

This three-year project aims to create an Open Platform for Authoring Open Textbooks – an application that will provide a strategic infrastructure for writing, designing, and producing open textbooks.

Escalating textbook costs in higher education negatively impact students' academic success, especially those students who are most financially vulnerable. Open textbooks are an ideal solution. But the number of existing open textbooks is limited, and more need to be created. The Open Textbook Network (OTN), with membership representing 914 academic libraries, is committed to advancing the use of open textbooks and requests \$488,775 to develop the Open Platform for Authoring Open Textbooks.

Nationally, academic libraries are increasingly interested in offering support to their faculty for open textbook publishing. However, libraries' expertise and tools to support publishing typically focus on journals and monographs, not textbooks. Textbooks are very different publications than journals and monographs. They utilize graphics and numerous instructional design elements that call-out learning objectives, problem sets, examples, and other components that scaffold students' understanding of the textbook content. Libraries are looking for expertise and tools to help them better support open textbook publishing.

To provide the expertise, the OTN has created a textbook publishing curriculum and is educating librarians on open textbook publishing. But librarians also need technical tools to supports the actual authoring tasks that their faculty need to address when creating something as complex as a textbook.

The Textbook Authoring Platform will provide a strategic infrastructure that librarians can use to support open textbook authoring. Benefits of The Platform: (1) The Platform will provide structural supports to help authors design and apply consistent instructional design across all elements of a textbook. (2) This structure will make the textbook content easily sharable and interoperable through standard data and file structures. (3) It will provide a venue for faculty to collaborate with other authors, librarians, editors, peer reviewers, instructional designers, and others who will work together with authors to create a quality textbook.

The principal investigator for this project will be Dr. David Ernst, Chief Information Officer in the College of Education and Human Development at the University of Minnesota. Dr. Ernst is also Director of the Center for Open Education and Executive Director and founder of the OTN. Karen Lauritsen, OTN Managing Director responsible for all OTN publishing initiatives, will be a co-investigator. An Advisory Group comprised of open textbook authors and librarians with textbook publishing expertise will guide the design and development of The Platform. Design facilitation and development of The Platform will be completed by Cabbage Patch Labs – experts in both open source publishing software, and publishing workflow design.

Ultimately, this project aims to build a tool that empowers libraries and authors to work collaboratively to create effective open textbooks, helping to make open textbook authoring a mainstream activity at colleges and universities nationally. This project will be successful if it creates a platform that meets the needs of the library and author communities and becomes used widely to create new open textbooks.

A National Platform for Authoring Open Textbooks  
Open Textbook Network (Regents of the University of Minnesota)

Escalating textbook costs in higher education negatively impact students' academic success, especially those students who are most financially vulnerable. An increasing number of institutions are looking to open textbooks as a solution. The Open Textbook Network (OTN) is a rapidly growing higher education consortium with members representing 914 academic libraries. Based at the University of Minnesota, but representing and serving a national network, the OTN is committed to advancing the use of open textbooks. It requests \$488,775 (fully matched by the University of Minnesota) to create a national platform for the authoring of open textbooks, including the documentation of best practices, workflows, and decision-making guidelines.

**Statement of National Need**

The focus on open textbooks is a nationally significant and timely movement, due to escalating educational costs of higher education and course materials, and the changing technological landscape. Students report that they frequently take fewer courses, drop courses, and even fail courses because of the cost of their textbooks.

Open textbooks are a powerful solution. Open textbooks are funded, published, and licensed to be freely used, adapted, and distributed. Faculty interest in open textbooks has increased sharply as higher education institutions have worked to remove barriers to adoption of open textbooks through awareness and education programs. But the number of existing open textbooks is limited, and many faculty who want to adopt an open textbook can't because a textbook in their field does not exist.

More open textbooks need to be created, and academic libraries are in a unique position to support this effort. Libraries are passionate about efforts to provide universal access to information. They are trusted by faculty and considered unbiased sources of academic materials. They often have critical expertise in intellectual property issues and open licenses. And many libraries have some expertise and experience in academic publishing.

Nationally, academic libraries are increasingly interested in offering support to their faculty for open textbook publishing. However, libraries' expertise and tools to support publishing typically focus on journals and monographs, not textbooks. Textbooks are very different publications than journals and monographs. They utilize graphics and instructional design elements that call-out learning objectives, problem sets, examples, and other components that scaffold students' understanding of the textbook content. It's important that these components are implemented consistently across chapters and sections of a textbook. Because of these added complexities, it's important that faculty are appropriately supported in this work, and libraries are looking for expertise and tools to help them do so.

In August, 2015, OTN member institutions first identified "open textbook publishing support" as a top priority. With this in mind, over the past three years, OTN staff have talked with faculty authors, university press directors, textbook publishers, support staff, librarians, instructional designers, and those involved in early open textbook publishing programs to begin formulating what supports are needed to make open textbook authoring and publishing more effective and efficient. The OTN developed an open textbook publishing curriculum that it first launched in early 2018, offered as professional development to a cohort of librarians. A revised and improved curriculum is currently

being offered to a second cohort. But the OTN also identified other needs that could best be addressed by an authoring platform that focused on the specific needs of textbook authors. Creating such a platform could reduce the overhead of writing open textbooks, making publishing accessible to more authors.

There are currently a number of open source software platforms that help with some aspects of publishing, such as managing the editorial workflow (e.g., PKP's Open Monograph Press), and typesetting and file format conversion (e.g., Pressbooks). But none of these platforms were developed to meet the specific needs of authors outlined in this proposal. Pressbooks is probably the closest, but it does not support the kinds of complex structural requirements we need in textbooks and it is not easily extendable. There is no platform designed to help ensure faculty create well-structured, instructionally consistent textbooks.

As evidence of national need, a number of OTN members have submitted letters of support for this project (attached), including Hawaii Community Colleges, Miami University, North Carolina State University, Open Oregon Educational Resources (serving all public institutions in Oregon), Portland State University, University of Arizona, University of Cincinnati, University of Hawaii at Manoa, University of North Texas, and Virginia Tech. Their experiences developing and managing open textbook programs have convinced them that a standardized authoring platform could smooth production workflows and make the process of customizing open content easier for faculty.

Four other letters of support come from experienced open textbook faculty authors. Caitlin Finlayson, University of Mary Washington; Matthew DeCarlo, Radford University; Jonathan Poritz, Colorado State University, Pueblo; and Ralph Morelli, Trinity College (faculty emeritus), are all faculty authors who have written and published open textbooks in their respective fields. They have contributed letters of support to this project because they know first-hand the time it currently takes to learn production tools and processes currently required to address the complex publishing requirements of textbooks. By creating an open authoring platform, more faculty authors would be interested and willing to write open textbooks, because they could focus on creating content, rather than on production overhead.

One additional letter of support comes from BCcampus – an international leader in open education – with extensive experience publishing textbooks with faculty in British Columbia.

The national need is clear: For the open education movement to advance, a platform is needed that will give academic libraries a tool to support their faculty in creating well-structured open textbooks.

### **Project Design**

Therefore, the OTN proposes the development of an open source National Platform for Authoring Open Textbooks.

#### **PLATFORM DESCRIPTION AND BENEFITS**

The Textbook Authoring Platform will provide a strategic infrastructure for writing, designing, and producing open textbooks. While the details of the features of The Platform will be guided by the Advisory Group, major functionality will include:

(1) Structuring the Authoring Experience - The Platform will provide structural supports to help authors delineate and apply consistent instructional design across all elements of a textbook.

(2) Interoperability – Content import/export functionality will allow interoperability with existing publishing technologies through standard data and file structures (e.g, import docx files, export ePub files).

(3) Collaboration – The Platform will provide collaboration functionality for faculty to work with other authors, librarians, editors, peer reviewers, instructional designers, and other contributors who can help authors create quality textbooks.

### Structuring the Authoring Experience

Textbooks typically involved more structure and design than most other academic publications. These structures are important, as they delineate distinct instructional design elements that are unique to textbooks. For example, a textbook might start each chapter with a list of learning objectives, or end each unit with a glossary of terms. These elements are important to student learning, as they provide mechanisms and structures that scaffold students' understanding of the subject matter. They provide structure, context, overview, motivation, review, and other functions that are useful for learning. But they make publishing a textbook complex and challenging. Left on their own with no guidance on textbook structure, some faculty tend to minimize these elements, possibly writing something more akin to a monograph.

The Platform will approach this challenge using lessons learned from web development. The method has been used and refined with actual authors on three book projects by OTN staff in face-to-face settings. Modern, well-structured web development involves the separation of structure, content, and design. The Platform will similarly separate the authoring tasks into these components, allowing authors to focus on one thing at a time – book/element structure, content, and design.

**Book/Element Structure** - First, the Platform will prompt the author and/or support team to decide on which structural elements the textbook will include, giving the textbook consistent elements from chapter to chapter. Examples of structural elements include:

Cover page	Objectives
Front matter, license and attribution	Overview
Table of Contents	Introduction
Preface or Forward	Body
Unit	Graphs, images, tables, maps
Chapter (within unit)	Sidebar
Section (within chapter)	Key terms
Sub-section (within section)	Vocabulary terms
Bibliography	Practice questions
Resources	Example sets
Appendices	Case Studies
Index	Conclusions
Instructor or Ancillary Materials	Answer keys
Headings	

Once these structural decisions are made, they can be applied to all units/chapters/sections, ensuring a consistency across the textbook that is important to student learning. For example, an author might decide to design a book so that each chapter includes the following structural elements:

Chapter:  
 Introduction  
 Objectives  
 Key Terms  
 [Sections]  
 Discussion Questions

And each section has these consistent elements:

Section:  
 Main Content  
 Review Questions

The process of creating this outline encourages authors to think through pedagogical elements that they might not have otherwise considered.

The other part of the book structure that needs to be developed is the content outline. The author needs to indicate the content scope and sequence that the textbook will cover. For instance, a Biology textbook content outline (for two chapters) might look like this:

Chapter 11. Meiosis and Sexual Reproduction  
 Section 11.1 The Process of Meiosis  
 Section 11.2 Sexual Reproduction  
 Chapter 12. Mendel's Experiments and Heredity  
 Section 12.1 Mendel's Experiments and the Laws of Probability  
 Section 12.2 Characteristics and Traits  
 Section 12.3 Laws of Inheritance

When these structures chapter/section structure and the content structure are combined, the complete structure of the textbook is revealed. For this example, combining these structures results in this outline:

Chapter 11. Meiosis and Sexual Reproduction  
 Introduction  
 Objectives  
 Key Terms  
 Section 11.1 The Process of Meiosis  
 Main Content  
 Review Questions  
 Section 11.2 Sexual Reproduction  
 Main Content  
 Review Questions  
 Discussion Questions  
 Chapter 12. Mendel's Experiments and Heredity  
 Introduction  
 Objectives  
 Key Terms  
 Section 12.1 Mendel's Experiments and the Laws of Probability  
 Main Content  
 Review Questions

Section 12.2 Characteristics and Traits Main Content Review Questions Section 12.3 Laws of Inheritance Main Content Review Questions
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The Platform will guide authors through creating these structures, and will combine them to guide authors' writing of content.

**Content** - Once content structuring decisions have been made and the outline generated, authors can focus on writing the content. The outline will ensure that the authors know exactly what content they need to write, and ensures consistency across all chapters and sections of the textbook.

**Design** - Additionally, authors will not need to worry about formatting each element of the textbook as they write, as that will be determined by an overarching stylesheet that provides consistent formatting for each element of the book, allowing the author to focus on content and pedagogy. For instance, the style sheet could include a style that renders the list of objectives at the beginning of each chapter in a blue box in bold font. Knowing that these styles will be applied, authors don't need concern themselves with font sizes, colors, margins, etc. when writing their content. The style sheet can be changed at any time to consistently change the styles across the textbook.

### Interoperability

Separating structure, content, and design will help scaffold authors' efforts and result in textbooks that are better designed and more pedagogically effective. In addition, this process will result in textbook content that is well-structured, providing interoperability benefits that come with structured data.

The content structure will ensure the textbook can be exported in formats like ePub, docx, html, mobi, and even InDesign (if there is a desire to import it into a more traditional publishing workflow). This will make sharing textbook content easier between other existing platforms and services, and ensure the content will be made useful to support accessibility technologies, like screen readers and braille printers.

In addition, The Platform will be import docx files, as Microsoft Word is the most common writing tool used by authors. Other import formats will be discussed with the Advisory Group.

### Collaboration

The role that librarians play in the publishing process is often as project and author management. They help keep the project moving, assist in communications, suggest deadlines, and generally watch over the project. The Platform will allow librarians to work alongside the authors to help manage the process and project.

The Platform could be used by a single author, with no other people involved. However, The Platform will be built on Editoria, an open source book publishing platform (described in-depth in The Platform Development section of this proposal) that is capable of handling collaborative publishing workflows if desired, and these capabilities will be retained for The Platform. This includes role-based authentication that will allow flexibility and control over the production process. A textbook could have multiple individuals serving in different roles, including authors, editors, and reviewers. This will allow

multiple authors to work on a textbook, or allow librarians to help manage the process as an editor or project manager.

Examples of roles that will be accommodated:

**Multiple Authors** - The Platform will support multiple authors working on a single textbook.

**Editors** - Editors can establish deadlines, assign reviewing tasks, and manage overall communications.

**Peer Reviewers** - The peer reviewer role will allow invited faculty to comment on the book content as feedback to the author. The author will be able to review and respond to edits directly in the system.

The specifics of how these and other roles progress to best meet the needs of textbook publishing will be discussed by the Advisory Group.

## PLATFORM DEVELOPMENT

The OTN will work with Cabbage Tree Labs for all production work. Cabbage Tree Labs was founded by Adam Hyde, who has created more online publishing platforms than anyone in the sector. Adam is also co-founder of Cabbage Tree Labs' sister organization - the Collaborative Knowledge (Coko) Foundation, a non-profit with the goal to "build community-owned solutions in open science, open research, and open education."

The Coko Foundation is constructing an open source technology framework to support a wide range of digital-first publishing use-cases. We are choosing their book publishing framework, Editoria, as a starting point for development of The Platform. Editoria is a very sophisticated book production framework that has been designed to be easily extensible. It is written using modern JavaScript frameworks and shares the same open source 'back end' (PubSweet) with nine other open source publishing platforms developed by eLife, The European Bioinformatics Institute, Hindawi, Digital Science, and others. Editoria itself was developed with the University of California Press and the California Digital Library. In addition to Editoria, The Platform will benefit from development on Coko's Wax Editor, a web-based word processor, and style sheets developed for digital and print-ready PDF output. All frameworks are built with open sources software components (e.g., JavaScript, Node.js, React, PostgreSQL).

### Advisory Group

The Platform design and development process will be guided by an advisory group with members representing expertise in publishing from different perspectives – library publishing, faculty authors, and instructional design and accessibility - recruited from the vast expertise existing within OTN member schools and beyond:

#### **Library Publishing**

Karen Bjork, Head of Digital Initiatives, Portland State University Libraries

Kevin Hawkins, Assistant Dean for Scholarly Communication, University of North Texas  
Libraries

Dr. Mark Konecky, Scholarly Communications Publishing Coordinator, University of Cincinnati  
Libraries

Carla Myers, Coordinator of Scholarly Communications, Miami University Libraries

Karen Lauritsen, Managing Director, Open Textbook Network

### **Faculty Authors**

Matt DeCarlo, Radford University

Jonathan Portiz, Colorado State University

### **Instructional Design/Accessibility**

Josie Grey, Coordinator of Collection Quality, Open Education, BCcampus

The advisory group will be engaged throughout the design and development process (as described below) starting in late 2019, with the first of four facilitated design sessions to clarify existing priorities, desired features, and functionality.

### **Technology Development**

The development process will be very open, iterative, and community focused. The major development tasks are as follows:

**Facilitation/Design** – Adam Hyde and Cabbage Tree Labs will facilitate design sessions with the Advisory Team, resulting in documentation describing the next set of development tasks. In all, four sessions will be held – two in year one and two in year two.

**Wax Editor Development** - The Wax Editor will be edited to support content structure requirements that emerge from the design sessions. This might include the development of additional tools necessary for textbook production (e.g., a 'quiz widget' for formatting quizzes).

**Automated Typesetting** – Stylesheets will be created to target print-ready PDF output. This also includes making changes to the typesetting engine itself (paged.js) to support any textbook-specific layout features (e.g., 'pop out' or margin boxes).

**Editoria Development** - The core Editoria application will be changed to support the open textbook production workflow, described in “Platform Description and Benefits” section of this proposal.

The development process will be very open. It will reflect the priorities identified during the four design sessions, facilitated by Adam Hyde. Adam is very experienced in this area and has facilitated similar design sessions with the University of California Press, European Bioinformatics Institute, Arxiv, the Organization for Human Brain Mapping, and others. Adams team will then take these designs, convert them into issues in the repository, form a roadmap, and start developing.

The Platform will be licensed with an MIT license, aligning with the licensing of the underlying Editoria framework. By creating an open source platform, the project’s viability beyond the funding period is increased. Others in the community can build on the tool, potentially create new features that can meet local or global needs, and make those features available to everyone. Cabbage Tree Labs is very experienced with open source (they produce only open source products) and have proven good stewards of software communities and products. All code will be available in GitLab repositories during development and in perpetuity afterwards.

### **Community Engagement**



The most important part of any successful open source software project is an active community. As stated earlier, the OTN's library members are very interested in open textbook publishing. While the project is starting with a small Advisory Group, the OTN staff will work to grow the number of libraries involved in the project by regularly communicating and pointing them to the code as it evolves. At any given time, there are dozens of publishing projects happening at OTN member libraries. These are local library-led initiatives, where faculty are compensated for their efforts and libraries provide the funding and support. The OTN will promote the software, even while it's in development, as a tool that available for exploration. It is expected that there will be significant interest in self-hosted instances of The Platform that member libraries will experiment with. OTN staff will create an interest group of members to encourage engagement with the project and build involvement in the community.

### Community, Support, and Training

Faculty need to be made aware, supported, and engaged with the new tool. This is why librarians' involvement is so crucial. Librarians are perfectly positioned to be the people on campus who will bring the tool to their faculty, help faculty become engaged with it, train them to use it, and support the ongoing publishing project (and, as noted earlier, they're seen as trustworthy, unbiased, and knowledgeable). This support is challenging work, and OTN is committed to providing the documentation, training, and community to make them successful.

**Documentation** - Editoria already has substantial documentation and the OTN will work with the developers to keep it maintained as new features are added.

**Training** - The OTN has educated more librarians about open education than any other organization. The OTN delivers professional development in a number of ways: day-long workshops, a Certificate on Open Education Librarianship, the OTN Summer Institute and Summit, and online training developed for our Open Textbook Publishing Cooperative. Most of the professional development has been focused on adoption of open textbooks, with the exception of the Publishing Cooperative curriculum. Once developed, awareness and education about The Platform will become a central topic of training in all OTN professional development programs.

The OTN's existing publishing training will also be an excellent companion to The Platform, as it trains librarians on the fundamentals of working with faculty to support textbook publishing (project management, author management, best practices for textbook production) that is agnostic of the publishing technology used.

To encourage faculty use of the platform, the OTN will provide training materials to academic libraries to promote the tool locally. The OTN also runs open education workshops for faculty, with over 4000 faculty trained to date. Once The Platform is viable, these trainings will be updated to promote it to faculty directly.

**Community** - The most important part of any successful open source software project is an active community. A large, active community encourages improvements of the code, helps promote broader use, and diversifies the voices involved in the project. While the OTN can't make anyone get involved with The Platform will be ideally positioned at the center of a large community of institutions (914 libraries) interested in open education. Initially, the project will start with a small Advisory Group, but OTN staff will work to grow the number of libraries involved in the project by regularly communicating and pointing them to the code as it evolves. At any given time, there are dozens of textbook publishing projects happening at OTN member libraries. These are local library-led

initiatives, where faculty are compensated for their efforts and libraries provide the funding and support. OTN staff will encourage experimentation, and create an interest group of members to encourage member engagement with the project and build involvement in the community.

The OTN will ensure that there is documentation, training, and community to support this initiative. This is what the OTN does best – gathers the community around an opportunity/challenge and moves forward collaboratively. It has helped librarians engage faculty around open textbook adoptions (4,000+), writing textbook reviews (3,000+), and publishing textbooks.

## EVALUATION

This project started with the OTN library community asserting the need for a tool that will help them support their faculty who wish to author open textbooks. The complexity of textbooks made support challenging and unwieldy. To measure whether this project is successful in creating such a tool, two measures will be examined:

**Use** – With such an open development process, there should be significant use by the end of the third year. It will likely be too early to see any textbooks actually published from the platform, but we could poll our members to see how many libraries were actively using the platform with their faculty.

**Needs Met** – The design of the platform will be largely guided by the Advisory Group. The group will set the development agenda for the platform, and stay engaged in it throughout the project. At the conclusion of the project, the Advisory Group will be gathered for a virtual focus group to answer the question “Does The Platform meet the needs that this group expressed?” In addition, any librarians and authors in the network who are using the platform will be surveyed with the same question – “Is it meeting the needs of you and your faculty authors?” based on the scope of the original project design.

## TIMELINE

December, 2019: Project kickoff. Advisory Group gathers for initial facilitated design session. Design documents created.

January, 2020 – June, 2020: Wax Editor development

June, 2020: Second Advisory Group meeting. Design documents created for next phase.

July, 2020 – December, 2020: Complete Wax Editor development. Begin Editoria and stylesheet development.

December, 2020: Third Advisory Group meeting. Design documents created for next phase.

January, 2021 - August, 2021: Editoria and stylesheet development.

August, 2021: Fourth and final Advisory Group meeting. Final design documents created for next phase.

September, 2021 - August, 2022: Final development of Wax Editor, Editoria, and stylesheets.

August, 2022: Program evaluation

## BUDGET

This grant request is for \$488,775 from IMLS, with the University of Minnesota contributing \$488,775 for a total of \$977,550.

Salaries and benefits for program staff	\$364,701
Software development	\$337,500
Travel (Advisory Group)	\$32,799
Indirect costs (33%)	\$242,550
<b>TOTAL</b>	<b>\$977,550</b>

See the attached budget justification for details on the resources needed for this program. At the conclusion of this grant, the OTN will continue maintaining and improving The Platform with funding from OTN membership fees and possibly additional grant funding, as appropriate. It will continue to nurture a community of librarians and authors for continuous improvement of The Platform.

This project will be planned and managed by Dr. David Ernst, Chief Information Officer in the College of Education & Human Development at the University of Minnesota. He is also Director of the Center for Open Education and Executive Director of the Open Textbook Network. Dr. Ernst has personally developed several software applications and has managed a software development team for the past 10 years. Karen Lauritsen, OTN's Managing Director, will also guide the platform's development, manage the work with the Advisory Group, create training for the Platform, and develop the community of practice surrounding it. Ms. Lauritsen is currently responsible for all of the OTN's textbook publishing efforts, including leading the Open Textbook Publishing Cooperative, and developing the open textbook publishing curriculum.

### **National Impact**

Nationally, there is a growing number of faculty interesting in becoming open textbook authors. And libraries are increasingly interested in finding ways to support these potential authors. But it's a steep climb. Currently, the technical expertise needed to support a textbook author is immense, limiting the number of libraries who can afford it to only a privileged few.

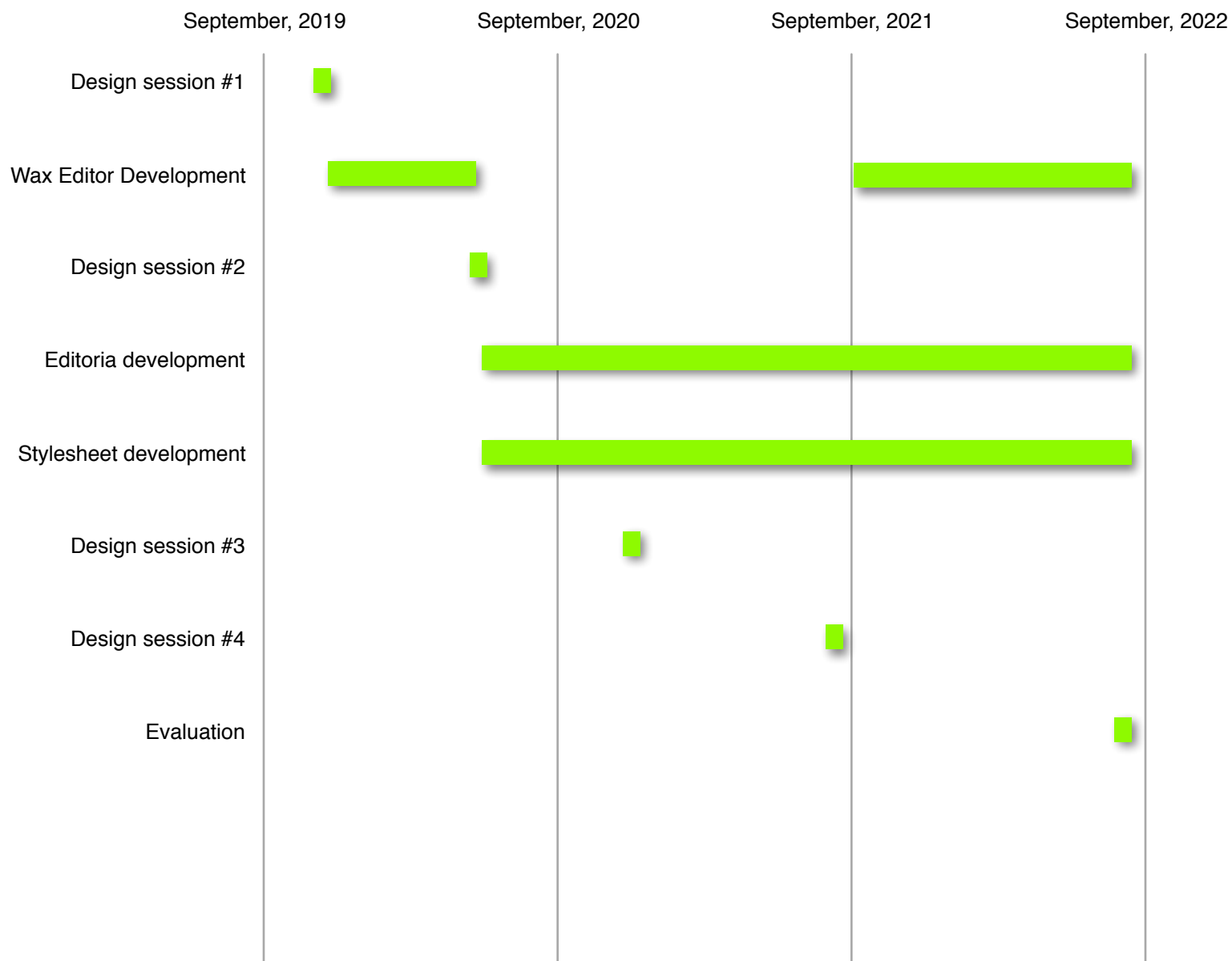
Higher education needs textbooks that contain pedagogical elements, are consistently structured, and are technically interoperable. The Platform will simultaneously help authors with all three of these items - structure the textbook, help them think about pedagogical devices, and create interoperable content by default. Lowering the cost of textbook production means that more libraries will be able to support their authors, which means more textbooks can be created, which will lead to more adoptions nationally. As one preliminary reviewer noted,

“The platform described could make it easier for underresourced [sic] postsecondary institutions to engage in the open textbook development process, this could have national impact by engaging more diverse perspectives and experiences in the development of resources available under an open license.”

The OTN is already addressing a number of awareness and education barriers to open textbook adoption. But addressing the number of textbooks available can only be done by reducing the cost and effort of production, which is what The Platform will do.

# Schedule of Completion

Open Textbook Network  
University of Minnesota





## DIGITAL PRODUCT FORM

### Introduction

The Institute of Museum and Library Services (IMLS) is committed to expanding public access to federally funded digital products (e.g., digital content, resources, assets, software, and datasets). The products you create with IMLS funding require careful stewardship to protect and enhance their value, and they should be freely and readily available for use and re-use by libraries, archives, museums, and the public. Because technology is dynamic and because we do not want to inhibit innovation, we do not want to prescribe set standards and practices that could become quickly outdated. Instead, we ask that you answer questions that address specific aspects of creating and managing digital products. Like all components of your IMLS application, your answers will be used by IMLS staff and by expert peer reviewers to evaluate your application, and they will be important in determining whether your project will be funded.

### Instructions

All applications must include a Digital Product Form.

- Please check here if you have reviewed Parts I, II, III, and IV below and you have determined that your proposal does NOT involve the creation of digital products (i.e., digital content, resources, assets, software, or datasets). You must still submit this Digital Product Form with your proposal even if you check this box, because this Digital Product Form is a Required Document.

If you ARE creating digital products, you must provide answers to the questions in Part I. In addition, you must also complete at least one of the subsequent sections. If you intend to create or collect digital content, resources, or assets, complete Part II. If you intend to develop software, complete Part III. If you intend to create a dataset, complete Part IV.

### Part I: Intellectual Property Rights and Permissions

**A.1** What will be the intellectual property status of the digital products (content, resources, assets, software, or datasets) you intend to create? Who will hold the copyright(s)? How will you explain property rights and permissions to potential users (for example, by assigning a non-restrictive license such as BSD, GNU, MIT, or Creative Commons to the product)? Explain and justify your licensing selections.

**A.2** What ownership rights will your organization assert over the new digital products and what conditions will you impose on access and use? Explain and justify any terms of access and conditions of use and detail how you will notify potential users about relevant terms or conditions.

**A. 3** If you will create any products that may involve privacy concerns, require obtaining permissions or rights, or raise any cultural sensitivities, describe the issues and how you plan to address them.

## **Part II: Projects Creating or Collecting Digital Content, Resources, or Assets**

### **A. Creating or Collecting New Digital Content, Resources, or Assets**

**A.1** Describe the digital content, resources, or assets you will create or collect, the quantities of each type, and the format(s) you will use.

**A.2** List the equipment, software, and supplies that you will use to create the content, resources, or assets, or the name of the service provider that will perform the work.

**A.3** List all the digital file formats (e.g., XML, TIFF, MPEG) you plan to use, along with the relevant information about the appropriate quality standards (e.g., resolution, sampling rate, or pixel dimensions).

## **B. Workflow and Asset Maintenance/Preservation**

**B.1** Describe your quality control plan. How will you monitor and evaluate your workflow and products?

**B.2** Describe your plan for preserving and maintaining digital assets during and after the award period of performance. Your plan may address storage systems, shared repositories, technical documentation, migration planning, and commitment of organizational funding for these purposes. Please note: You may charge the federal award before closeout for the costs of publication or sharing of research results if the costs are not incurred during the period of performance of the federal award (see 2 C.F.R. § 200.461).

## **C. Metadata**

**C.1** Describe how you will produce any and all technical, descriptive, administrative, or preservation metadata. Specify which standards you will use for the metadata structure (e.g., MARC, Dublin Core, Encoded Archival Description, PBCore, PREMIS) and metadata content (e.g., thesauri).

**C.2** Explain your strategy for preserving and maintaining metadata created or collected during and after the award period of performance.

**C.3** Explain what metadata sharing and/or other strategies you will use to facilitate widespread discovery and use of the digital content, resources, or assets created during your project (e.g., an API [Application Programming Interface], contributions to a digital platform, or other ways you might enable batch queries and retrieval of metadata).

## **D. Access and Use**

**D.1** Describe how you will make the digital content, resources, or assets available to the public. Include details such as the delivery strategy (e.g., openly available online, available to specified audiences) and underlying hardware/software platforms and infrastructure (e.g., specific digital repository software or leased services, accessibility via standard web browsers, requirements for special software tools in order to use the content).

**D.2** Provide the name(s) and URL(s) (Uniform Resource Locator) for any examples of previous digital content, resources, or assets your organization has created.

## **Part III. Projects Developing Software**

### **A. General Information**

**A.1** Describe the software you intend to create, including a summary of the major functions it will perform and the intended primary audience(s) it will serve.



**A.2** List other existing software that wholly or partially performs the same functions, and explain how the software you intend to create is different, and justify why those differences are significant and necessary.

## **B. Technical Information**

**B.1** List the programming languages, platforms, software, or other applications you will use to create your software and explain why you chose them.

**B.2** Describe how the software you intend to create will extend or interoperate with relevant existing software.

**B.3** Describe any underlying additional software or system dependencies necessary to run the software you intend to create.

**B.4** Describe the processes you will use for development, documentation, and for maintaining and updating documentation for users of the software.

**B.5** Provide the name(s) and URL(s) for examples of any previous software your organization has created.

### **C. Access and Use**

**C.1** We expect applicants seeking federal funds for software to develop and release these products under open-source licenses to maximize access and promote reuse. What ownership rights will your organization assert over the software you intend to create, and what conditions will you impose on its access and use? Identify and explain the license under which you will release source code for the software you develop (e.g., BSD, GNU, or MIT software licenses). Explain and justify any prohibitive terms or conditions of use or access and detail how you will notify potential users about relevant terms and conditions.

**C.2** Describe how you will make the software and source code available to the public and/or its intended users.

**C.3** Identify where you will deposit the source code for the software you intend to develop:

Name of publicly accessible source code repository:

URL:

## **Part IV: Projects Creating Datasets**

**A.1** Identify the type of data you plan to collect or generate, and the purpose or intended use to which you expect it to be put. Describe the method(s) you will use and the approximate dates or intervals at which you will collect or generate it.

**A.2** Does the proposed data collection or research activity require approval by any internal review panel or institutional review board (IRB)? If so, has the proposed research activity been approved? If not, what is your plan for securing approval?

**A.3** Will you collect any personally identifiable information (PII), confidential information (e.g., trade secrets), or proprietary information? If so, detail the specific steps you will take to protect such information while you prepare the data files for public release (e.g., data anonymization, data suppression PII, or synthetic data).

**A.4** If you will collect additional documentation, such as consent agreements, along with the data, describe plans for preserving the documentation and ensuring that its relationship to the collected data is maintained.

**A.5** What methods will you use to collect or generate the data? Provide details about any technical requirements or dependencies that would be necessary for understanding, retrieving, displaying, or processing the dataset(s).

**A.6** What documentation (e.g., data documentation, codebooks) will you capture or create along with the dataset(s)? Where will the documentation be stored and in what format(s)? How will you permanently associate and manage the documentation with the dataset(s) it describes?

**A.7** What is your plan for archiving, managing, and disseminating data after the completion of the award-funded project?

**A.8** Identify where you will deposit the dataset(s):

Name of repository:

URL:

**A.9** When and how frequently will you review this data management plan? How will the implementation be monitored?