsors and jumpstarts innovative and promising approaches to advance STEM research & education. NSF decision makers continually seek out efforts to bring research and education together in meaningful ways. Not only does such an approach help to prepare the next generation of scientists but also, it seems to me, to cultivate that synergy for potentially profound impacts on accelerating the development of new knowledge. The NSDL Program Director purposefully molded the program to include projects associated with the broad spectrum of the STEM community to work individually as well as collectively in order to serve STEM and the public good. As NSDL launched, the Core Integration team of UCAR, Cornell, and Columbia shaped their individual areas of effort (outreach, technical, and collection development) to construct an overarching framework to which individual projects could join, contribute, and gain.

To my mind, some end results gained from “NSDL-style networks” are that one develops a greater understanding of the complex, heterogeneous networks needed to conduct STEM research and learning in a cyber-global society, as well as a keen sense that no one group sees the whole picture. When people with different expertise work together, we can start to bring together our complementary strengths and contribute more effectively to this collective undertaking for new, validated forms of STEM research and learning.

Collaboration, Collective Perspectives and Practices

My strongest impression of NSDL style networks comes through at its Annual Meetings. Separate from the location and the number of attendees, the meetings themselves convey enthusiasm, energy, and lots of discussions about efforts. Going from session to session, you're sure to see new as well as old faces and projects – faces and projects that you wouldn't normally encounter when you attend your “professional” national conference. You can count on running into this mix of people and projects from all parts of the NSDL because the session themes generally and intentionally cut across audiences and disciplines. It takes quite a while to understand the different vocabularies, approaches, and issues reflected by the diverse participants in the discussions. You likely can't fully appreciate the concerns represented by others outside your audience and discipline, but hearing their perspectives helps you appreciate the complexities facing STEM communities. While it is plain that the questions are plentiful and growing, you take heart in the diversity and commitment of those pursuing some answers.

The highly collaborative nature of the NSDL program has worked well through an overarching framework of shared mission, interoperable technology, and common policies which are customized to meet the needs and interests of the communities taking part in NSDL. NSDL priorities support dissemination of high quality, sharable STEM resources through metadata with open source software and protocols, such as Open Archives Initiative - Protocol for Metadata Harvesting (OAI-PMH) and based upon consistent and community-based practices, such as the

NSDL privacy policies. The NSDL mission not only reinforces objectives recognized in the MatDL project, such as the Dublin Core metadata schema, but also guides MatDL's practices in areas under development such as reuse and repurposing of information. Most importantly, for the many projects taking part in the NSDL program, this collective identity represents a recognizable presence of credibility and stability in the larger STEM communities and that presence has a greater collective impact than any single project could have. Correspondingly, the individual projects representing specific audiences and disciplines contribute to the NSDL's clear vision for targeting particular needs and emerging interests within STEM communities.

The NSDL collective identity is made up of the larger network component (i.e., NSDL) which is customized by the "community" component (e.g., Materials Digital Library Pathway). Both components team up to enhance the credibility and stability that NSDL & Materials Digital Library Pathway carry in the scientific community. NSDL, as the network component, contributes broad outreach, visibility, and connections to other parts of STEM initiatives while MatDL, the community component, brings out the specific and emerging interests and needs of the materials community. MatDL is more readily accepted the STEM community because of its participation in the NSDL while the NSDL is strengthened as MatDL's involvement in the materials community grows. A key factor in the NSDL collective identity is NSDL's participation in the NSF peer-reviewed grant model because it reinforces credibility and confidence within STEM community.

Contributing to the creation of NSDL's multidisciplinary enterprise gives individual projects, like MatDL, broader possibilities and approaches. The variety of groups involved provides many opportunities for networking to discover who is involved in what areas. The multi-institutional structure of NSDL encourages individual projects to informally exchange ideas and expertise with one another which may not have occurred without the NSDL framework linking their individual efforts. The exchange often leads to streamlined and collaborative activities by which the individual groups work together to reach multidisciplinary audiences. As an example, MatDL and ChemCollective, two individual projects with mutual interests in virtual labs for undergraduate education are contributing to a larger, multidisciplinary outreach, connecting with audiences that individually would have been difficult for each project to reach.

In addition to developing collective perspective and practices, NSDL has regularly initiated and supported numerous small group workshops to bring together a cross section of people and projects focused on particular issues of common interest throughout its evolution as a program. These informal and close interactions are particularly effective in being informative, initiating communication, and increasing the likelihood for group collaboration. For example, Pathways, like MatDL, are domain and audience focused projects. As a result of regular meetings and discussions, our individual projects have worked together to begin offer joint outreach at professional society meetings on an ongoing basis. Workshops have also brought NSDL projects together with other NSF efforts and professional STEM organizations to learn about complementary missions and to explore possible collaboration. These gatherings focus on sharing information and developing cooperative activities to have greater impact on STEM and society.

NSF and NSDL's broad vista of the evolving landscape of learning and research promotes participation and contributions by its projects in the broader STEM community. Through my MatDL work as part of NSDL, I have been able to develop growing relationships with professional societies related to materials, such as TMS (The minerals, metals, and materials society) and its Education Committee as well as the International Council for Science's Committee on Data and Technology (CODATA) as Co-Chair of the Task Group on Exchangeable Materials Data Representation to support Scientific Research and Education. As the NSDL Pathway in materials science, MatDL has been invited to participate in past NSF workshops, such as *From Cyberinfrastructure to Cyberdiscovery in Materials Science* (2006), as well as future ones, such as the upcoming Materials Education Workshop and the Course, Curriculum, and Laboratory Improvement PI Conference. These venues enable NSDL projects to interact with other members of the STEM community, have a voice in community forums, contribute ideas to workshop reports, and bring these community discussions back into the NSDL efforts.

As NSDL continues forward, it is important for everyone to recognize how much has been accomplished over a relatively short period of time as well as how much more can yet be attained. As part of NSDL, a broad base of STEM content, services, and tool developers are successfully building and forging their individual efforts in order to serve particular audiences and disciplines as well as to reach across user groups and domains. To me, it seems that the overarching framework of the NSDL and its community-based projects offer clear complementary benefits to other STEM efforts. It's the "NSDL's style" of networks that the program and its projects seek to contribute in their collaborations with other initiatives to implementing new forms of STEM research and learning.