

Highlight Template

Division of Information & Intelligent Systems

Each year, NSF program officers are asked to write descriptions of program accomplishments, or "highlights" on the results of NSF research and education awards. This activity is related to requirements under the Government Performance and Results Act (GPRA). These highlights are a significant source of information for the Advisory Committee for GPRA Performance Assessment (AC/GPA), which meets once a year to evaluate and write a report on the Foundation's performance in the strategic outcome goals outlined in the [2006-2011 Strategic Plan](#).

PI Last Name:	Fox
PI First Name:	Edward
Institution:	Virginia Tech (VPI&SU)
Directorate/Division:	Information & Intelligent Systems
Program Officer:	Stephen Griffin
NSF Award Number (s)	IIS-0535057

Highlight Title: Digital library curriculum modules now available

Highlight Text: With support from NSF, a collaborative team of researchers at Virginia Tech (led by Edward A. Fox) and the University of North Carolina at Chapel Hill (led by Barbara M. Wildemuth and Jeffrey Pomerantz) has developed a dozen curriculum modules intended for use in graduate courses on digital libraries (DLs). The modules are part of a larger curriculum framework; additional modules will continue to be added by the research team and others. The curriculum framework is intended for use in both computer science (CS) and information and library science (ILS) programs.

Each module provides suggested readings, lecture notes, and class activities, and fits within the curricular framework developed earlier by the team. The modules cover DL history, digitization, metadata, DL architecture, DL applications, information needs, information seeking behaviors, interaction design and usability assessment, reference services, preservation, DL evaluation and user studies, and intellectual property issues. Each module has been reviewed by experts in the field; in addition, modules were field tested in eight different universities during the fall 2008 semester. Modules to be added include four developed in the fall 2008 Virginia Tech computer science advanced graduate class on digital libraries, where nine others had been tested. These new modules will be reviewed and later included: file formats (and transformation and migration), personalization, protocols, and web archiving.

The process of module development also has supported the development of a vibrant DL education community. While the project team consists of only five people, almost 150 others have been involved in module development, review, or field testing; providing input and advice to the project; and/or participating in project-funded doctoral consortia.

NOTE: Insert only text in the box. Text Boxes expand to accommodate your entries.

In terms of intellectual merit, why is this outcome notable and / or important?

Through this project, a curriculum for digital libraries education and the materials to support it are being made available to CS and ILS educators throughout the US and the world. The curriculum framework and the individual modules are both theory-based (drawing on the 5S framework for digital libraries) and empirically-based (drawing on analyses of DL research literature and syllabi); they should help further define the field as a well-established discipline. In addition, this work draws on over

50 years of the investigators' teaching experience, as well as the contributions of almost 150 other teachers and many more students.

In terms of broader impacts, why is this outcome notable and / or important?

The curriculum framework and modules developed through this project will have a strong positive impact on the quality of DL education and training. The broad base of support for this work demonstrates that it will be disseminated widely, rather than just being implemented locally. In summary, it will improve the education of the next generation of digital librarians and DL developers, thus enhancing the quality of the DLs they create and manage.

Does this highlight represent transformative or potentially transformative research? If so, please explain why.

Yes No

No.

Does this highlight represent Broadening Participation? If so, please explain why.

Yes No

Yes, indirectly. Because many ILS programs are predominantly women, strengthening the DL curriculum in these programs is likely to bring more women into the field of digital libraries.

Are there existing or potential societal benefits of this research? It is important for NSF to be able to provide examples of NSF-supported research that have societal benefits, including benefits to the U.S. economy. If so, please explain why.

Yes No

Yes. As the education of digital librarians and DL developers is improved, the quality of their work will have a positive impact on the users of the DLs they create and manage. These users may include a broad range of the US population, including scholars, cultural institutions and their target audiences, educators at all levels, and the general public.

Select Primary (and Secondary) Strategic Outcome Goal

Included below are two tables – titled **Primary Strategic Outcome Goal** and **Secondary Strategic Outcome Goal**.

All NSF projects have "Primary" strategic outcome goals and they may also have "Secondary" strategic outcome goals. In the PRIMARY strategic outcome goal table please select **one category** (i.e., one column) that BEST DESCRIBES your project's highlight. Within that column, please check one or more boxes that apply. If your project also has clear Secondary strategic outcome goals, select the appropriate column in the *second table* labeled "Secondary Strategic Outcome Goals and check as many boxes within that column that describe your project. So, for example, if your Primary Strategic Outcome Goal was Discovery, your Secondary Goal may be Learning.

Primary Strategic Outcome Goal

Decide whether your project's *Primary Strategic Outcome* goals address Discovery, Learning or Research Infrastructure. For whichever of the three you select, please check one or more boxes within that column that best describe your project.

Discovery	Learning	Research Infrastructure
<p>Foster research that will advance the frontiers of knowledge, emphasizing areas of greatest opportunity and potential benefit and establishing the nation as a global leader in fundamental and transformational science and engineering.</p> <p><i>Please Note:</i> 1) If you are reporting an outcome from an EPSCoR Research Infrastructure Improvement grant, or a research grant co-funded with the EPSCoR Program, please check the EPSCoR box under DISCOVERY, as well as the box that represents the area of science, engineering, or education for the project. 2) If you are reporting an outcome of research conducted at an NSF-funded large facility and check a category under Discovery for the PRIMARY goal, please also check the Major Multi-User Facilities category under Research Infrastructure for the SECONDARY goal.</p> <ul style="list-style-type: none"> <input type="checkbox"/> Biological Sciences <input type="checkbox"/> Computer & Information Science and Engineering <input type="checkbox"/> Cyberinfrastructure (excluding Shared Cyberinfrastructure Tools) <input type="checkbox"/> Engineering Research <input type="checkbox"/> Small Business Innovation Research/Small Business Technology <input type="checkbox"/> Geosciences: Earth, Atmosphere, and Ocean Sciences <input type="checkbox"/> Geosciences: Earth, Atmosphere, and Ocean Sciences <input type="checkbox"/> Social, Behavioral, & Economic Sciences <input type="checkbox"/> Polar Sciences: Arctic and Antarctic Research <input type="checkbox"/> CAREER: Faculty Early Career Program <input type="checkbox"/> EPSCoR: Experimental Program to Stimulate Competitive Research <input type="checkbox"/> International Collaborative Research <input type="checkbox"/> Ed. Res. And Evaluation to Improve STEM Learning and Teaching <input type="checkbox"/> Centers for Analysis & Synthesis <input type="checkbox"/> Centers for Chemical Innovation <input type="checkbox"/> Engineering Research Centers <input type="checkbox"/> Materials Res. Science & Eng Centers/Networks <input type="checkbox"/> Nanoscale Science & Eng Centers/Networks <input type="checkbox"/> Science & Tech Centers <input type="checkbox"/> Science of Learning Centers 	<p>Cultivate a world-class, broadly inclusive science and engineering workforce, and expand the scientific literacy of all citizens.</p> <ul style="list-style-type: none"> <input type="checkbox"/> K-12 Education <input type="checkbox"/> Teacher Training <input type="checkbox"/> Undergraduate Education <input checked="" type="checkbox"/> Graduate Education <input type="checkbox"/> Postdoctoral Fellowships, including International Postdoctoral Fellowships <input type="checkbox"/> International Research Experiences for Undergraduate & Graduate Students <input checked="" type="checkbox"/> Public Understanding of Science <input checked="" type="checkbox"/> Broadening Participation to Improve Workforce Development <input type="checkbox"/> Promoting CyberLearning Strategies to Enhance STEM Education <input checked="" type="checkbox"/> Professional and Career Development 	<p>Build the nation's research capability through critical investments in advanced instrumentation, facilities, cyber-infrastructure and experimental tools.</p> <p><i>Please Note:</i> If you are reporting an outcome of research conducted at an NSF-funded large facility and check the Major Multi-User Facilities category under Research Infrastructure for the PRIMARY goal, please also check the appropriate category under Discovery for the SECONDARY goal.</p> <ul style="list-style-type: none"> <input type="checkbox"/> Academic Research Fleet <input type="checkbox"/> ATLAS – A Toroidal Large Angle Spectrometer <input type="checkbox"/> CMS – Compact Muon Solenoid <input type="checkbox"/> Cornell Electron Storage Ring <input type="checkbox"/> Gemini Observatory <input type="checkbox"/> IRIS – Incorporated Research Institutes for Seismology <input type="checkbox"/> Integrated Ocean Drilling Program <input type="checkbox"/> Large Hadron Collider <input type="checkbox"/> Laser Interferometer Gravitational Wave Observatory (LIGO) <input type="checkbox"/> MREFC Projects <input type="checkbox"/> National Astronomy and Ionosphere Center (NAIC) <input type="checkbox"/> National Center for Atmospheric Research (NCAR) <input type="checkbox"/> National High Magnetic Field Laboratory <input type="checkbox"/> National Nanofabrication Infrastructure Network <input type="checkbox"/> National Optical Astronomy Observatory (NOAO) <input type="checkbox"/> National Radio Astronomy Observatory (NRAO) <input type="checkbox"/> National Solar Observatory <input type="checkbox"/> National Superconducting Cyclotron Laboratory <input type="checkbox"/> Network for Earthquake Engineering Simulation (NEES) <input type="checkbox"/> Polar Facilities & Logistics <input type="checkbox"/> Major Research Instrumentation (MRI) Program <input type="checkbox"/> Shared Cyberinfrastructure Tools <input type="checkbox"/> Other Infrastructure and Research Resources

Secondary Strategic Outcome Goal

Complete this table **only** if your project has clear *Secondary Outcome goals*. So, for example, if your Primary Strategic Outcome Goal was Discovery, then your Secondary Strategic Outcome Goal can be either Learning or Research Infrastructure. Please check one or more boxes within that column that describe your project's Secondary Strategic Outcome goals:

Discovery	Learning	Research Infrastructure
Foster research that will advance the frontiers of knowledge, emphasizing	Cultivate a world-class, broadly inclusive science and engineering	Build the nation's research capability through critical investments in advanced

<p>areas of greatest opportunity and potential benefit and establishing the nation as a global leader in fundamental and transformational science and engineering.</p> <p><i>Please Note:</i> 1) If you are reporting an outcome from an EPSCoR Research Infrastructure Improvement grant, or a research grant co-funded with the EPSCoR Program, please check the EPSCoR box under DISCOVERY, as well as the box that represents the area of science, engineering, or education for the project. 2) If you are reporting an outcome of research conducted at an NSF-funded large facility and check a category under Discovery for the PRIMARY goal, please also check the Major Multi-User Facilities category under Research Infrastructure for the SECONDARY goal.</p> <ul style="list-style-type: none"> <input type="checkbox"/> Biological Sciences <input checked="" type="checkbox"/> Computer & Information Science and Engineering <input type="checkbox"/> Cyberinfrastructure (excluding Shared Cyberinfrastructure Tools) <input type="checkbox"/> Engineering Research <input type="checkbox"/> Small Business Innovation Research/Small Business Technology <input type="checkbox"/> Geosciences: Earth, Atmosphere, and Ocean Sciences <input type="checkbox"/> Geosciences: Earth, Atmosphere, and Ocean Sciences <input type="checkbox"/> Social, Behavioral, & Economic Sciences <input type="checkbox"/> Polar Sciences: Arctic and Antarctic Research <input type="checkbox"/> CAREER: Faculty Early Career Program <input type="checkbox"/> EPSCoR: Experimental Program to Stimulate Competitive Research <input type="checkbox"/> International Collaborative Research <input type="checkbox"/> Ed. Res. And Evaluation to Improve STEM Learning and Teaching <input type="checkbox"/> Centers for Analysis & Synthesis <input type="checkbox"/> Centers for Chemical Innovation <input type="checkbox"/> Engineering Research Centers <input type="checkbox"/> Materials Res. Science & Eng Centers/Networks <input type="checkbox"/> Nanoscale Science & Eng Centers/Networks <input type="checkbox"/> Science & Tech Centers <input type="checkbox"/> Science of Learning Centers 	<p>workforce, and expand the scientific literacy of all citizens.</p> <ul style="list-style-type: none"> <input type="checkbox"/> K-12 Education <input type="checkbox"/> Teacher Training <input type="checkbox"/> Undergraduate Education <input type="checkbox"/> Graduate Education <input type="checkbox"/> Postdoctoral Fellowships, including International Postdoctoral Fellowships <input type="checkbox"/> International Research Experiences for Undergraduate & Graduate Students <input type="checkbox"/> Public Understanding of Science <input type="checkbox"/> Broadening Participation to Improve Workforce Development <input type="checkbox"/> Promoting CyberLearning Strategies to Enhance STEM Education <input type="checkbox"/> Professional and Career Development 	<p>instrumentation, facilities, cyber-infrastructure and experimental tools.</p> <p><i>Please Note:</i> If you are reporting an outcome of research conducted at an NSF-funded large facility and check the Major Multi-User Facilities category under Research Infrastructure for the PRIMARY goal, please also check the appropriate category under Discovery for the SECONDARY goal.</p> <ul style="list-style-type: none"> <input type="checkbox"/> Academic Research Fleet <input type="checkbox"/> ATLAS – A Toroidal Large Angle Spectrometer <input type="checkbox"/> CMS – Compact Muon Solenoid <input type="checkbox"/> Cornell Electron Storage Ring <input type="checkbox"/> Gemini Observatory <input type="checkbox"/> IRIS – Incorporated Research Institutes for Seismology <input type="checkbox"/> Integrated Ocean Drilling Program <input type="checkbox"/> Large Hadron Collider <input type="checkbox"/> Laser Interferometer Gravitational Wave Observatory (LIGO) <input type="checkbox"/> MREFC Projects <input type="checkbox"/> National Astronomy and Ionosphere Center (NAIC) <input type="checkbox"/> National Center for Atmospheric Research (NCAR) <input type="checkbox"/> National High Magnetic Field Laboratory <input type="checkbox"/> National Nanofabrication Infrastructure Network <input type="checkbox"/> National Optical Astronomy Observatory (NOAO) <input type="checkbox"/> National Radio Astronomy Observatory (NRAO) <input type="checkbox"/> National Solar Observatory <input type="checkbox"/> National Superconducting Cyclotron Laboratory <input type="checkbox"/> Network for Earthquake Engineering Simulation (NEES) <input type="checkbox"/> Polar Facilities & Logistics <input type="checkbox"/> Major Research Instrumentation (MRI) Program <input type="checkbox"/> Shared Cyberinfrastructure Tools <input type="checkbox"/> Other Infrastructure and Research Resources
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NSF Investments (Existing and Proposed) -- select as many as apply

- Adaptive Systems Technology
- American Competitiveness Initiative (ACI)
- Climate Change
- Cyber-enabled Discovery and Innovation (CDI)
- Cyberinfrastructure
- Environment (including the importance of fresh water supplies)
- Homeland Security
- Human and Social Dynamics

- International Polar Year (IPY)
- National Nanotechnology Initiative (NNI)
- Networking and Information Technology Research Development (NITRD)
- Science of Science Policy
- Sensor Research
- Understanding Complex Biological Systems (including the interfaces of life, physical, and computational sciences)
- None Applicable

Add Image

- Resolution should be 72 dpi or higher.
- Files must be GIFs or JPEGs.
- File names cannot contain spaces or punctuation other than dashes (-) or underscores (_).
- File names must be 25 characters or less.
- Images must be the size you want them to appear. Recommended maximum width and height are 240 pixels.

Image: (Insert image below. If you have multiple images, please provide captions for each.)



Image Caption: Digital libraries curriculum development logo

Has NSF been granted permission to use this image? Yes No

If yes, please enter the image credit: Digital libraries curriculum development logo

Complete and Return NSF Form 1515 (Required):