

AGILE PROJECT MANAGEMENT
& SUMMER CONFERENCE ISSUE

June 2023

Trends and Issues in Library Technology



International Federation
of Library Associations and Institutions
IFLA IT Section

TRENDS & ISSUES IN LIBRARY TECHNOLOGY

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Editor's Notes

Agile Project Management and Conference Issue



As the world of Artificial Intelligence expands, these effects are transforming our technological landscape at an unprecedented pace. With these thoughts in mind, we present this special edition of IFLA IT's *Trends and Issues in Library Technology*, which, fittingly, delves into the necessities of Agile Project Management.

Given the ever-increasing complexity of library IT projects, characterized by emergent software frameworks and paradigm shifts in information technology, the necessity for adopting Agile methodologies is apparent. To address this topic, we have assembled a great collection of articles centered around Agile Project Management. I am also delighted to announce our forthcoming IT Satellite Pre-Conference, [Agile Methodologies in Libraries: Innovations in Library Projects and Management](#), to be held at the Netherlands' Erasmus University, preceding the [IFLA World Library and Information Congress](#) in Rotterdam. I encourage everyone to attend.

The special feature section of this issue comprises an exploration of Agile Project Management, ranging from large-scale consortial university projects to national libraries, as well as conceptual overviews of Agile principles. Contributions include Galadriel Chilton's insightful account of the Ivy Plus Libraries Confederation's adoption of Agile methods for collaborative collection projects and organizational development and a fascinating case study by Jean-Sébastien Gendreau, Mathieu Sabourin, and Kat Timms detailing the implementation of Agile processes at the National Library and Archives of Canada. I contributed an article on Agile Project Management Principles for libraries which focuses on the Agile philosophy within larger contexts of IT project management and Angela

Yon, from Illinois State University presents an innovative, project, Contextualizing Performers in Circus Route Books: Linked Data Entities and the Open Data Environment, synthesizing complex historiographies with library technologies through planning and collaboration with stakeholders on contextual and technological levels.

This issue also features a comprehensive conference overview by our chair, Dr. Edmund Balnaves, on the IT section's great contributions this year to the *upcoming IFLA World Library and Information Congress* in Rotterdam and Communication Director, Francois Xavier Boffy on IT-related sessions. Patrick Cher also provides an excellent account of the second IFLA IT-sponsored AI Satellite, held in collaboration with the National Library Board of Singapore earlier this year.

I hope that many of you will join us at the forthcoming conference in the Netherlands which possesses many cultural attractions, including the Rotterdam's Bauhaus Museum Boijmans Van Beuningen, Erasmus Bridge, and Amsterdam's art historical cultural treasures including Van Gogh, Rembrandt, and the Rijksmuseum.

I look forward to meeting each of you at our annual conference and Satellite, and extend warm wishes for safe travels.

Kind Regards,
Ray



Ray Uzwyshyn, Ph.D. MBA MLIS
ruzwyshyn@gmail.com
Editor, Trends and Issues in Library Technology

IT Section Chair's Corner

Message from the Chair

The IT section continues to be at the crossroads in IFLA, given the increasing impact of information technology on all aspects of life. The section collaborated with other IFLA standing committees to plan a great line of the for the IFLA congress in Rotterdam (dates) including:

1. Our open session: **Digital Technologies and Sustainability: Say Your Piece in 7+3** - being coordinated by May Chang
2. A joint session with *Library Buildings and Equipment Section: Technology Enhanced Library Learning Environments, Architectural Spatial Design and New Information Technology Possibilities* coordinated by Ray Uzwyshyn in conjunction with Buildings and Equipment section
3. A joint session with AMVS: **Artificial Reality/Virtual Reality, metaverse, immersive technologies – New methods for Sustainable Communities in Libraries.** Coordinated by Edmund Balnaves and May Chang in conjunction with AMVS/Monique Threatt
4. A joint Session with Cataloguing and Subject Analysis and Access sessions. **Artificial Intelligence and machine learning for cataloguing: utopia, threat or opportunity?** Coordinated by Vincent Boulet (Cataloguing) in conjunction with Cory Lampert
5. A joint session with Subject Analysis and Access. **Library data in the world of machine learning: ethics, bias and algorithms** Coordinated by Cory Lampert with SAA
6. Our satellite conference: **Agile methodology in libraries: innovations in library projects.** Coordinated by Elena Sanchez
7. **Artificial Intelligence, Partner or Rival?: Implications for Government, Information and the Law** - An AI SIG event coordinated by Andrew Cox
8. **Will Generative AI be a friend or foe in the future of librarianship?** An AI SIG event (Provocation) led by DH/DS
9. **Let's library for responsible AI** (Panel) Led by FAIFE and also with CLM with AI SIG cooperation.

The renewal cycle for the Information Technology Section is underway with elections for section membership required given the number of applicants to join the section. The changes in section composition invariably bring new ideas and focus for the activities of the standing committee, and fresh insights into the experience of IT in the library sector to share with IFLA. I look forward to welcoming the new members of the section at our first meeting in May.

You will see the starring presence of Artificial Intelligence in this congress. IFLA (and wider society) are absorbing the growing presence of AI. The IT section has had strongly attended and very interesting conferences on AI in Galway (July 2022) and Singapore (March 2023). This discourse is very important as the library community assesses the role of AI and its impact on operations and the profession. ChatGPT burst on the scenes seemingly complete like Aphrodite, promising to be everyone's new friend. The myth and the reality differ of course, and some of the strengths and weaknesses of the generative AI are being explored as we explore the role of this technology.

AI however is not the only theme that we are exploring. Our satellite conference on Agile methodology in Rotterdam follows on our successful Dublin 2022 session. We are also exploring the emerging role of the Metaverse and VR in libraries.

IFLA itself is in a point of inflection, especially with the creation of the regional divisions. The forthcoming congress will be an opportunity to understand further the new regional structures for IFLA.

I welcome you to this latest edition of TILT, also an important forum to explore different aspects of IT as they play out in librarianship.

Regards
Edmund



Edmund Balnaves, Ph.D.,
ejb@prosentient.com.au
Chair, IFLA IT Section

2023 IFLA Conference Sessions Overview

Francois Xavier Boffy, francois-xavier.boffy@univ-lyon1.fr

Head of IT Department, Claude Bernard - Academic Library
Université de Lyon, France



Like every year, but certainly more in 2023 than before, many sessions of the WLIC program will have to do with IT topics. Satellites and online events around this congress will also give opportunities to explore technological and digital libraries issues. Let's go for a small non-exhaustive "IT hitchhiker's guide"!

Not surprisingly, Artificial Intelligence will be a major IT topic this year, in line with both the raising of the newly formed AI SIG activities and the recent publicity of new AI generative tools impacting deeply many activities (including librarianship). We can here mention:

1. (Panel) Let's library for responsible AI
 - Led by FAIFE and CLM Section
 - 21 Aug (Mon), 12.30am CEST – Dock 10
2. (Provocation) Will Generative AI be a friend or foe in the future of librarianship?
 - Led by Digital Humanities/Digital Scholarship SIG
 - 22 Aug (Tue), 8.30am CEST – Dock 1
3. (Panel) Artificial Intelligence, Partner or Rival?: Implications for Government, Information and the Law
 - Led by AI SIG with participation of Division B
 - 22 Aug (Tue), 1.30pm CEST – Dock 1
4. (Ignite Talk) National Libraries + AI = Opportunities, Challenges & Risks
 - Led by National Libraries Section with IT Section and AI SIG
 - 23 Aug (Wed), 8.30am CEST – Rotterdam B+C+D
5. (Panel) Library data in the world of machine learning: ethics, bias and algorithms

- Led by IT Section with SAA and CAT sections
 - 23 Aug (Wed), 10am CEST – Port 1 B+C
6. (Panel) Utopia, threat or opportunity? Artificial Intelligence and Machine Learning for cataloguing
- Led by Cataloguing Section with IT and SAA sections
 - 23 Aug (Wed), 1.30pm CEST – Port 1 B+C

ARL section also plans a session around AI issue:

- (Hot Topic) From Gutenberg to ChatGPT: Will AI Change the Mission of Academic and Research Libraries?
 - 22 Aug (Tue), 10.15am CEST – Dock 1

AI is nonetheless not the one and only IT topic in tech-friendly librarians. Virtual reality was in the hype when Meta launched its metaverse applications, this is less in hot topics now but opportunities and risks about augmented and virtual spaces still have to be analysed by libraries. Joint session with AudioVisual and Multimedia Section will have the theme:

- AR/VR, metaverse, immersive technologies – building sustainable communities
 - 24 Aug (Thu), 10am CEST – Dock 1

Crossing building topics with digital transformation is a long-term work, but worth to be done as shown by the open session co-organized with Library Buildings and Equipment Section:

- Technology-Enhanced Library Learning Environments, Architectural Spatial Design and New Information Technology Possibilities
 - 22 Aug (Tue), 3pm CEST – Dock 1

WLIC 2022 gave the opportunity to propose an open session upon progressive and interesting adoption of agile methodology in library projects. This year the IT Section is organising a satellite meeting at Erasmus University Rotterdam on Friday August 18th:

- Agile methodology in libraries: innovations in library projects

As always, IT topics are never far from sessions where digital tools or processes are involved. Satellite meetings like “The school library standards in the digital age” (School Libraries section), “Universal Bibliographic Control at the crossroads: the challenges of unifying IFLA bibliographic standards” (Bibliography Section,

Cataloguing Section and Subject Analysis and Access Section) and “Working Together to Develop Digital Literate Learners” (Information Literacy Section) may be of interest.

There are certainly other sessions or meetings that would be relevant for the librarians involved in information technologies in libraries, so let’s keep track of the IFLA WLIC 2023 program (and/or on the [@IFLA_IT](#) Twitter account).



Retrospective of AI Satellite Conference in Singapore

Patrick Cher, patrick_cher@nlb.gov.sg

Senior Project Manager, Technology and Services Group
National Library Board, Singapore



Figure 1. National Library Building, Singapore

Introduction

A conference co-organised by the IFLA Information Technology (IT) Section, the Big Data Special Interest Group, the Artificial Intelligence Special Interest Group and the National Library Board (NLB), Singapore took place at the National Library Building on March 2 and 3, 2023. As part of the two-day hybrid conference, participants discussed AI's practical implementation, upcoming opportunities and future ethical considerations.

Pre-conference Library Tour of Robotics and Automation Solutions

The conference started on a high note, with a pre-conference library tour to the Tampines Regional Library on 1 March 2023. The tour gave delegates a first-hand view of the various robotics and automation solutions deployed for library operations, including the Mobile

Bookdrop and Shelf-Reading Robot. These solutions were part of the NLB's 5-year Libraries of the Future masterplan to transform library services and operations to serve users better. Guided by the smart operation roadmap, robotics and automation were introduced to reduce mundane and routine work, so that library staff could focus on higher value work.

Mobile Bookdrop

Due to its enormous physical space spanning 10,900 square metres, over five storeys, the Tampines Regional Library showcased robotics and automation to exemplary effect. Mobile Bookdrop was developed in response to library users' frustrations with finding stationary book drop stations far away from the main entrance. Mobile Bookdrop robots follow marked lines in the library with a bin attached. A bin can hold up to 150 books before replacement.



Figure 2. Mobile Bookdrop robot stopping for 2 library users at the Tampines Regional Library.

Auto Sorter

The Auto Sorter is a conveyor belt system that processes books returned at the bookdrop and sorts the returned items by detecting the RFID tag into bins based on pre-defined categories. Manual intervention was required for exception items, which makes up 1% of the returned items. Once the bins are filled, staff are alerted to transfer books to trolleys for shelving. Using analysis of past loan records, the Auto Sorter identified popular items for staff to put up on the “Just Returned” shelves near the library entrance.



Figure 3. Children observing the Auto sorter in the library@harbourfront.

Shelf-Reading Robot

The Shelf-Reading Robot is a robot that tackles the problem of erroneously placed books and reduces the number of man hours needed for those corrections. The robot detects RFID tags in the library books on the shelves, ensuring that they are in the right place and order, with 99% accuracy. The robot would produce a report detailing the misplaced books and their locations, so staff could replace them. With the robot, shelf-reading is performed twice a day, so that there are up-to-date records to enable users to search for the

location of a book on the shelf. Data on the items' locations were collected from the scans and fed into the library catalogue system. This enabled library users to locate books via the library map in the catalogue and NLB Mobile app.



Figure 4. Shelf Reading Robot in action of scanning shelves with its multiple arms.

Conference Retrospective

The conference presented informative and thought-provoking sessions, featuring esteemed speakers from organizations such as the National Institute of Education Singapore, Library of Congress, National Library of Australia, and Hong Kong SKH Ming Hua Theological College. Topics covered a wide range of areas, including AI-powered Library Innovations, AI-driven data analysis, AI in digital preservation, and the use of mini-AI games for Digital Humanities.



Figure 5. Dr Ramine Tinati giving the opening keynote.

The conference commenced with a welcome address by the chairperson of the IFLA IT Section, Dr Edmund Balnaves, followed by an opening keynote by Dr Ramine Tinati, Managing Director and ASEAN Chief Data Scientist at Accenture. Dr Tinati provided an overview of the landscape of AI and ML, discussing the current state of AI and advancements. He concluded his keynote by sharing a few industrial applications of AI, such as a toolkit that enables financial institutions to document bias in their AI models and a graph-based search engine and recommender that offers users a new experience to

find library items in the physical and digital catalogue. This set the stage for the mid-term conference.

Jacky Wong and Feng Yikang: Using Crowd Data to Create New User Experiences: Incorporating Robotic Process Automation, Geovisualisation and Service Robot

Jacky and Yikang presented information on the Robotic Process Automation (RPA), Geovisualisation and Service Robot projects undertaken by the National Institute of Education Singapore (NIE) in response to the local government's safe distancing and crowd control measures.

The NIE team developed an innovative approach using Wi-Fi usage data from various wireless access points in

the library as a proxy for crowd level. An RPA program was created to extract and compute this data to provide up-to-date information to staff and users. The data is accessible via an Application Programming Interface (API) that serves as an intermediary for different applications to communicate with each other.

The crowd data is displayed as a mobile responsive heatmap, which users can access through the library portal. This feature allows users to make informed decisions regarding their library visits and find less crowded spaces. TEMI, a roving service concierge robot, is also able to utilize the crowd level data to patrol crowded areas and broadcast Safe Management Measures announcements such as maintaining social distance and wearing masks.

Is the Library Crowded Now?

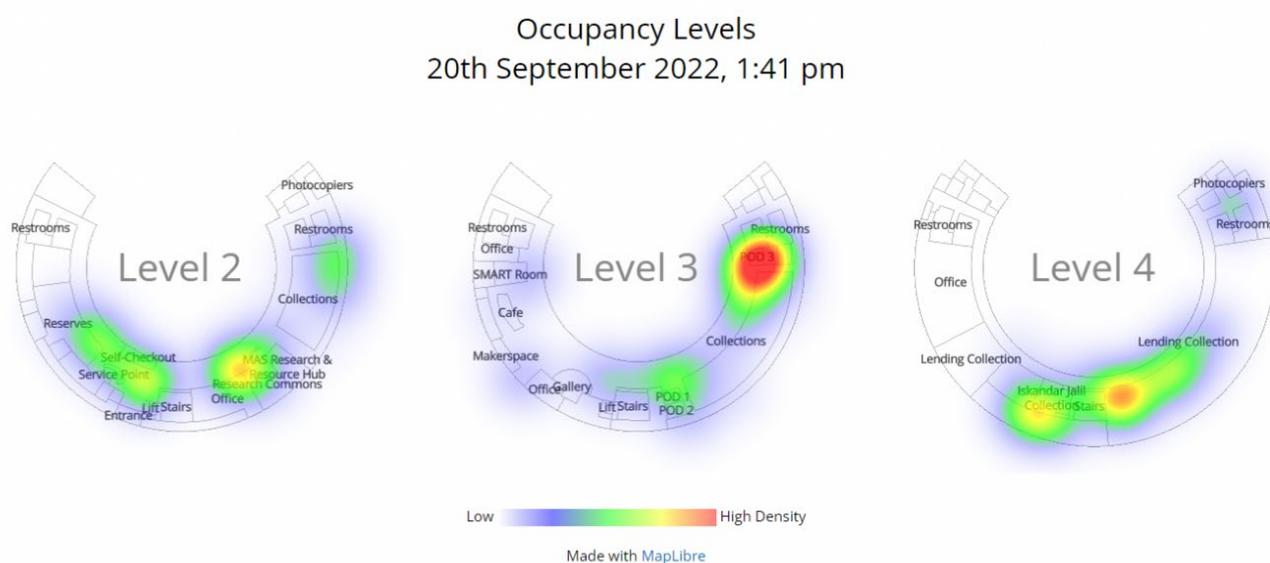


Figure 6. National Institute of Education's Heatmap showing where the crowd is.

Dr Helen Cheung and Yoko Hirose Nagao: Development of Mini-AI Games with Digital Humanities for Library User Education

Dr. Helen delivered a presentation on the project titled "Connect the World via Libraries" undertaken by Hong Kong SKH Ming Hua Theological College, aimed at facilitating the development of digital literacy skills amongst librarians, faculties and students from Hong Kong, Japan and Australia. The programme involves various activities such as online tours, talks and mini-AI games, with the objective of helping students acquire coding and digital literacy skills and creating teaching materials for librarians and faculties.

The mini-AI games employed block-based programming languages such as Scratch, mBlock and MIT App Inventor, designed to provide participants with little or no coding skills an introduction to basic programming concepts. This served as a foundation for participants to progress towards text-based programming languages.

Given that the theological college is primarily focused on humanities, the games developed by the participants were centred around this area. Some initial games included features like identifying books by facial expressions, learning Japanese vocabulary via a shooting game and finding seals via Chinese characters.

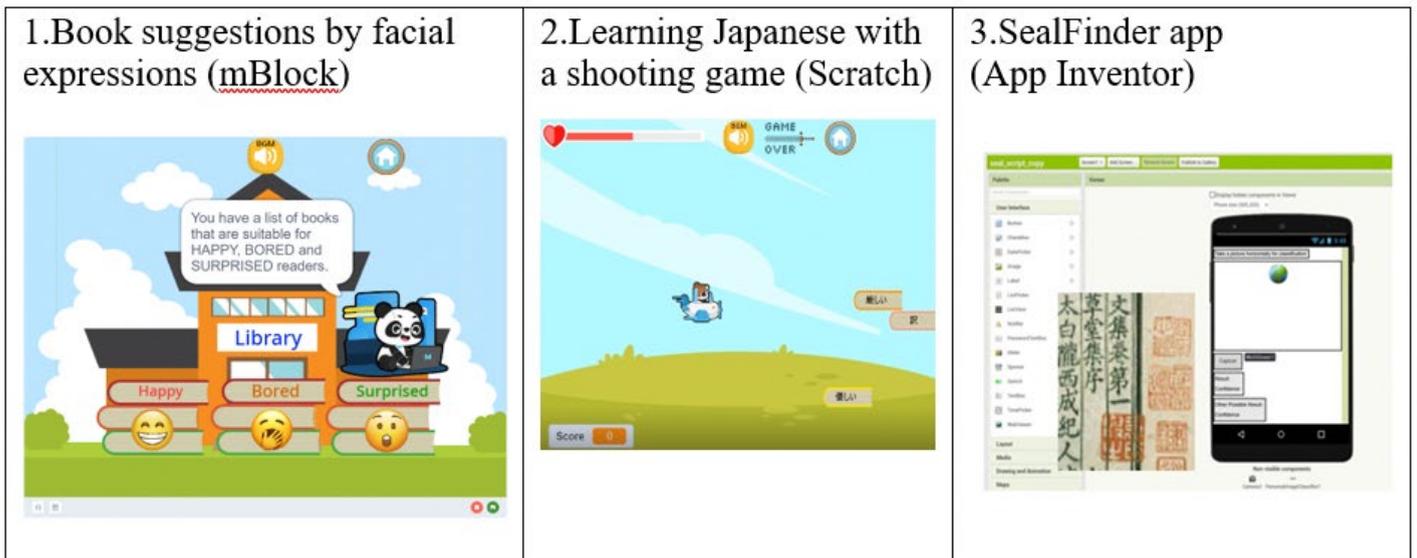


Figure 7. Mini-AI games developed by participants in August 2022.

Caroline Saccucci and Meghan Ferriter: Exploring Computational Description While Assessing Machine Learning

Caroline and Meghan, from the Library of Congress (LOC), presented an experiment to test five Machine Learning models in their ability to generate MARC record catalogue metadata from the contents of eBooks. The training data which the five ML models was trained on, consisted of 23,130 items and their existing catalogue records. A mix of text extraction and visual analysis approaches were tested on these five ML models – GROBID (GeneRation Of Bibliographic Data), Annif, LoC Spacy, BERT and NLP with Layout features.

The process of evaluation would help develop quality benchmarks for automated methods along with detailed benefits, risks, and costs. The outcomes of the experiment could help inform future developments in born-digital cataloguing workflows. A set of tools developed by the LC Labs team will be used to plan, document, analyse, prioritize, and assess AI technologies.

David Wong and Cathy Pilgrim: The National Library of Australia and AI - The Use of Machine Learning and Complex Search Algorithms for the Australian Web Archive, Plans For AI, and Considerations for its Use

Since the 1990s, the National Library of Australia (NLA) has been successful in operating digital library services through content digitisation for online access. The presentation by David and Cathy delved into the NLA's progress beyond digitisation, measures taken thus far, as well as artificial intelligence and machine learning scaling and automating operations to remain relevant in a digital age.

The Australian Web Archive (AWA) contains snapshots of .au websites from 1996, some of which were believed to have disappeared, but are still available in the archive in full colour. Users could perform full-text searches in the archive, which is one of the world's largest openly searchable archives of web content that has been fully indexed. The NLA's version of Google's PageRank algorithm was employed as well as AI in indexing and search functionality to suppress unwanted noise and junk and providing users with the results they expect or desire.

The presentation also covered the AWA's page ranking algorithm, Bayesian filtering, and machine learning image recognition used to identify and classify essential content for an archive comprising 700 terabytes of data across 15 billion objects.

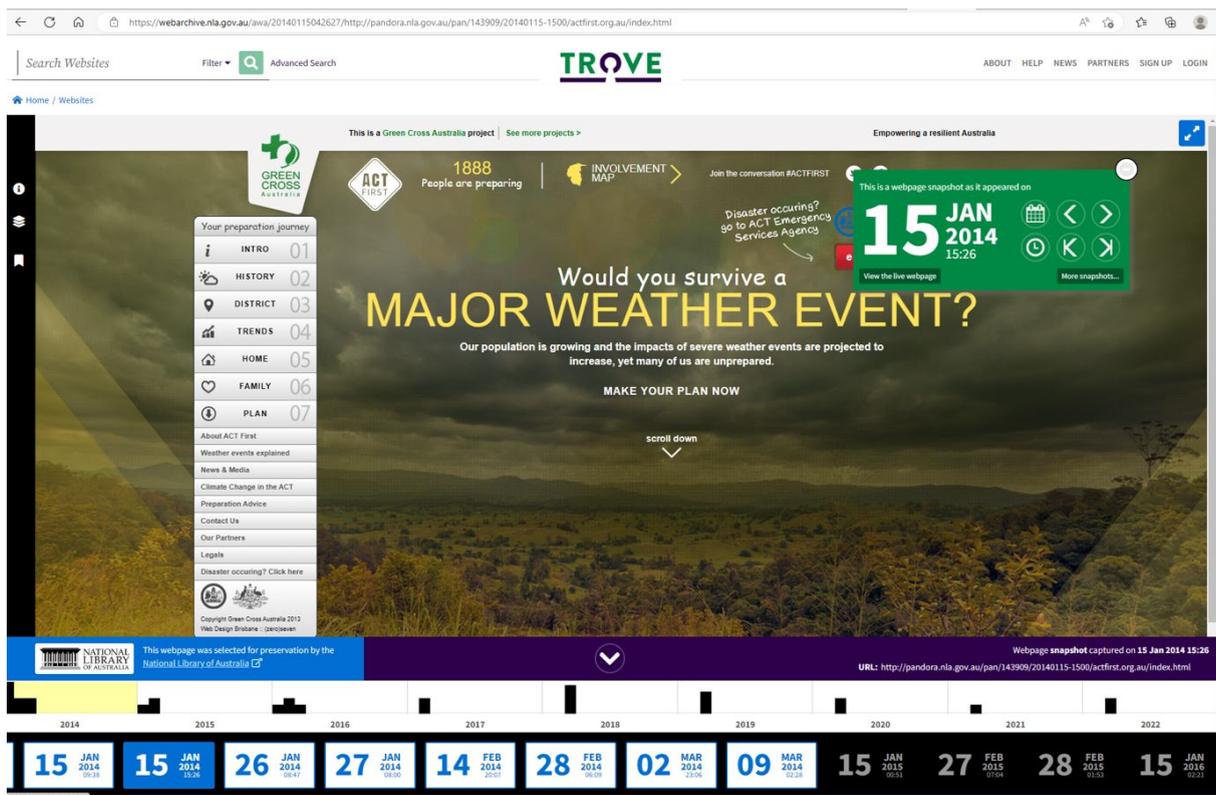


Figure 8. Screenshot of the Australian Web Archive.

Conference Workshops

The attendees were provided with the opportunity to participate in workshops on Ethics and AI, as well as exploring Chatbots, Recommender Engines and Image Recognition across both days.

In the Ethics and AI workshop, participants were facilitated by Dr Andrew Cox, where they had the chance to work in groups to create ethics scenarios to generate awareness and discussion around AI and its ethics.

Dr Edmund Balnaves and Iman Magdy Khamis facilitated the Exploring Chatbots, Recommender Engines and Image Recognition workshop, which provided hands-on experiences and insights. The attendees were taught how to start their own projects using open-source toolkits, start their AI projects on \$5/day and build their first book Python recommender system.



Figure 9. Ethics and AI workshop facilitated by Dr Andrew Cox.

Concluding Thoughts

In conclusion, the International Federation of Library Associations' conference "AI in Focus: Artificial Intelligence and Libraries" was a great success. The conference brought together experts from around the world to discuss the practical implementation of AI in libraries, its ethical considerations, and opportunities. Attendees were treated to informative and thought-provoking sessions, and workshops on Ethics and AI, Chatbots, Recommender Engines, and Image Recognition. The pre-conference library tour to the Tampines Regional Library showcased robotics and automation in library operations, which has improved efficiency, reduced human error, and lowered operation costs. The adoption of these technologies has also allowed library staff to focus on higher value work.

Overall, the conference was a fantastic opportunity for attendees to develop collaborative relationships, learn and share ideas on how AI can be leveraged to improve library services and user experience. I would like to express our sincere gratitude to our esteemed colleagues from the National Library Board Singapore, IFLA IT Section, Artificial Intelligence Special Interest Group, Big Data Special Group, speakers, attendees, and all those who have contributed to the success of this conference. I eagerly anticipate future opportunities for collaboration and further discussions on AI and libraries.

Using Agile Methods & Tools for Collaborative Collections Projects and Organizational Development

Galadriel Chilton, galadriel.chilton@yale.edu

Director, Collections Initiatives

Ivy Plus Libraries Confederation, USA



Ivy Plus Libraries Confederation

Figure 1: [Ivy Plus Libraries Confederation](#)

Introduction

In the past six years, the DCI has managed multiple projects using Agile principles that concluded on time and under budget and is currently managing pilot project for collaborative print acquisitions. By sharing examples of project design and practices for effective and efficient outcomes, this research illustrates how multidisciplinary project teams enhance diversity of expertise and institutional representation. Coupled with discrete project components and distinct project teams, each component may lead to mission-fulfilling progress towards the partnership's collaborative collection development strategic priority. For each project, applying an iterative and flexible Agile mindset to the project's management, is key.

Adaptations of Agile components and processes to the management of the following projects include:

- Collective Collection Analysis Dataset Feasibility Study which tested methods for how the IPLC partnership works together and how they deduplicated monograph holdings records from 6 institutions with different integrated library systems.
- Analysis for Collaborative Collection Development which built upon the feasibility study by deduplicating holdings from all 13 partner institutions, compared holdings to usage, and created a model for how many copies of a monograph are needed to meet user needs.
- Definitions & Concepts for Diversity, Equity, Inclusion, and Antiracism for Collaborative Collection Development where the project team drafted terms to inform the partnership's collaborative collections work.
- Collaborative Book Collection Program Pilot where the project team applied the result of the Analysis for Collaborative Collection Development project to a coordinated print acquisitions process.

About the Ivy Plus Libraries Confederation (IPLC)

IPLC: Organizational Structure



Figure 2: IPLC Organizational Structure

IPLC is a voluntary union of 13 sovereign academic libraries in the United States: Brown University, the University of Chicago, Columbia University, Cornell University, Dartmouth College, Duke University, Harvard University, Johns Hopkins University, the Massachusetts Institute of Technology, the University of Pennsylvania, Princeton University, Stanford University, and Yale University.

Per their mission, IPLC “leverages [their] collective assets to improve discovery of and access to information, and its innovative use at scale for the creation of new knowledge, and exercises action and leadership in helping shape the discourse around scholarly communication, and the outcomes of that discourse.”

IPLC’s three strategic priorities are:

1. Collaborative Resource Sharing & Discovery
2. Collaborative Collection Development & Management of Collections
3. Collaborative Leadership to Change the Scholarly Communication System

Comprised of different groups, IPLC’s Library Directors Group oversees the partnership. There are also 6 key groups – collections, assessment, technical services, IT, scholarly communications, and resource sharing – working in fulfillment of the partnership’s strategic priorities. Additionally, there are 26 affinity groups that operate as communities of practice.

Reporting to the Library Directors Group, the Program Steering Group includes representatives from each of the 6 key groups, as well as a representative from one of the affinity groups. The Program Steering Group is responsible for building community and identifying and stewarding initiatives that require the expertise and knowledge from multiple or all the 6 key groups as well as the affinity groups as needed.

Cultivating Community

In her nearly 7 years with IPLC, the DCI has observed that there are foundational elements required for a community to thrive and for successful collaboration when it comes to cultivating community and collaboration. These are: trust, governance, communication, kindness, and network (or community) with “trust” noted most frequently.

In their 2002 article, “A Pedagogy of Trust in Higher Learning, Teaching”, Curzon-Hobson notes that “...trust is a fundamental element in the pursuit of higher learning for it is through a sense of trust that students

will embrace an empowering experience,” (p. 266) and that “...without this sense of trust, the dialogical learning experience will be restricted...” (p. 276).

Given that projects in libraries are often about learning, without trust the learning experience and work in our organizations will also be restricted.

Furthermore, when it comes to project management, recognizing the “planning fallacy” is also necessary when working to establish governance, communication, kindness, and trust-building for a project team.

As Tim Herrera writes “There’s a ‘predisposition of humans to underestimate the time it takes to complete a thing called the planning fallacy, which leads us to overcommit to opportunities at the expense of actually completing them’ said Greg McKeown, author of Essentialism... ‘It’s so deep in us,’ he said, ‘you can know about it and even understand the principle, and you’ll still do it’” (Herrera, T.).

In the case studies below, the author exemplifies how Agile techniques help with governance, trust, communication, and the planning fallacy.

Project Vocabulary & Definitions

First, terms and definitions that are foundational for the remainder of this article, are given in the context of managing projects, cultivating community, and developing an organization:

1. A **project** is a “temporary endeavor undertaken to create a unique product, service or result” (Project Management Institute). If it’s not temporary and unique, it’s not a project.
2. Next is the author’s own definition of **project management**: *humans* working, collaborating, and communicating together to apply their diverse and collective knowledge, skills, tools, and techniques to project tasks to complete the requirements of a time-bound project.
3. **Agile** is “relating to or denoting a method of project management, used especially for software development, that is characterized by the division of tasks into short phases of work and frequent reassessment and adaptation of plans,” and “**agile project management** divides responsibility among more than one team member” (Mountain Goat Software).

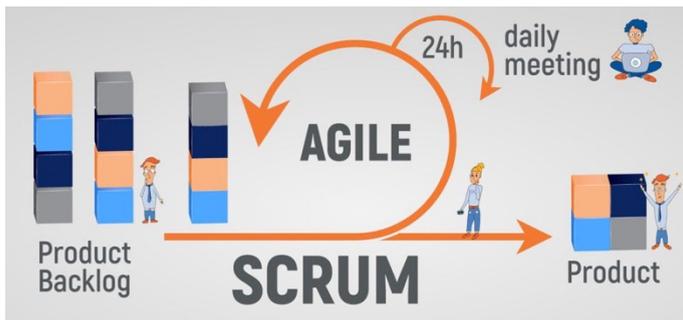


Figure 3: [Agile and Scrum](#)

4. A method of agile, **Scrum** “is an iterative and incremental agile software development framework for managing product development. It defines ‘a flexible, holistic product development strategy where a development team works as a unit to reach a common goal’,...challenges assumptions of the ‘traditional, sequential approach’ to product development, and enables teams to self-organize by encouraging physical co-location or close online collaboration of all team members, as well as daily face-to-face communication among all team members and disciplines involved” (Mountain Goat Software).
5. Another component of agile is **kanban**. The Japanese word for “visual signal”, “A **kanban board** is an agile project management tool designed to help visualize work, limit work-in-progress, and maximize efficiency” (Rehkopf, M.).

So how does one successfully fulfill the key requirements for successful collaboration (e.g., governance, trust, communication, and kindness), and avoid the planning fallacy when managing projects or cultivating community while working with messy, flawed, and glorious humans?

An agile mindset and application of agile project management techniques are key since the Agile approach is collaborative, responsibilities are divided, and shared responsibility builds networks and community which builds trust.

For example, core components of Agile are the division of tasks into short phases of work, and the division of responsibilities among more than one team member. These short phases of work allow flexibility and modification plus a shorter time frame. Distinct tasks make it easier to avoid the planning fallacy. Additionally, Scrum, a key part of Agile emphasizes that the team is working together, enables self-organization,

collaboration, and communication.

Using Scrum, a method of agile, means that the team works as a unit – or a network/community. Scrum also by its nature sets an expectation of shared and collaborative governance through self-organizing, collaboration, and communication. Similarly, another agile method used is a Kanban board which by helping visualize work, aids with communications with a wide variety of key colleagues.

Case Studies

Following are summaries of three case studies where the DCI has incorporated agile techniques into projects she has managed for the IPLC.

Collection Analysis Dataset Feasibility Study

This project began in October 2018 and concluded in April 2019. The goals of this project were to:

- Test methods and processes for collaborating,
- Document the time and resources needed to complete collaborative collections projects,
- Explore the rigor of our bibliographic records, and
- Explore Gold Rush’s Library Content Comparison Tool as a viable option for IPLC’s collection analysis work.

The diversity of expertise on the team was critical to the project’s on time and under budget completion. This team worked as a unit of shared knowledge that intentionally included circulation and resource sharing, collection development, technical services, law librarianship, subject librarianship, and collection analysis expertise among the project team’s members.

For this project, the DCI employed agile methods of dividing tasks into short phases of work, and constant reassessment and adaptation of plans. The project team reviewed tasks completed, in progress, and to be done at each weekly project team meeting, and about one third of the way through the project established a dedicated data analysis team to fulfill a gap in expertise needed to complete critical project tasks.

The time study from this project highlighted where each project team member recorded their time on task in 30 minute increments. The study revealed that most of the project time was spent in meetings. Meetings were where project governance was established, project tasks were developed and shared and where the team communicated and became a network. This time study exemplified how collaboration requires work, synchronous communication, and learning together.

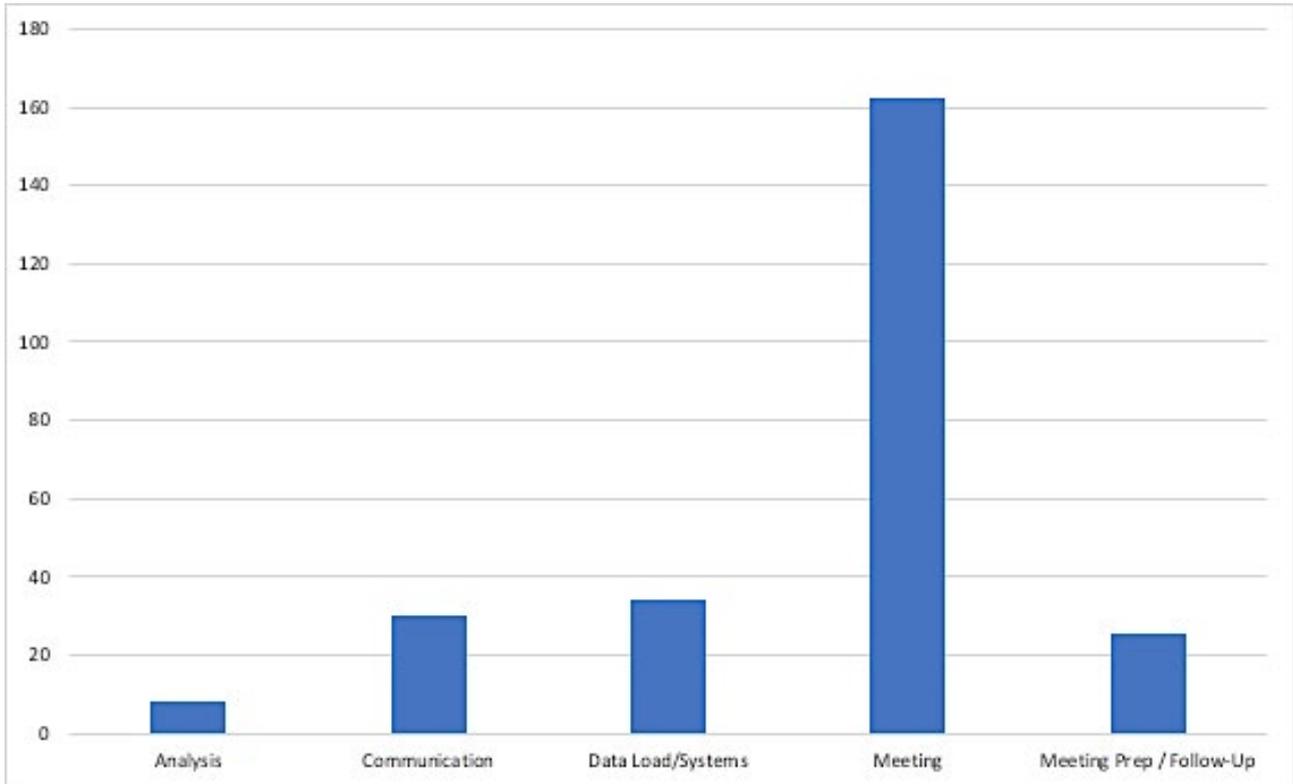


Figure 4: Project Team Time in Hours by Category

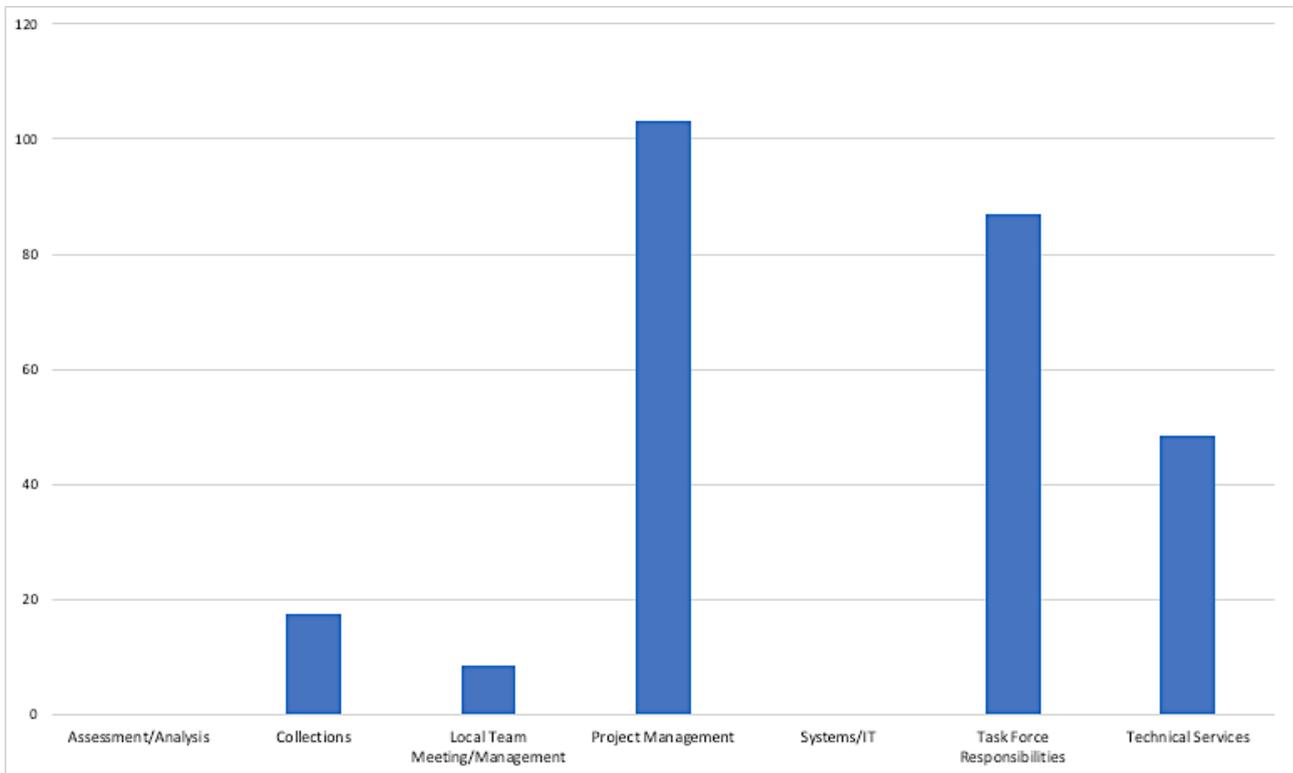


Figure 5: Project Team Time in Hours by Functional Area

When analyzing the project team's time in hours by functional area, it is clear that even using agile methods with distributed project work, as well as an iterative flexible approach, projects need project management which takes time.

Analysis for Collaborative Collection Development

The next project built on the Dataset Feasibility Study. This was bigger and began in October 2019 and concluded in June 2020. The Analysis for Collaborative Collection Development Project was a 5-part – or 5-interconnected team project with 26 people including the following teams:

- Data Extraction
- Data Analysis
- Defining Strategic Duplication
- Use Data Feasibility
- Use Cases for Data Analysis Approach

This project ran as if it were its own pop-up organization for 8 months with a mission to conduct data analysis to inform collaborative collections at a network level: what is owned and what is used across IPLC.

This project had five interconnected and dependent components that built on the work of the dataset feasibility study, most specifically the following recommendations from the feasibility study:

- Expand data in the Gold Rush Library Content Comparison Tool,
- Investigate demand for single-part monographs by comparing holdings and ILL and BorrowDirect data, and
- Investigate demand for single-part monographs by comparing holdings data with circulation data.

This multi-part effort informed the development of IPLC prospective collaborative collections within the partnership's "Collaborative Collection Development and Management of Collection" strategic priority. This was especially true for the "rigorous collection and analysis of data about holdings, collections use, and user behavior – and the development of better tools to support that analysis,". The project's five parts, each with their own project teams and each managed by the DCI, included:

1. Data

Expand data in the Gold Rush Library Content Comparison Tool to include bibliographic records from all 13 partners for single part print

monographs published between 2013 and 2017.

2. Use Cases

Draft use cases – or revise the use cases written for the Dataset Feasibility Study – to explore areas of most duplication of general collection single part monographs published between 2013 and 2017 (e.g., language, subject heading or LC call number, imprint/publisher, imprint date, etc.)

3. Strategic Duplication

Define what is "strategic duplication" and what constitutes "excess of demonstrated demand" based on both circulation and specialized subject areas built by endowments. This should result in collaborative prospective collection development for high-level parameters (e.g., English language, non-English language materials; high level discipline such as Humanities, Social Science, etc.). "Excess of demonstrated demand" means both collecting more than user demand and high demand where collective collections could help meet high user demand.

4. Use Data Feasibility Study

Draft the data specifications and analysis parameters for resource sharing data and circulation.

5. Data Analysis: Holdings and Use Data

Implement use cases to analyze duplication of single part monograph holdings and analyze holdings against use data (resource sharing and circulation) using "Strategic Duplication" definitions and documentation.

The big deliverable for this project was an interactive dashboard that took sample holdings (single part print monographs published between 2013 and 2017) and compared holdings to use by broad category such as publisher and LC Class: <http://bit.ly/IPLC-ERL>.

This dashboard includes modeling for how many copies are needed via our BorrowDirect high speed resource sharing network based on copies in the network and the time/duration of check out.

Division of tasks and iteration were core to the project's process and key to successful outcomes especially given that each team's work informed and evolved one another's work.

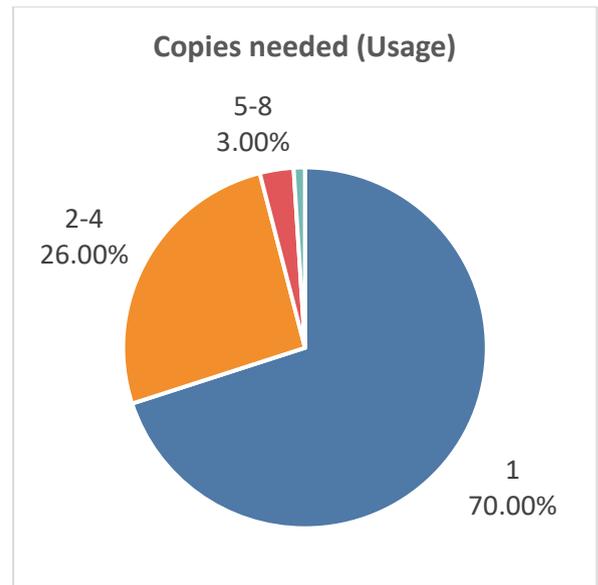
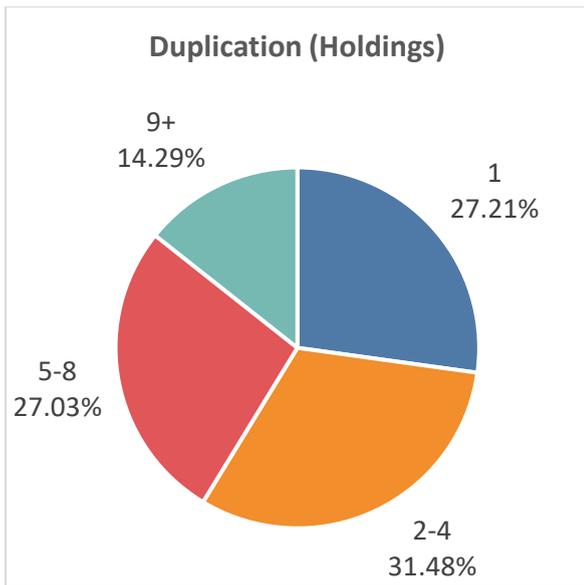


Figure 6: Duplication of Holdings vs. Copies Needed

IPLC Organizational Review

The third case study relates to organizational development. It was an organizational review with intentional engagement with the IPLC community that in turn informed the project's tasks. This project was managed by the DCI and IPLC's Director of Discovery & Resource Sharing Initiatives (DDRSI).

Though the DCI and DDRSI did not follow a specific 2-week timeframe like a Scrum sprint, they used Airtable

to establish small iterative components and subcomponents of the project with Scrum sprint in mind as a structure for managing and working on the project.

They used Kanban board categories (To Do, Doing, Done + Waiting) for each project component and used an Airtable Gallery view to create a sharable dashboard to communicate in realtime with our colleagues who could open the dashboard at anytime to view the project's progress and status.

Interfaces					
IPLC Organizational Review - 2021					
IPLC Org Review Components					
Tasks Primary Audience Add or import					
VIEWS All projects Hide fields Filter Group Sort Color Share view					
<input type="checkbox"/>	A Name	Status	Primary Audience	Start Date	Due End D...
1	1. Project Planning	Doing	IPLC Community	1/12/2021	2/3/2021
2	2. Environmental Scan	Doing		2/16/2021	3/10/2021
3	3. Document Review	Doing		2/16/2021	3/10/2021
4	4. Feedback from IPLC	Not Started	Collection Development Group IPLC Community Resource Sharing Group	3/11/2021	5/10/2021
5	5. Preliminary Findings & Recommendations	Not Started	IPLC Community	5/11/2021	6/10/2021
6	6. Final Report	Not Started	IPLC Community	6/11/2021	7/12/2021
<input type="checkbox"/>	7. Presentation of Final Report & Recommendations	Not Started	IPLC Community	6/11/2021	7/12/2021

Figure 7: IPLC Organizational Review Project Tasks: Project Managers' View in Airtable

Airtable Gallery Sign up

Filter Sort

Public Dashboard

SUBTASKS

- Create
- Review with the Library Directors Executive Team
- Distribute to IPLC Key ...

STATUS

Done

START DATE

DUE DATE

PROJECT COMPONENT

1. Project Planning

STATUS NOTES

Project Plan

SUBTASKS

- Outline
- Outline to Airtable
- Definitions of Done for Project Components...

STATUS

Done

START DATE

1/12/2021

DUE DATE

2/3/2021

PROJECT COMPONENT

1. Project Planning

STATUS NOTES

Under review by the Library Directors...

Lit Review

SUBTASKS

- Definition of Done
- To Review:
 - BIG Collection (GC)
 - ITAV Document (GB)...

STATUS

Done

START DATE

2/8/2021

DUE DATE

3/10/2021

PROJECT COMPONENT

2. Environmental Scan

STATUS NOTES

Organizational Structures of L...

SUBTASKS

- Define Like Organization
- Similar organization?
- Closed organization?
- Operationally similar?...

STATUS

Done

START DATE

2/16/2021

DUE DATE

3/30/2021

PROJECT COMPONENT

2. Environmental Scan

STATUS NOTES

Figure 8: IPLC Organizational Review Project Tasks: Community View in Airtable

Conclusion

As both a mindset and a project management technique, Agile is tremendously powerful and effective for managing projects and building community. Agile project management enables teams to work as temporary pop-up organizations and create unique, mission-fulfilling deliverables. It establishes short phases of works and distinct tasks to complete within each phase, and consistently reassesses and adapts tasks as needed to meet projects goals. Because an essential part of Agile project management is division of responsibility, applying Agile requires communication and shared governance. Thus, it is an ideal process for cultivating community and collaboration.

Author

As the Director of Collections Initiatives for the Ivy Plus Libraries Confederation, Galadriel Chilton is the principal planner and project manager for collaborative collections initiatives and works with approximately 4,650 colleagues across 3 time zones. Galadriel earned her Bachelor of Arts at Berea College, and holds a master in library science from Indiana University, and master of arts in educational technology and instructional design from San Diego State University. Additionally, she has taught e-resource management and licensing classes for University of Wisconsin iSchool.

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Improving Digital Services and Access to Collections at Library and Archives Canada

Jean-Sébastien Gendreau, Jean-Sebastien.Gendreau@bac-lac.gc.ca

Team Lead, IT Solutions

Library and Archives Canada, Canada

Mathieu Sabourin, mathieu.sabourin@bac-lac.gc.ca

Chief, Databases and Digital Access, Access and Services

Library and Archives Canada, Canada

Kat Timms, Katherine.Timms@bac-lac.gc.ca

Senior Advisor, Office of the Senior Director General, Digital Services

Library and Archives Canada, Canada



Library and Archives
Canada

Bibliothèque et Archives
Canada

Library and Archives Canada (LAC) has taken strides to address the current digital reality when it comes to providing client services. LAC formed from the merger of the National Library of Canada and National Archives of Canada in 2004.¹ Its mandate includes preserving and making accessible Canadian documentary heritage; facilitating cooperation among Canadian communities, and sharing knowledge; and acting as the memory of the Government of Canada.² LAC's extensive holdings include archival records from public or private individuals or groups in all media as well as published material by or about Canadians (e.g., books, serials, movies, music, theses, microfilm).³ Providing easy access to LAC's holdings has to start with a proper online presence. Today's users expect more online and, although creating these services is not rocket science, putting the building blocks in place is not simple. LAC has struggled for some time to determine how to offer a sign-in application that could provide similar services to what a client experiences at a physical location. Much work devoted to the effort using traditional project development methodologies did not yield substantial

results for almost 15 years. By contrast, the Digital Access Agile team created this product in only four months releasing it to the public in February 2022.

The Agile Methodology: How It Works at LAC

The Digital Access Agile team consists of a marriage between two separate divisions. The application developers, scrum master and an agile coach/technical lead contribute from the "IT/Digital side". The product owner, user experience (UX) designer, UX researcher, and product data analyst contribute from the "business side." This interdisciplinary team structure is well designed to support its suite of products. This includes a series of public-facing applications for digital access to LAC's collection and related digital services. We support bridging across organizational areas to bring together the right group of people to ensure the success of the products being developed.

The main goal of assembling the Digital Access Team was to break away from the traditional waterfall project approach in order to increase the frequency, consistency, and quality of support to our products, and by extension, to offer better services.⁴ While there was an appetite and support at all levels to make this transformation a reality, it was difficult to get the footing to sustain this transformation in a lasting manner. Being successful involved finding a way to

¹ *Library and Archives Canada Act, Statutes of Canada 2004*, c.11, <https://laws-lois.justice.gc.ca/eng/acts/L-7.7/>.

² Library and Archives Canada, "Our Mandate," date modified October 7, 2022, <https://library-archives.canada.ca/eng/corporate/about-us/mandate/Pages/mandate.aspx>.

³ Library and Archives Canada, "Who We Are and What We Do," date modified October 6, 2022, <https://library-archives.canada.ca/eng/collection/basics/Pages/who-we-are.aspx>.

⁴ Waterfall project methodology typically involves detailed, linear project planning with each phase depending on the previous phase. The scope and requirements are defined at the start of the project, and the client is typically only involved at the start and end of the project. See: Jason Fair, "Agile versus Waterfall: [Which] Approach is Right for My ERP Project?" (paper presented at PMI Global Congress 2012—EMEA, Marseilles, France), <https://www.pmi.org/learning/library/agile-versus-waterfall-approach-erp-project-6300>.

make space for this new method with what we could afford to put together, while combining it with existing processes that are often seen as rigid with prescriptions and expectations.

One of the pillars of a successful agile transformation is establishing a solid foundation. We started with what we considered as the bare minimum for the basic vision at the working level. First, we established the target products. Second, we assembled the team: an agile coach, four developers, a scrum master, a product owner, and a fledgling UX designer. Third, we defined and scheduled the rituals that would support and reinforce our new methodology (i.e., daily scrum, iteration reviews, retrospectives, and planning sessions). From there, we collectively practiced this new mindset and methodology as a team, gradually improving together through knowledge sharing and experimentation.

For over a year, we made substantial changes and improvements to a handful of our core products such as Collection Search and Co-lab. However, it became increasingly apparent that LAC needed to revisit what the transformation to agile methodology meant at both the team and wider organizational project management levels. If we wanted to improve how we served our products, the team would require better access to UX research resources. If the team was to cement itself at LAC, we needed to better demonstrate how we could integrate with our project management office to adequately report on our work, while working in tandem with enterprise processes to ensure organizational alignment.

There remains plenty of overall integration work ahead of us on our transformation journey. We recognize that ongoing review and monitoring of transformation progress will help ensure long-term success. Fostering a change of methodology and culture of this magnitude at the institutional level in the public sector takes time.

What It Means to Fully Embrace the Agile Methodology
Moving from a project-based mentality to a product-based mentality is perhaps one of the hardest cultural

changes to manage. It involves moving away from a focus on reporting on schedules, deadlines, and budgets that relate to various top-down levels of the overall public organization funding and planning models. Instead, agile methodology favors empowering individuals who know the product best at the working level. They autonomously generate and manage the direction, growth, and maintenance of the products. Even with increased autonomy for product management at the operational level, we still work within the broader administrative structures for project management, funding, and reporting at LAC. Part of this has required collectively determining how to accommodate the “light on documentation” agile methodology within a “documentation first” waterfall project environment. This fulfills the organizational need for overseeing and reporting on work.

In the face of such dramatic changes, education became a key component for success. This includes learning the foundational notions of agile methodology and its mechanics, as well as professional skills required to fulfill team needs. Time investment up front is worthwhile and effective in preventing problems down the road while also increasing the quality of work. We fostered a culture of continuous learning in the team by assigning a minimum amount of time for learning each iteration, leveraging less expensive online self-directed course formats, and building and coordinating a curriculum across the team with our agile coach and product owner.

Another foundational component was embracing and integrating the principles of UX design and research. Our team’s approach involves investing in user research to hear from clients directly. Different tactics like design sprints, workshops, consultations, interviews, surveys, and studies, all help us move from subjective assumptions to having more objectivity about our products. This has helped validate ideas to eliminate or confirm doubts, save time, and increase the likelihood of overall positive user experiences and the delivery of something valuable to the end user.

KAI **ZEN**
改 + **善** = “good change”
 “change” “good” aka
 “continuous improvement”

Further solidifying our move away from the waterfall project cycle was eliminating the notion that the product needed to be “perfect” from the start. Embracing the agile methodology means that, for a multitude of benefits, one must accept the need to frequently revisit and iterate on a feature or product. As long as the minimum viable product (MVP) delivers the base value to end users, one can keep adjusting and building to increase the viability to users while continuing to receive feedback before, during, and after, the initial delivery.⁵

One of the concepts underpinning agile methodology is the Japanese concept of *kaizen*, where one seeks to improve oneself with consistent, small, incremental changes. Most agile methodologies prescribe certain rituals to guide and coordinate the work and

simultaneously provide a built-in way to help the team iteratively improve not only their product, but also themselves. As an example, the iteration retrospective has provided the team with the opportunity to share honest feedback, to learn about one another, to trust one another, and ultimately to learn how to better work together to set team growth-oriented goals. This and other rituals, such as the daily scrum, review, and iteration planning, require ongoing commitment. They contribute to not only the regular work cycle of an agile team, but also provide a positive feedback loop that helps with continuous improvement and increased likelihood of a successful transformation over the long term.

While undergoing an agile transformation, it is important to recognize that other teams may not be working in the same manner. When connecting with a team working in a waterfall manner, one may need to coordinate around schedules and be patient. These interactions can provide an opportunity to be transformation leaders and help others better understand the benefits that agile methodology could bring to their own teams.

Using Agile Methodology for My Account

⁵ A minimum viable product (MVP) is a product with enough features to present to clients for their validation early in the development cycle. Validating and iterating products in response to user feedback is a core component in agile

methodology. See: ProductPlan, "Minimum Viable Product (MVP)," 2023, <https://www.productplan.com/glossary/minimum-viable-product/>.

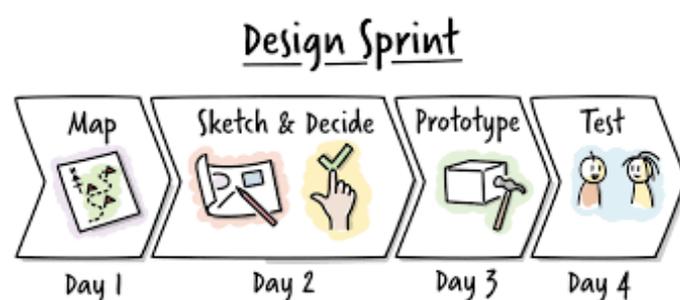
While a well-defined project with a clear endgame can benefit from a waterfall methodology, it does not always work for larger endeavours. My Account is one of those big creations that needed a different strategy. Previous attempts focused on listing everything a client would be able to do after signing in but without articulating the technical details. Essentially, LAC was looking at the top of the mountain but could not figure out how to get to it. The way the Digital Access Agile team approached the idea was fundamentally different. My Account is not a project, but rather a product first created on a small-scale. It could then grow to provide more online features, and eventually be retired when it no longer meets client needs. The product is maintained in an ongoing fashion in relation to evolving client needs.

This perspective shift opens many possibilities, like focusing on small, frequent and, most of all, achievable improvements. We are no longer aiming for a perfect product on Day One. Instead of solely focusing on the top of the mountain, we take it one base camp at a time and reassess at each interval. We understood early on that integrating different types of forms used by clients in My Account, like reproduction or consultation requests, was ultimately necessary. However, this feature could not be the first thing tackled by the development team if there was no hub to host the solution. It was imperative for our team to create a solid foundation for the product itself that could be easily migrated when necessary. With that in mind, what was the envisioned foundation and how did it enable the

creation of the MVP?

The Foundation and MVP

Our first goal was to figure out, as a team, where we would start. We already had two products using the same sign-in module, but nothing was interconnected. When a client connected to Co-Lab,⁶ our crowdsourcing tool, the credentials were not transferred to My Events,⁷ our event registration tool. This was our starting point. Create a space for clients where credentials would be shared between products. This common understanding fuelled our next step, the design sprint.



The design sprint exercise helped us plan the work ahead. The team spent a week brainstorming to create a prototype that could be shared with stakeholders. Figure 1 depicts one of the original sketches, figure 2 shows the mock-up from the design sprint, and figure 3 presents the product currently available to clients. While not every feature came to fruition out of the prototype, it helped focus where more investigation was needed or where pressure points might arise.

⁶ To explore our crowdsourcing tool, please consult <https://co-lab.bac-lac.gc.ca/eng>.

⁷ To sign up for future events at LAC, please consult <https://library->

archives.canada.ca/eng/services/public/events-exhibitions/pages/events.aspx.



Figure 1: My Account design sprint progression: step 1 – the sketch.

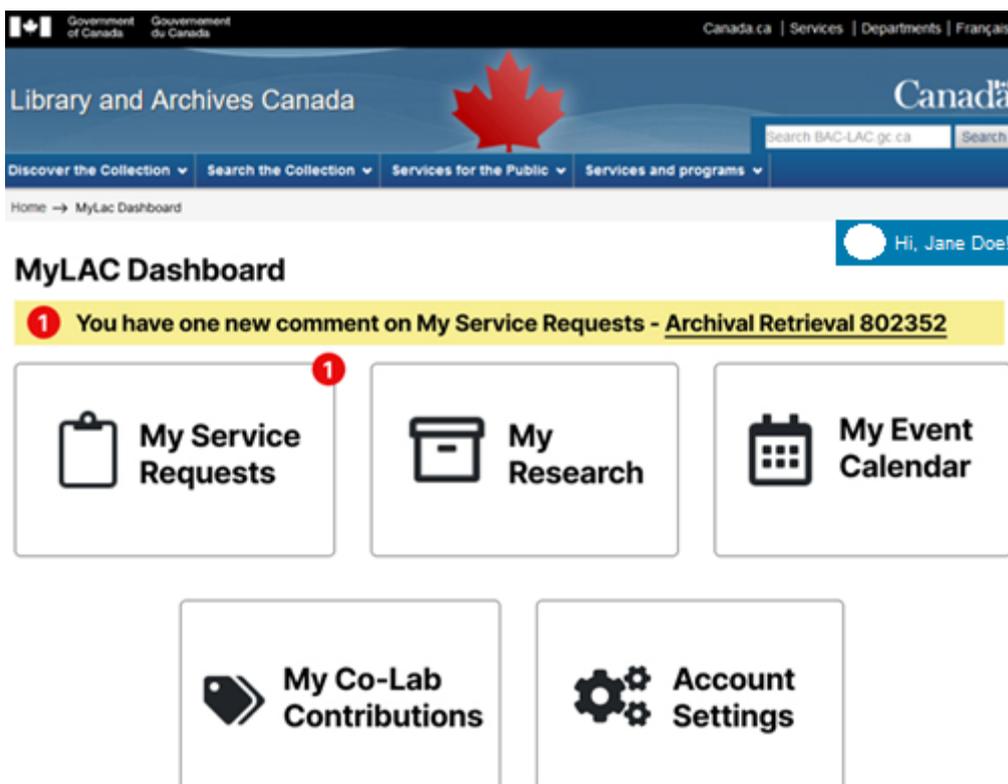
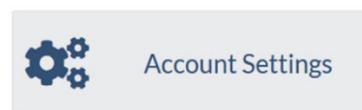
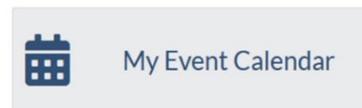


Figure 2: My Account design sprint progression: step 2 – the mock-up.



[About](#) [Feedback](#)



[Report a problem on this page](#)

[Share this page](#)

Figure 3: My Account design sprint progression: step 3 – the prototype product.

Our initial goal was small, but attainable. Our intent was to go to production with a simple offering. Not offering much might be seen initially as a risk, but it is part of the agile development process. UX researchers within our team could test the initial solution to see if it matched our clients' expectations. If we did not meet them, we would not have to go back to square one. If failure is unavoidable, it is better to fail small.

The MVP was a step in the right direction, but the work is not over. In fact, the definition of "finished" has had to be reassessed at LAC when dealing with online products such as My Account. Online services and products need continual maintenance. Client needs are ever-changing. There are increasing expectations that services should be easily available online. This is particularly the case with cultural heritage institutions dealing with vast archival and library holdings. In reality, it is a monumental challenge for a federal department that does not have the same type of resources as the private sector to address client expectations.

Our goal with My Account was to create a simple and useful product for clients and that is what we did. For the time being, My Account is small, but it has a strong foundation. Clients can use a single sign in. They have access to their crowdsourcing collaboration in Co-Lab and their research lists in My Research. They can sign up to future events organized by LAC. What is next,

though? How can we make sure that the product can grow and help our clients get better services by using My Account?

What's Next for My Account?

The point of a multidisciplinary team is to have the right players around the table to bring their vast knowledge together. They can then make the best decisions with client needs as a focus point. This implies asking tough questions to subject matter experts (SMEs), reviewing existing workflows, and often critiquing the status quo. The future of My Account is exactly that: review aging analogue processes and see if better alternatives can be created.

Let's focus in on one specific service: how to order archival material for in-person consultation purposes. Many issues affecting this service are also observed elsewhere, mainly with reproduction requests and Access to Information and Privacy (ATIP) requests.⁸ They were all originally conceived as paper forms that were moved online without much modification. Today's clients are expecting to have comprehensive online forms with a way to track sent requests. While this seems simple enough, developing such tools with existing back-end systems can become complex quickly.

Since the initial launch of My Account, the team has been working on My Circulation Request. Clients will have access to their personal archival retrieval history. They will be able to track in real time if their ordered material is available at a LAC service point. We approached the problem the same way as before: we sketched a desired mock-up based on comments from clients and the consultation staff. We then explored how to retrieve the correct metadata from our internal circulation management system. Finally, we tested the first draft and started coding with the intent of speaking often to stakeholders to tweak the emerging product.

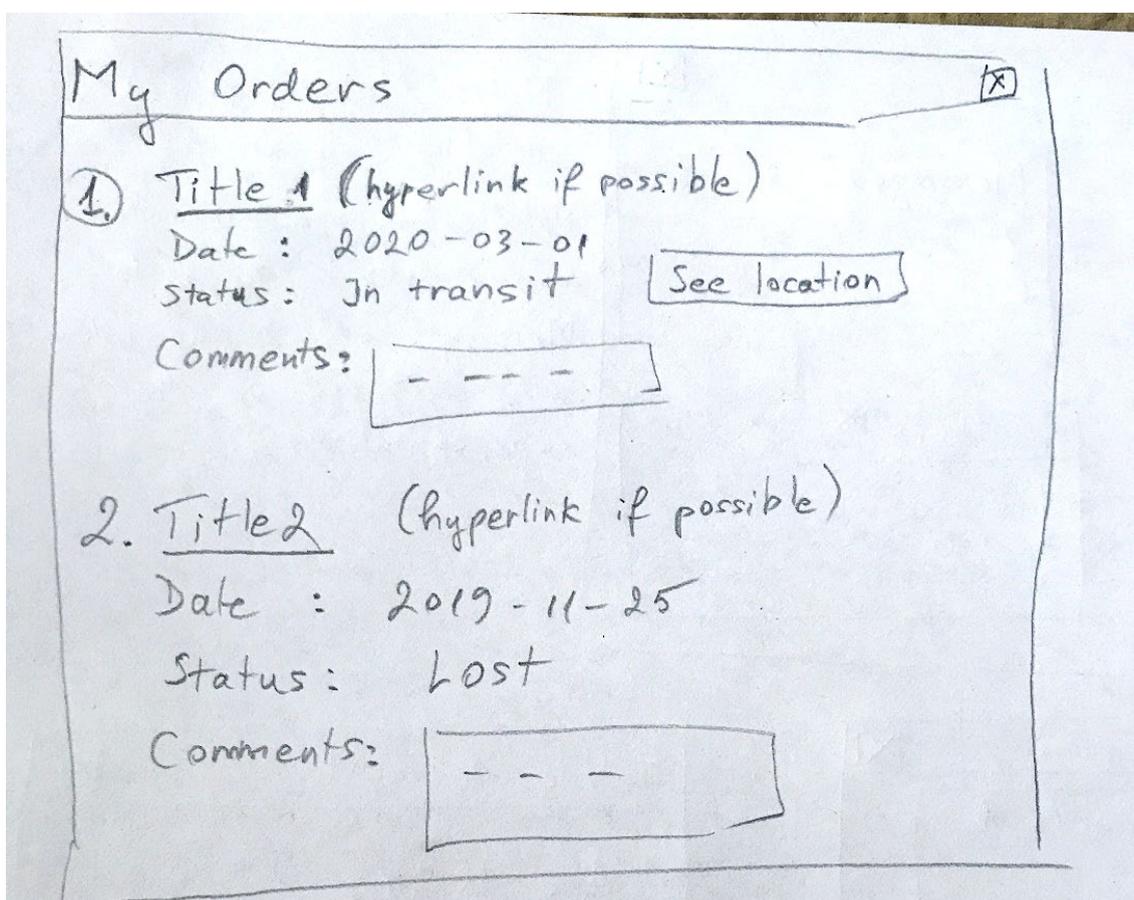


Figure 4. My Circulation Request design sprint progression: step 1 – the sketch.

⁸ The *Access to Information Act* gives Canadians and residents of Canada a right to access federal government records that are subject to the *Act*. The *Privacy Act* grants everyone the right to access their personal information held by government institutions subject to the *Act*. Formal requests for information can be made under each act. See: Treasury Board of Canada Secretariat, "How Access to

Information and Personal Information Requests Work," date modified August 12, 2022, <https://www.canada.ca/en/treasury-board-secretariat/services/access-information-privacy/access-information/how-access-information-personal-information-requests-work.html>.



My Account

Name

Canada.ca > Page 2 > Page 3

My Requests

See your current and past material circulation requests at Library and Archives Canada's Ottawa location. You can search your requests by keyword, and limit by time period or status.

Search my requests for... Sort by Most recent Search

Showing 1-3 of 63 total requests

Material requests **Reserve requests**

Request # 801542-1

Container barcode: 198502 Request submitted May 3, 2021

Container label: RG 9 III-D-3 5034 **Complete**

Circulation status: Req. -Not Circ

Check out date: XXXX-XX-XX

Location: **Due date:**

Request # 792704-1

Container barcode: 198502 Request submitted May 11, 2018

Container label: RG 9 III-D-3 5034 **Transferred**

Circulation status: Req. -Not Circ

Check out date: XXXX-XX-XX

Figure 5. My Circulation Request design sprint progression: step 2 – the mock-up.



My Account

➔ Sign In (External)

➔ Sign In

[Canada.ca](#) > [Library and Archives](#)

My Requests

See the history of your material circulation requests at Library and Archives Canada's Ottawa location. You can search your requests by keyword, and limit by time period or status.

Order Asc ▾
Search

Limit to

Time Period:

All

Last month

Last 3 months

Last 6 months

Last year

Status:

All

Active

Complete

Transferred

Cancelled

Showing 1-10 of 75 total request

Request #: 888222-1

Container barcode : 196234
Request submitted : 2022-08-30

Container label : RG2 1863
Cancelled

Circulation status : In Storage

Check-out date :

Location

Main, 395 Wellington, Ottawa, Third Floor, Rm 354

Due date : 2022-10-14 1

Request #: 850343-1

Container barcode : 11667
Request submitted : 2019-11-18

Container label : RG24 12345
Cancelled

Circulation status : In Storage

Check-out date :

Location

Main, 395 Wellington, Ottawa, Third Floor, Rm 354

Due date : 2019-12-27 1

Figure 6. My Circulation Request design sprint progression: Step 3 – the product in development.

As seen in Figures 4, 5 and 6 we have improved at making mock-ups. This is the result of investing in the right type of talent and in people when forming multi-disciplinary development teams. The MVP of this new feature does not include the form itself. When exploring the problem, we quickly realized that integrating the form and its back-end components would require a significant amount of effort. Integrating forms into My Account is a clear need that we will be exploring soon. In the meantime, clients must still ask LAC's staff for their information, which creates a service bottleneck. The team made the decision to aim at a smaller target, but one that would have the maximum impact on clients.

Conclusion

Client services start on the web. Having a platform like My Account is no longer a nice-to-have. It is a necessity for offering effective services to Canadians. Our goal is to make My Account a place for clients to start their journey into LAC's holdings with the least number of unknowns. Agile methodology at LAC has shown its merit by underpinning the success of My Account. The Digital Access Agile team's approach is responsive to evolving client needs in its iterative approach to managing its suite of products, including My Account. Agile methodology has provided the framework to allow effective integration of business and IT staff, particularly through ongoing and regular communication. The foundation of digital access services is more and more solid now at LAC, so let us build the rest of the house together.

Can We Get Some Agile Here? The Application of Agile Project Management Principles for Library IT

Ray Uzwyshyn, Ph.D. MLIS MBA, ruzwyshyn@gmail.com

Associate Dean, Research Collections and Strategy
Mississippi State University Libraries, USA



Figure 1. Agile Project Management

Introduction – Libraries and Principles of Agile Project Management

As we enter the second decade of the 21st century, our institutions are rapidly changing. Agile project management techniques are needed to pivot with modern technology paradigms and take advantage of new library possibilities. Academic libraries are no exception to these shifts with an increasing range of complex IT implementation expectations through rosters of IT projects ranging from technology enhanced learning commons, to data research repositories, AI, and new algorithmic literacy centers. To manage the pace of new IT implementation and ongoing integration demands, a structured and Agile application of principles of IT project management is warranted. This research explores an innovative line of Agile 21st century IT project management principles for online library projects under the rubrics of Agile and Project Management. This includes collaboration, iteration,

user focus, flexibility, emergence and embracing versioning for quick empowerment of decision-making for greater innovation. This work focuses particularly on the logistics of Agile management that online library projects more desperately need. It explains the case for Agile projects to highlight the necessity for Agile implementation through principles and the wider scope of project management.

Agile IT Project Management is a methodology for managing IT projects that emphasizes iterative development, collaboration, and responsiveness to change. Key concepts include user focus, adaptive planning, continuous delivery, and self-organizing teams (Ambler, 2009). Agile Project Management concepts find applicability in academic libraries where processes could benefit from streamlining through a formalization of Agile Project Management structures and processes. Scrum, Kanban, and Lean are frameworks, structures and methodologies that all benefit Library IT processes.

Even though system wide implementation of information technology has been carried out widely in libraries in the past three decades, there is room for a more structured approach utilizing these structures from Agile perspectives. This research highlights a few current directions and synergies from best practices of Agile Project Management and current library technology needs. It highlights the most applicable and innovative areas of Agile techniques that would be useful to pursue.

Agile and Project Management Principles and Tools

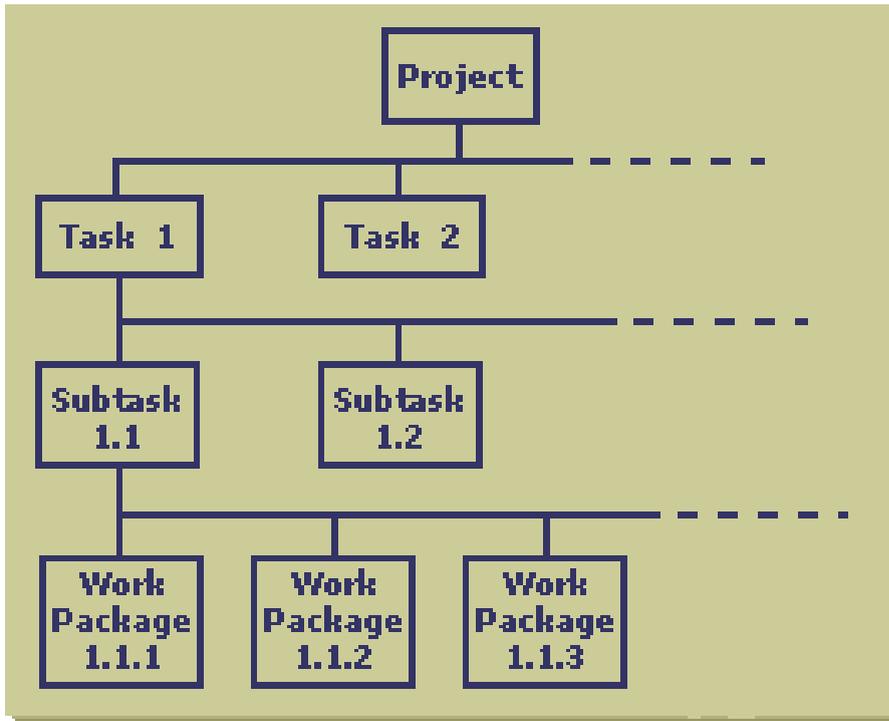


Figure 2. Work Breakdown Structure

Principles of Agile Project Management are much in congruence with library and online information center culture and project management. Work structures and processes are similar - logical, methodical, measurable and specific. When dealing with public, special or academic libraries' online IT projects, needed methodologies are those that provide analytic benchmarks and a measured review of methods and the agility to pivot as needs demand. Many library system migrations, web and mobile redesigns or implementation projects linger too long without progress or, alternatively, are unnecessarily delayed by 'scope creep,' the tendency for project requirements to expand until project failure becomes inevitable (Schwalbe, 2011, p.197). All too often, discussion and communication enabling project progress of library systems IT projects breaks down among larger stakeholder groups. Agile Project Management

principles, such as iterative development and simplified workflow management systems, such as Scrum and Kanban, provide tools to prevent scope creep and enable communication, project completion and success. Tools such as defined work breakdown structures (WBS) and stakeholder agreement documents from project management, capture, control and move projects forward in organized and prescribed ways. More specific principles of Agile such as continuous improvement, early delivery, minimum viable products, sustainable development and lean thinking synergistically complement more general frameworks of project management to fit more technocentric societal expectations and current ways of development (See Table 1).

Principles of Agile IT Project Management	Definition	Example 1	Example 2	Additional Examples
User Satisfaction	Delivering IT Products that meets user's needs	Delivering a product that meets user expectations	Gathering and incorporating feedback from end-users throughout development	Conducting user surveys to assess satisfaction
Embracing Change	Responding to change in requirements, priorities, and market conditions	Prioritizing features based on changing needs	Incorporating feedback and insights from stakeholders to improve product	Updating the product roadmap based on changing conditions
Incremental Delivery	Delivering working software in small, incremental releases	Releasing a minimum viable product to test and validate assumptions	Delivering new features in small, frequent releases to provide value to users	Updating and refining the product backlog based on feedback from users and stakeholders
Self-Organizing Teams	Teams that have the authority and responsibility to organize themselves and make decisions	Empowering team members to choose how they work and what they work on	Encouraging team members to take ownership of the development process	Facilitating collaboration and knowledge sharing among team members
Continuous Improvement	Fostering a culture of continuous learning and improvement	Conducting regular retrospectives to identify areas for improvement	Experimenting with new tools, processes, and methodologies to improve productivity	Encouraging open and honest communication and feedback among team members
Agile Planning	Emphasizing flexibility and responsiveness in planning and prioritization	Using an iterative planning process to refine and prioritize development tasks	Prioritizing tasks based on value and user needs	Creating a product roadmap to align development efforts with business goals
Early and Continuous Delivery	Delivering working software as early and frequently as possible	Releasing a minimum viable product to test and validate assumptions	Delivering new features in small, frequent releases to provide value	Using continuous integration and delivery to ensure the product is always in a deployable state
Working Software	Emphasizing the importance of delivering working software that meets user needs	Prioritizing development tasks based on their impact	Using testing to ensure that everything is working correctly	Prioritizing technical excellence to ensure that software is maintainable and scalable

Table 1. Agile Principles of Agile IT Project Management

Working Methodologies

Scrum and Sprints

Scrum is an Agile framework that emphasizes iterative development, self-organizing teams, and continuous delivery. Scrum projects are managed in Sprints, which are time-boxed periods of 1-4 weeks, during which a set of tasks are completed, and Minimal Viable Product (MVP) is produced. At the end of each Sprint, the team reviews the progress made and adjusts the project plan accordingly. Scrum is a highly flexible methodology that can be adapted to a wide range of projects and teams.

Scrum can be applied to library IT projects in a variety of ways. For example, a library may use Scrum to develop a new digital library platform. The project team would be organized into a self-organizing Scrum team that would work together to develop the platform in Sprints. The team would meet regularly to discuss progress, identify roadblocks, and adjust as needed. By using Scrum, the library could respond to changes in the project quickly and deliver a high-quality product on time.



Figure 3. Scrum and Sprint Planning

Kanban and Kanban Boards

Kanban is an Agile methodology that emphasizes visualizing work, limiting work in progress, and delivering work in a continuous flow. Kanban projects are managed through a Kanban Board, which is a visual representation of the work being done. The Kanban Board is divided into columns, each of which represents a stage of the project. As work is completed, each activity is moved to the next column on the board.

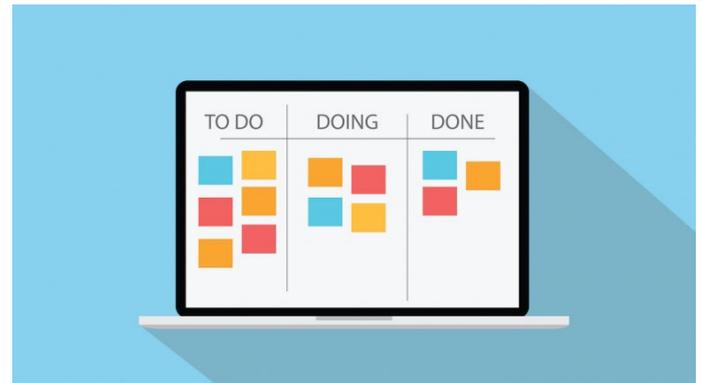


Figure 4. Kanban Simplified Board

Kanban can be applied to library IT projects in a variety of ways. For example, a library may use Kanban to manage the development of a new mobile application. The project team would use a Kanban Board to visualize the work 'To Do,' 'Being Done' and 'Done.' As work is completed, it will be moved to the next board. Trello is a notable example of an online Kanban Board which also emphasizes socially networked online communication.

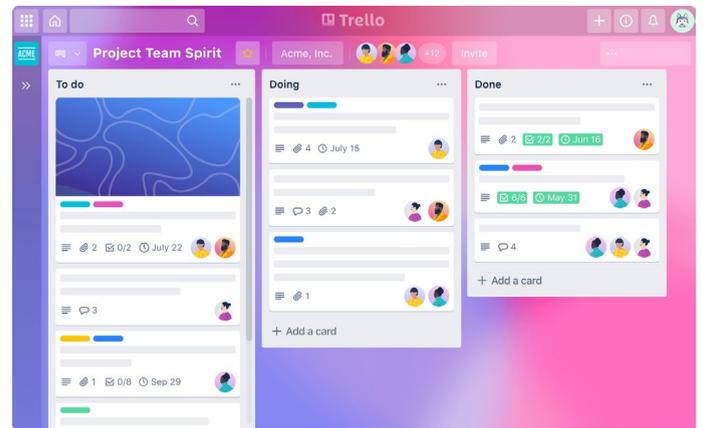


Figure 5. Trello Kanban Board.

<https://www.atlassian.com/software/trello>

Libraries, Communication, Project Management Methodologies

The major cause for any IT project failure or delay during a project lifecycle is communication breakdowns and a lack of planning by stakeholders (IT Cortex, 2008). This failure of planned communication and the need for risk management methodologies is magnified in large institutions like libraries. Typically, a variety of stakeholders are tasked to implement or redesign new technological artifacts whether these be new mobile websites, digital libraries or implementation of enterprise-wide information systems. Usually, many of the team stakeholders tasked with these projects will have little IT experience and less formal project management training. This legacy of historical library workplace development becomes a detriment and liability. The irony is that from Agile Project Management contexts, this diversity may be harnessed

towards better usability review, communication and systems. Fair to say, communication breakdowns with these heterogeneously composed teams or committees happen often. Agile Project Management tools like

Kanban boards simplifies, formalizes and manages communication channels through 'communication' planning and documents inclusive of stakeholder registries and management strategies.

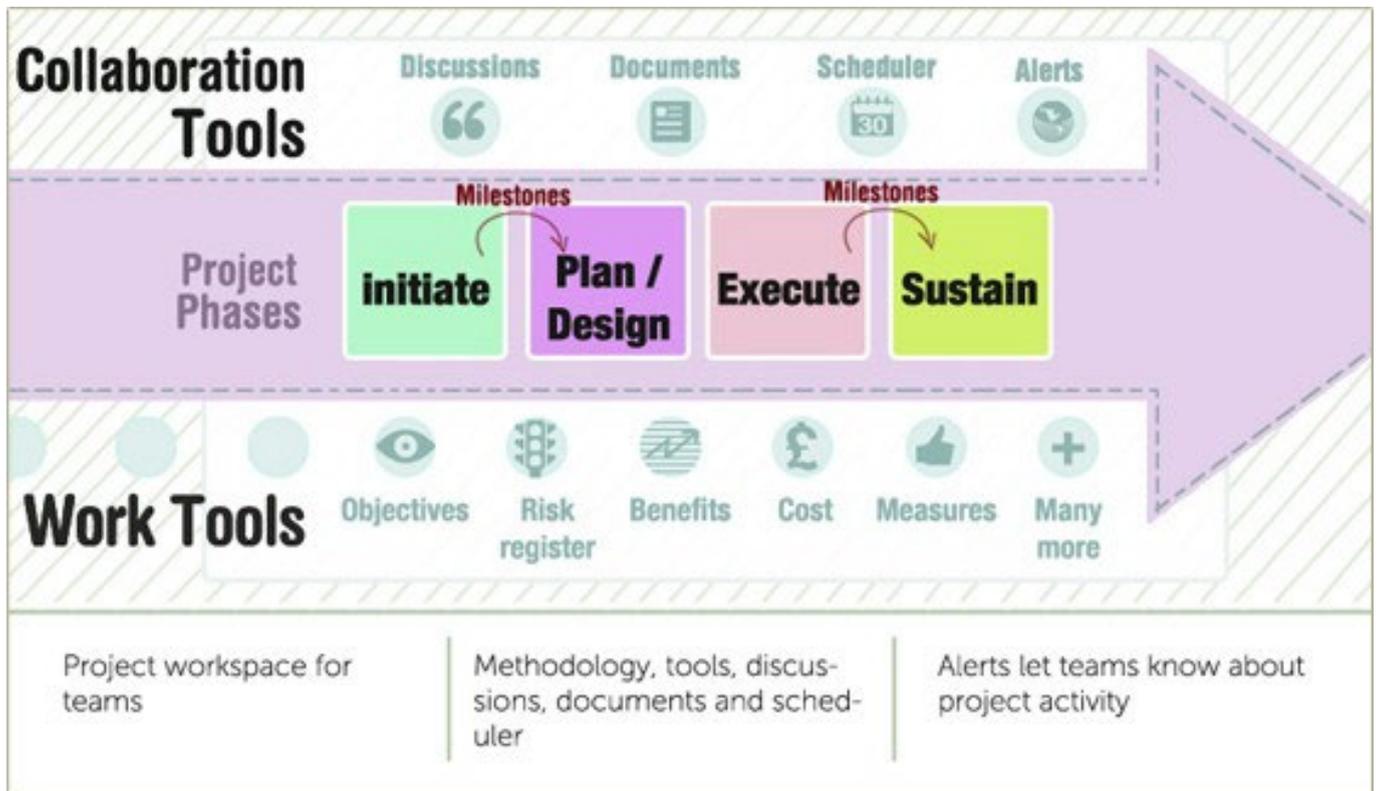


Figure 6. Communication Channels Through Collaboration Work Tools

The Business Case for Agile IT Project Managers

and results in more efficient decision making for subsequent milestones for greater chance of success (Masses, 2010, p. 529).

One of the key issues a digital library project manager must currently contend with has to do with how to shepherd projects towards approval and the top of the queue for competing resources. In terms of human resources and with the ever-expanding agenda of projects, a passionate library IT project manager on staff is also a clever idea whose time perhaps has arrived.

Agile Project management also offers both structured software and quantification possibilities for both formalization of project metrics and structured analytics for later assessment (Microsoft Project) but also more agile-minded communication tools for quick global communications (i.e., Basecamp, Monday.com, Atlassian's Jira). From Agile Project Management perspectives, library IT projects, whether additions to the system, new systems or specialized digital library requests, are also disruptive forces which frequently encounter a variety of resistance.



Figure 7. Project Managers and Kanban to Simplify Workflow Complexity

Tasking a project manager to formalize communications through a project lifecycle to manage stakeholder expectations facilitates buy-in and ownership of a project, monitors and controls stakeholder processes

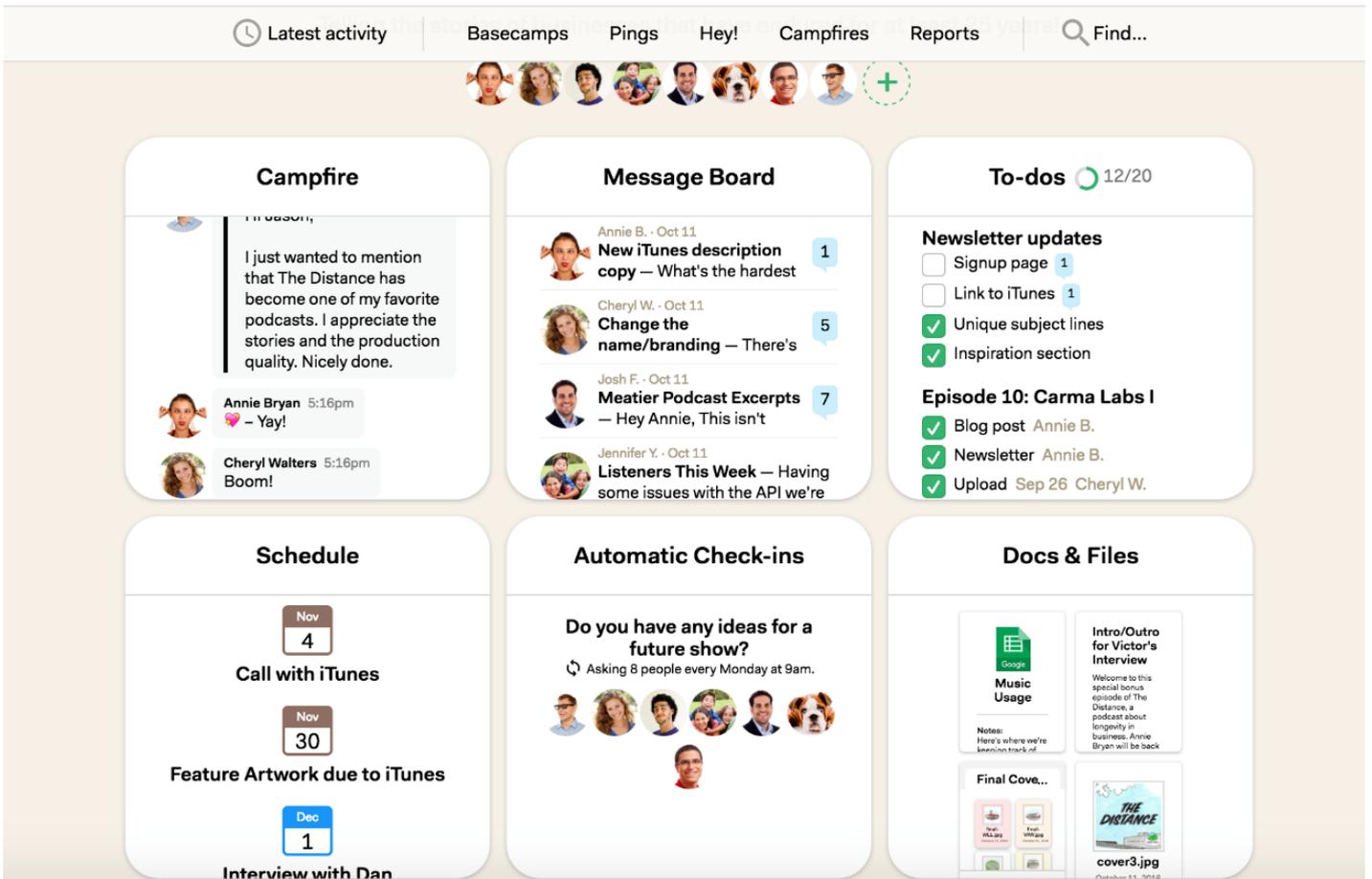


Figure 8. Basecamp Communication & Collaboration Tools

Library IT project managers should create wide fields of allies as early as possible through appeals to common organizational objectives and mission statements (Cervone, 2011, p.96).

Formalizing communication lines with online library IT project stakeholders, library organizational leaders and university representatives is also a good first step. Transparently discussing issues relating to resistance and thinking through group psychology is also a good proactive Agile Project Management technique and may be usefully formalized within online library project work plans. Identifying preferred communication vehicles, stakeholder viewpoints and varying levels of commitment or resistance potentially helps meetings and communications planning and forwarding a project with larger organizations. Communication and social media design plans are key, including strategizing with team members regarding the target project communications that will be sent to specific constituent groups who may be particularly invested or resistant to a project.

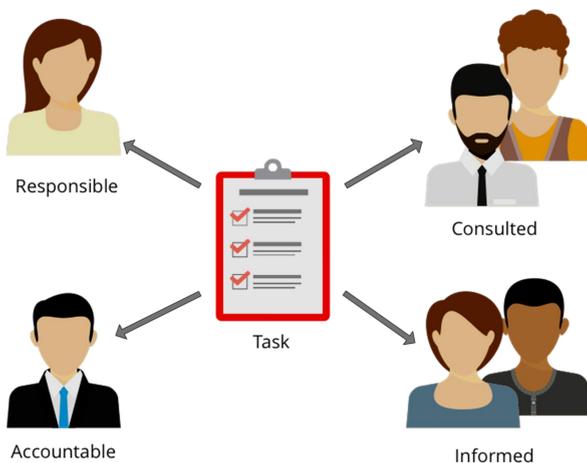


Figure 9. Agile Communication Assignment Matrix Techniques

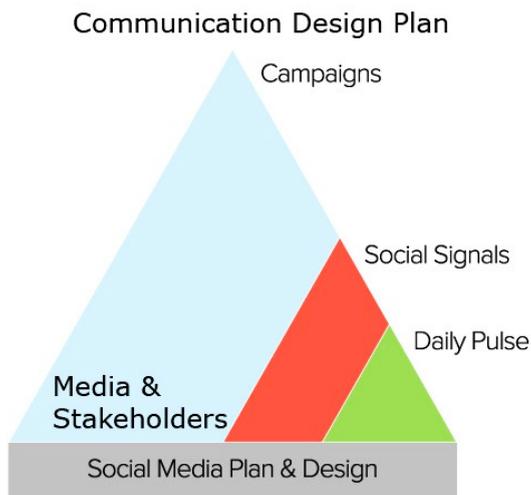


Figure 10. Communication and Social Media Design Plans

Approaching Agile IT Projects – Sponsors, Scope, and Agile Developmental Models

Many libraries' IT projects, even major ones, are started without a project sponsor, plan, project manager or formalized methodology. To be Agile, one should not discard project management plans. A project plan is still needed to provide a roadmap which should include scope statements, deliverables and team information. A communication plan, work breakdown structure, controlling mechanisms and a budget should be included and documents should be transparent and circulated with higher administration for initial project sponsorship, review and support.

If one is developing any type of digital library application or mobile infrastructure, a software development methodology should be chosen. All too often, library IT projects fail to formalize these methods to the project's peril. Information technology project development models also range in style and methodology, each having specific characteristics. Waterfall, incremental, iterative, adaptive and exploratory are all common Agile development models, each possessing specific characteristics and suitability towards different environments (Schwalbe, 2011, p. 59- 61). Project stakeholders should be aware of conceptual model parameters including timelines and basic characteristics.

An Agile approach to IT project development includes the progressive strategy of scope, design, build, test, check and deploy, with a quick initial iteration development time termed a Sprint (usually around four weeks). This allows design and redesign of the system based on user feedback (Chang, 2010, p.673). With this methodology, emphasis is on gathering requirements in a project plan in a clear, complete and verifiable way (Chang, p. 673).

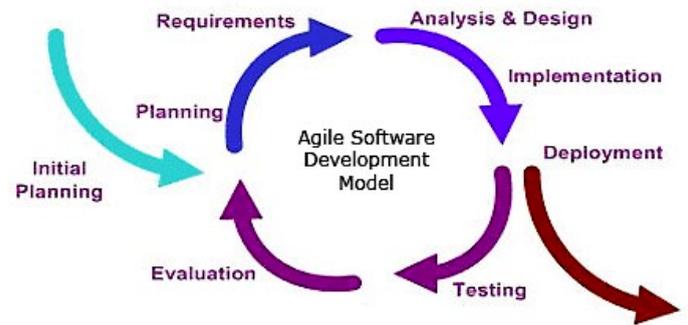


Figure 11. Agile Software Development Model

It is also important that stakeholders are aware of the methodology and have also signed a project plan to understand parameters to increase chances for project success. Project managers should also be aware of differences in methodology to suit the various library environments. Agile methods work best in organizational cultures where change is welcome and innovation and creativity are encouraged with less resistance (Chang, p. 677). If a project manager becomes cognizant that the wider environment is not suitable for this type of IT methodology, it is their duty to shift methodologies or educate proactively to a more suitable method for the culture.

Library IT Agile Project Managers: The Current Landscape



Figure 12. Project Management Formalization

Presently, the role of a dedicated IT project manager with an Agile or PMP designation in academic, public or special libraries is still relatively rare, but these methodologies are increasingly accepted. Often, most library IT projects are managed by librarians with MLIS or IT related degrees from either library, web or systems departments (53%) (Fan and Keach, 2011, p. 6). As mid and large-scale technology project demands for libraries have increased, the time has come to bring this staff employment category into the fold or, alternatively, lobby to include a concentration of IT project

management courses in traditional Master of Library and Information Science Graduate Degrees (MLIS).

A longer list of formal Agile techniques of Kanban, Lean and Scrum, as well as project management inclusive of writing project plans, controlling scope, identifying sponsors, documenting project requirements and budgets have large room within library IT projects. A good, steadfast project manager and formal communication plan between stakeholders and

administration enables a well-planned setting for more creative parameters and technical progress. Library IT projects would also benefit from a dedicated library project manager to clarify shifting priorities (scope creep), address resource issues, plan communications and formalize technical parameters (Fan and Keach, 2011, p.12).

Q3 project overview

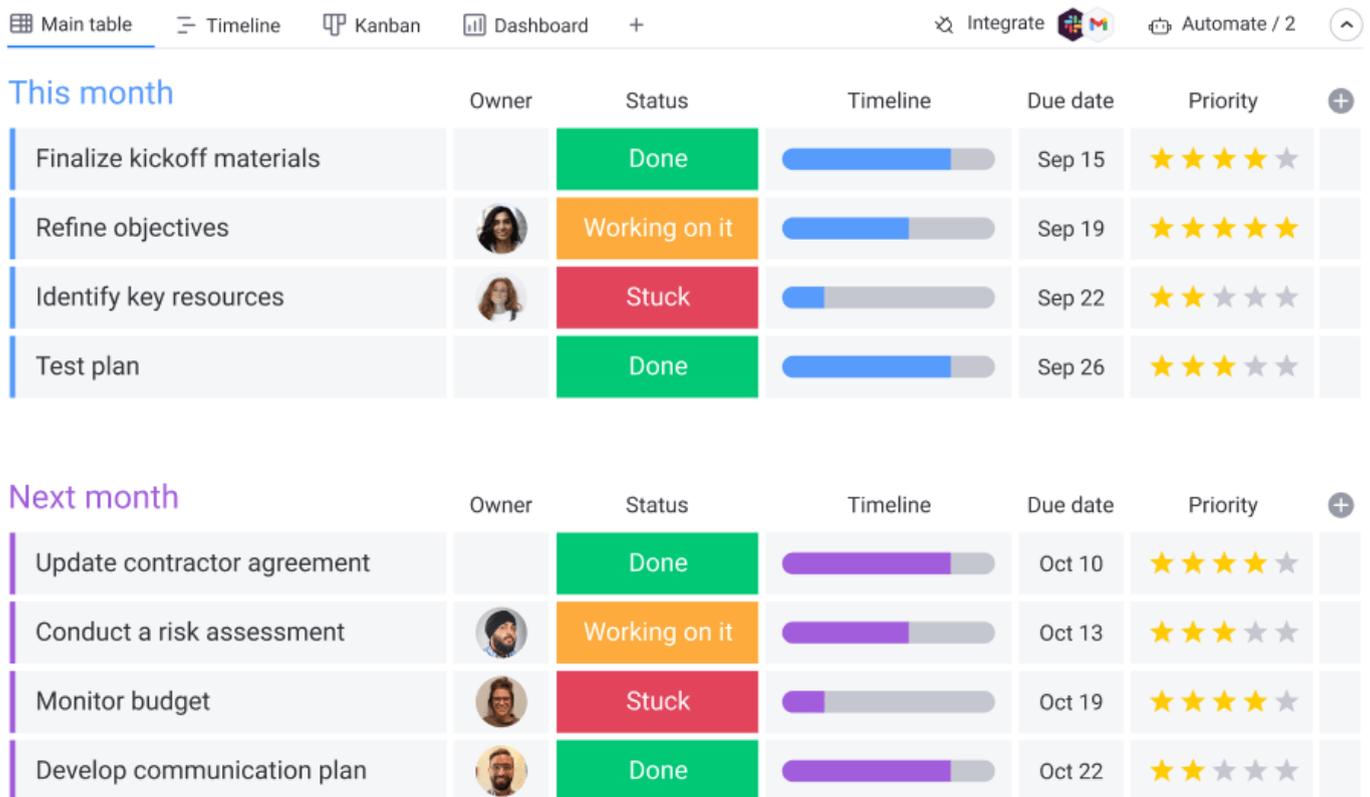


Figure 12. Monday.com Project Overview Kanban Board Variation

Libraries Changing 21st Century Goals

In a survey of libraries going forward in the twenty-first century, the Institute of Museum and Library Services (IMLS) found that the highest priority goal of academic libraries was ranked as increased access to collections through digitization. The second highest priority was named as preservation of materials through digitization and digital projects (Lopatin, 2006, p.274). Both priorities involve ongoing elevated levels of IT project commitment and agile management techniques.

Many libraries involve special collections whose main thrust in the 21st century regard specialized, born-digital and more recently mixed media extended reality (XR) projects. These projects may be large or small scale, textual or image based. They involve a complex amalgam of multimedia artifacts and a wide range of stakeholders with varying needs and agendas. IT project requirements are increasingly complex. Because of the contents' increased level of media, copyright and metadata complexity, librarians have more than enough on their section of this plate. With ongoing complex IT platform delivery expectations (mobile, etc.), the addition of Agile project management organization skills toward these multi-pronged projects allows for the focus of specialized skills through the segmentation of roles.

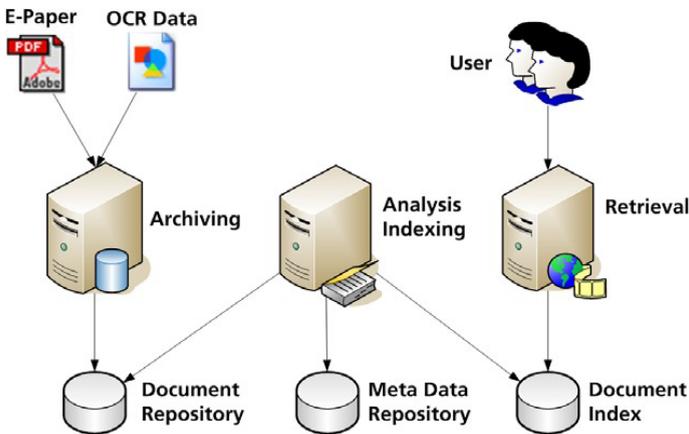


Figure 13. Digitization Process

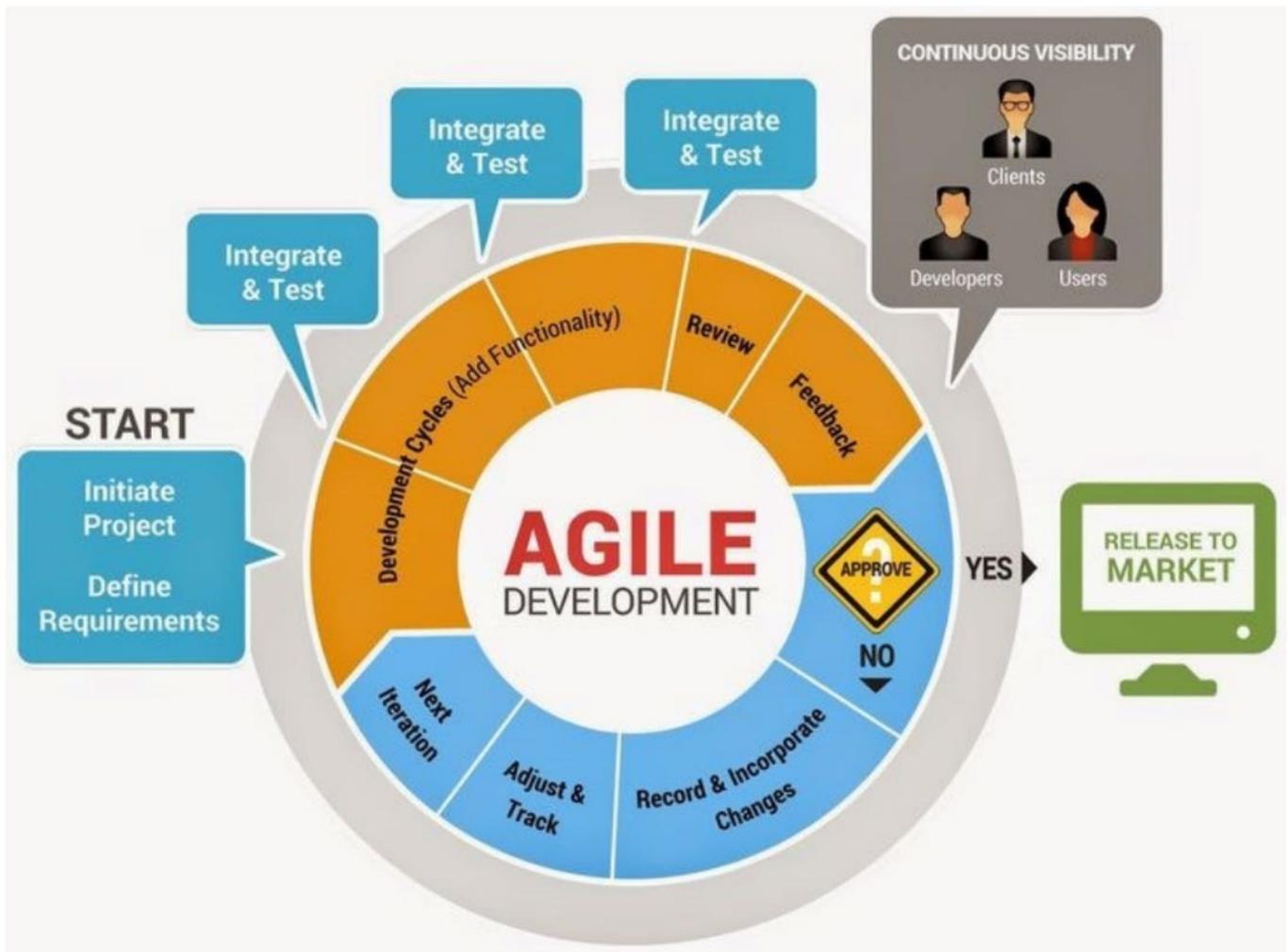


Figure 14. Agile Product Development Cycle

Conclusions, Agile and Library AI Projects

The upcoming possibilities for libraries and AI technologies in the 21st century with regards to Agile, services, content and the currently occurring AI revolution are fascinating, vibrant, and complex. Agile IT Project Management will play a vital role in emergent AI categories of patron services engendered, applications created and how the ever-growing stream of digital content is managed, processed, labeled with metadata, and then retrieved.

Project Management with Agile is an imperative area for libraries to reexamine from infrastructure perspectives as they wade into the new paradigms of artificial intelligence. Agile will allow libraries to function and adapt effectively and for institutions to lead with technology. There is also enough room for everyone at the table. Together, stakeholders may work more productively for the more efficient functioning of the greater whole.

This research has rearticulated some of the specificity and challenges of library IT functions, importance, and applicability of principles of Agile Project Management to the field. The application of formalized Agile Project Management for libraries is currently largely unexplored. Major factors of Agile such as continuous integration, prioritization, collaboration, user satisfaction, embracing change, incremental delivery, self-organizing teams (see Table 2) have much room for further implementation in libraries. The territory for synthesis of agile with library, information science, AI and IT project management is fertile. Hopefully, this research has pointed out a few of the salient areas, utility, and needs. The future and better success of libraries in the new millennia will depend on the application of 21st century Agile Project Management techniques to the ever-growing complexity of exciting and new AI and other IT project possibilities.

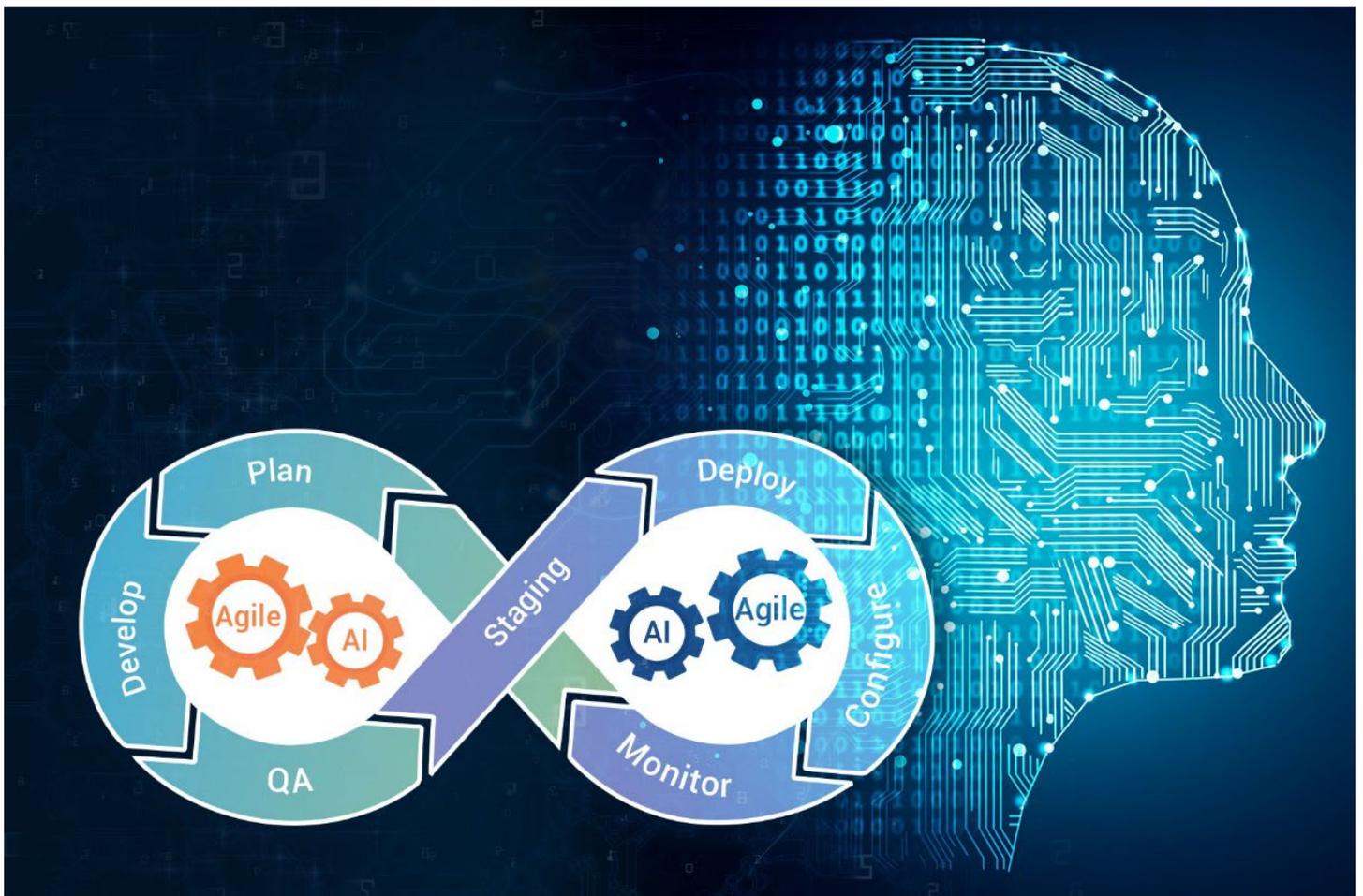


Figure 14. Library AI Projects, Agile and Human Computer Interaction

Factors in Agile IT Project Management	Definition	Example 1	Example 2	Additional Examples
Iterative Development	Continuous improvement through frequent cycles of planning, development, and testing	Scrum framework: An agile framework for software development that emphasizes iterative development and cross-functional teams.	Kanban methodology: A method for managing and improving workflows that emphasizes visualization, limiting work in progress, and continuous delivery.	Lean development practices: A set of principles and practices that focus on eliminating waste, maximizing value, and continuous improvement.
User Involvement	Collaboration and feedback from end-users throughout the development process	User stories and personas: Techniques for defining user needs and goals that can inform the development process.	Usability testing and user acceptance testing: Techniques for evaluating the usability and effectiveness of software from the perspective of end-users.	Agile UX design methodologies: Approaches to user experience design that prioritize collaboration and iterative feedback.
Cross-Functional Teams	Multi-disciplinary teams with shared accountability and flexible roles	Self-organizing teams: Teams that have the authority and responsibility to organize themselves and make decisions.	Pair programming and code reviews: Techniques for improving code quality and sharing knowledge across team members.	DevOps and Continuous Delivery: A set of practices and tools that emphasize collaboration and automation between development and operations teams.
Adaptive Planning	Flexibility and responsiveness to changing requirements and priorities	Backlog sprint planning: Techniques for refining and prioritizing development tasks based on feedback and changing requirements.	Agile estimation and story point sizing: Techniques for estimating the effort required to complete development tasks, which can inform project prioritization.	Retrospectives and continuous improvement: Techniques for reflecting on the development process and identifying opportunities for improvement.
Time-Boxed Delivery	Fixed periods of development with deliverables at the end of each cycle	Sprints and iterations: Fixed periods of development that typically last one to four weeks, during which a set of prioritized tasks are completed and delivered.	Time-boxed meetings and ceremonies: Meetings and events that have a fixed duration and schedule, including daily stand-up meetings, sprint planning, and sprint retrospectives.	Release planning and roadmapping: Techniques for planning and coordinating multiple development cycles and releases over a longer timeframe.
Continuous Integration	Continuous integration of code changes and automated testing	Continuous integration and delivery pipelines: Automated processes for integrating code changes and testing them in a controlled environment before deployment.	Automated unit and acceptance testing: Techniques for automatically testing code at multiple levels to ensure that it meets requirements and performs as expected.	Continuous deployment and monitoring: Techniques for deploying and monitoring software in production environments, which can inform future development and maintenance.
Prioritization	Prioritization of features and tasks based on value and user needs	Product backlog management: Techniques for managing and prioritizing a list of development tasks based on business value and user needs.	Value-driven prioritization techniques: Approaches to prioritization that focus on maximizing value and minimizing waste, such as cost of delay analysis and value-based pricing.	Minimum Viable Product (MVP) development: A strategy for developing a product with only the essential features required to test and validate its value to users.
Collaboration	Collaboration and communication between team members and stakeholders	Daily stand-up meetings: Short, daily meetings in which team members share updates, identify blockers, and coordinate their work.	Retrospectives and feedback sessions: Meetings and events in which team members reflect on their work and identify opportunities for improvement, with the participation of stakeholders.	Pair programming and code reviews: Techniques for sharing knowledge, improving code quality.

Table 2. Major Factors in Agile IT Project Management

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Contextualizing Performers in Circus Route Books: Linked Data Entities and the Open Data Environment

Angela Yon, ayon@ilstu.edu

Assistant Professor, Cataloging and Metadata Librarian
Milner Library, Illinois State University, USA



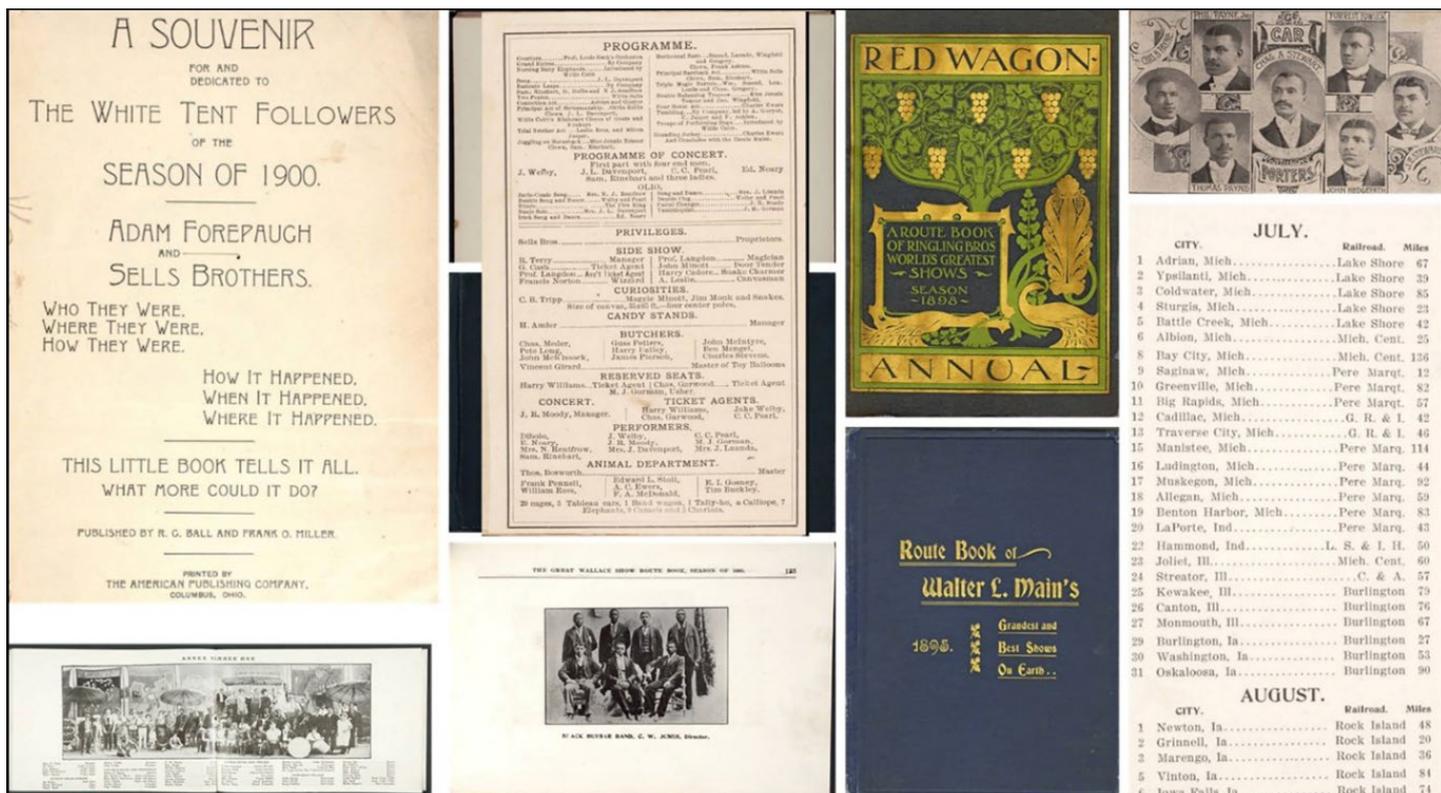
Collage of performers from diverse populations found in circus route books from the Circus Route Books digital collection at Illinois State University, Milner Library

In 2017 Milner Library at Illinois State University received a grant from the Digitizing Hidden Collections program, a national grant competition administered by the Council on Library & Information Resources (CLIR), for a collaborative digitization project of circus route books held by Circus World, Illinois State University, and the John and Mable Ringling Museum of Art. The three institutions house the largest circus collections in the United States and collectively they shared their unique route books to build a digital collection for the [Step Right Up: Digitizing Over 100 Years of Circus Route Books](#) project.

Circus Route Books were published at the end of the show's season. Route books contain various information including personnel by department and performance acts, the itinerary of cities and towns; and may also include photographs and statistics such as miles traveled, weather reports, ticket sales, and daily events. The Circus Route Books collection is significant not only

because it provides detailed insights into circus life, but the books also highlight the circus industry's role in American history and society. The American circus played a pivotal part in shaping American culture. Route books are rich resources. They have a broad appeal that extends beyond individual scholars interested in the circus. This disciplinary interest includes American studies, history and interdisciplinary studies of sociology, anthropology, economics and labor, geography, race and cultural studies, performing arts, and gender studies.

The following research discusses a 'linked data' and 'collections as data' approach employed with digital tools and open data in the digital humanities exhibit: [Agency through Otherness: Portraits of Performers in Circus Route Books, 1875-1925](#). This endeavor represents the final segment of the four-year grant project.



Collage with images, itinerary, program acts and covers found in circus route books from the Circus Route Books digital collection at Illinois State University, Milner Library

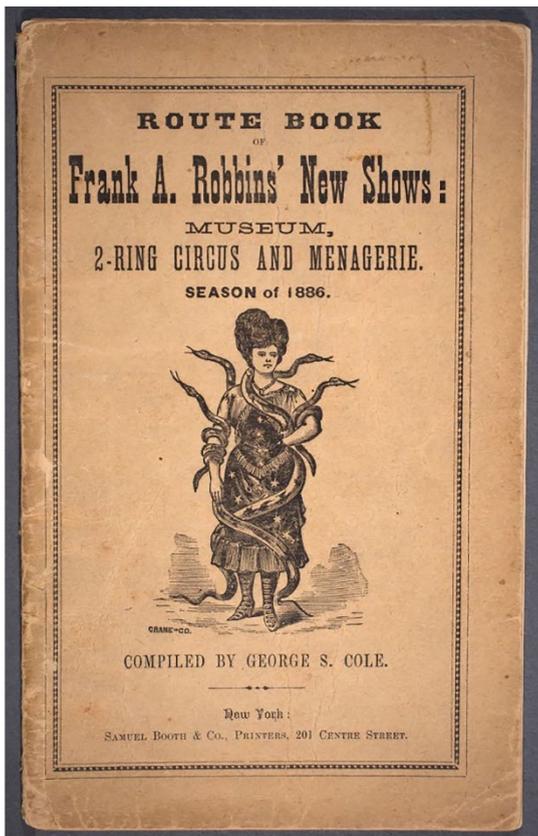
Project Background - Step Right Up: Digitizing Over 100 Years of Circus Route Books

In the first three years, the project team worked on the detailed inventory, digitization, construction of original descriptive metadata for the combined collection of 306 route books, and upload of objects in the digital collection platform CONTENTdm. Data and creation of controlled vocabularies included names of performers, circus acts, circus names and owners, advertisers, and regional stops. The library launched the digital collection in 2020.

The collection is more reachable through this digital surrogate, opening the opportunity to view these books globally. Formerly, the books were only available for physical viewing separately at the three institutions. Milner Library's digital collections, including the Circus Route Books, are part of the Digital Public Library of America (DPLA) through the regional Illinois Digital Heritage hub. They harvest data via OAI (Open Archive Initiative) and host Milner's collections on their site. As a member, others, both within and outside the network can export datasets from DPLA collections via APIs.



First Annual Route Book of the Great William Sells and James H. Gray United Shows Season 1900 from the Circus Route Books digital collection at Illinois State University, Milner Library



Route Book of Frank A. Robbins' New Shows: Museum, 2-Ring Circus and Menagerie Season of 1886 from the Circus Route Books digital collection at Illinois State University, Milner Library

Literature Review

For decades, galleries, libraries, archives, and museums (GLAM) worldwide have invested in the digitization of their cultural heritage holdings to meet the public demands for direct access to their collections and to reach a larger and diverse audience. Digital collections, however, are no longer viewed merely as the surrogates of the physical collections. In recent years there has been an increased interest in “collections as data” from institutions. “A collections as data paradigm seeks to foster an expanded set of research, pedagogical, and artistic potential predicated on the computational use of cultural heritage collections.” (Padilla, 2018). It looks beyond the traditional use of digital collections as proxies for the physical and providing access of inherent data to enable digital humanities research. To support this new outlook, both the Institute of Museum and Library Services and the Andrew W. Mellon Foundation have funded recent ‘Always Already Computational’ projects that created a framework and guide of standards and best practices for transforming digital collections to data for computational use and innovative research methods. (Wittmann et al., 2019, pp. 49-50)

Following this guidance in their pilot for a collections as data strategy, the University of Utah J. Willard Marriott Library converted five library collections into datasets

and made the data available through a public GitHub repository. Examples of datasets produced were geographic coordinates, genealogical information of dates and place names from newspaper obituaries, and oral history texts. They tested the data with various digital humanities methods for visualization and computational exploration including geographic information system (GIS) mapping, text mining, and topic modeling. (Wittmann et al., 2019, p. 50)

The growing increase in digital cultural heritage data enables increased levels of access and new strategies of analysis and exploration. This includes innovative interactive applications (Windhauer et al., 2019, p. 2312), visualization aids, discovery, analysis, and communication about collections which lead users to findings of diverse perspectives. These unexpected discoveries may inspire new ways to examine primary sources and historical evidence (Glowacka-Musial, 2021, p. 6). Datasets of cultural heritage collections are rich and often contain varied metadata related with the many different object types such as images, texts, artifacts, music, and films. They are also connected to historical contextual information and knowledge. Linked data can help with this contextualization in visualizing and interpreting collections in broader cultural and societal spaces. (Windhauer et al., 2019, p. 2312) “Linked Data and Semantic Web technologies are becoming increasingly important in creating, publishing, and analyzing cultural heritage data in digital humanities.”(Bikakis et al. 2021, p. 166)



Wikidata offers a low-barrier, high-result method for creating and using linked data in libraries and cultural heritage institutions. It makes data not only visible but reusable as linked data.

Ashleigh Hawkins argues for the increased collaboration with archives and digital humanities, engagement with linked data and the incorporation of artificial intelligence and low-barrier tools like Wikidata into production workflows to expand access and use of digital archives (Hawkins, 2022, p. 320).

There has been growing interest and engagement from libraries and other cultural heritage organizations in Wikidata and Wikipedia. Recent reports published by the International Federation of Library Associations and Institutions (IFLA), the Program for Cooperative Cataloguing (PCC), and the Association of Research Libraries (ARL) advocate for Wikidata integration to advance discovery (International Federation of Library Associations and Institutions, 2016; Program for Cooperative Cataloguing, 2018-2021, Association of Research Libraries 2019). In September 2020, PCC launched a Wikidata pilot project and over seventy academic and cultural institutions globally participated in the pilot to increase the movement toward identity management (Wikidata, 2022).

Wikidata, Collections as Data, Open Data, Digital Storytelling

In the last year of the project, the main objective was to make data readily open and reusable to aid in optimal discoverability and create data relationships with the collection. To accomplish this, there were three goals:

1. Invest time in the disambiguation and research of circus performer names, create Library of Congress Name Authority Records (NAR) and Wikidata entries for circus and performer names to add them to the linked data information landscape; specifically focused on performers that were the most identified in the collection and from historically excluded and underrepresented groups.

2. Research and record geographic coordinates of individual circus routes from the books.
3. Based on the collection data generated, create data visualizations and interactive narrative experiences with digital tools.

The culmination of these efforts resulted in the digital humanities project, [Agency through Otherness: Portraits of Performers in Circus Route Books 1875-1925](#). The exhibit features essays, images, interactive timelines, and map data visualizations of circus routes overlaid with data of Native Lands, historical railroads, and population growth in the United States.

For the first goal, time investment in the disambiguation and research of highlighted circus performers in the collection leveraged identity management principles with Library of Congress Name Authority Records and Wikidata to create linked open data. The creation of identifiers with name authority records and Wikidata entries for these performers aids in higher discoverability to information on these persons and the collection (Image 1). The team also participated in the PCC-Wikidata Pilot. The work in the creation of links between these data stores and the collection foster future fully actionable linked open data. An example of linked data in action is through use of SPARQL queries against the Wikidata items the project team created. Information can be pulled out in a text list, or as a data visualization such as a timeline (Image 2).

The image shows two side-by-side screenshots. On the left is a Library of Congress Name Authority Record (NAR) for Tetu Robinson. It lists various identifiers and their corresponding records, including a Wikidata ID (Q104247359) and a VIAF ID (8161028755023740232). On the right is a Wikidata entry for Tetu Robinson (Q104247359). The entry includes a description as an American circus performer, a list of languages with labels and descriptions, and a list of statements such as 'instance of human', 'family name Robinson', 'languages spoken, written or signed English', and 'occupation circus performer, aerialist, acrobat'.

Image 1. Library of Congress name authority record created on the left for the aerialist and equestrian Tetu Robinson and a Wikidata entry on the right.

present day Native reclaimed land data map layer was made available in ArcGIS by the USGS National Gap Analysis Program. The team incorporated the map visualizations alongside text, images, and other media to create an exhibit with narrative and interactive experiences using digital tools.

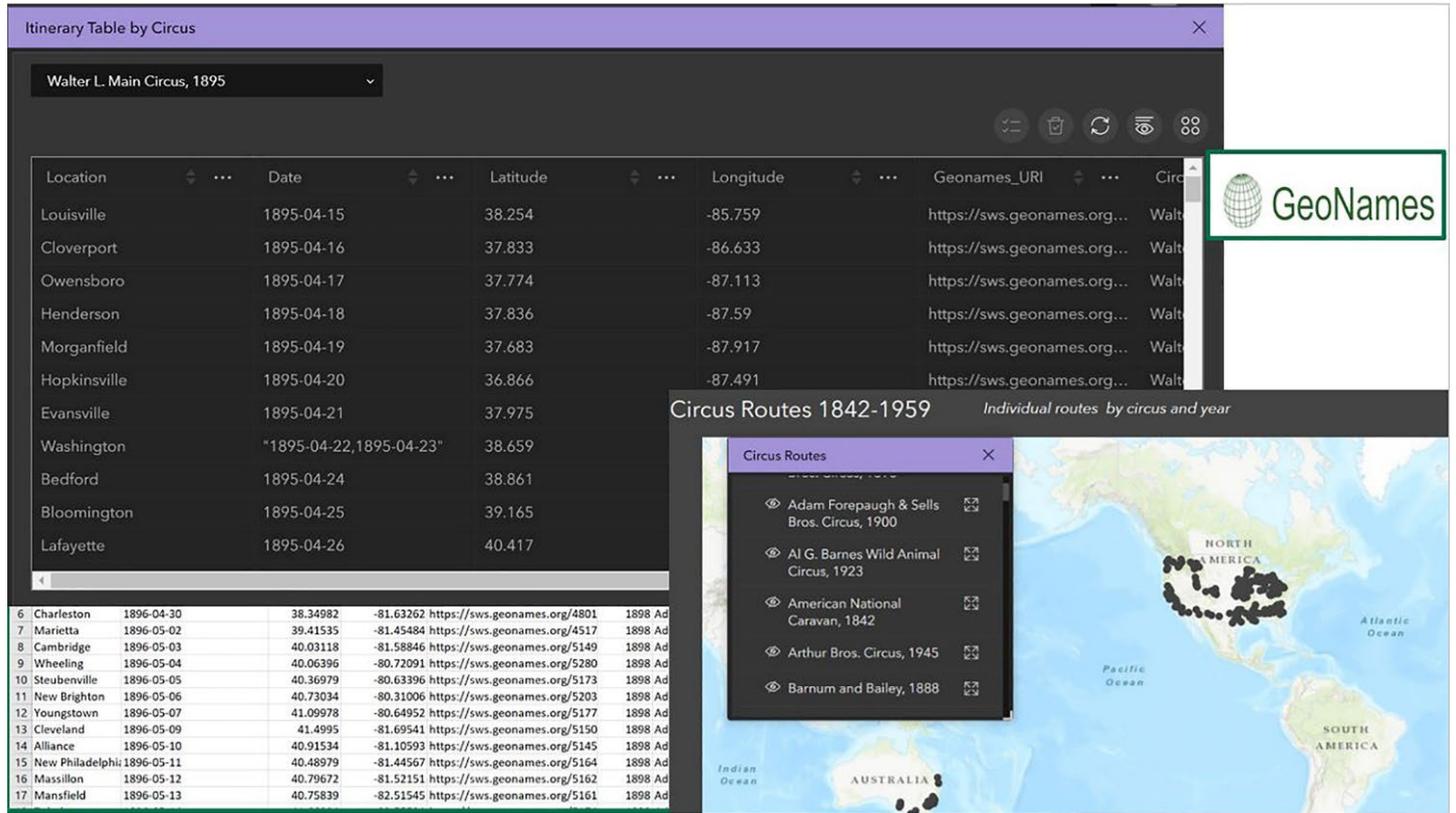


Image 3. Recorded GeoNames geographic coordinates and names of city/town stops with dates of circus routes exported into ArcGIS for map visualization and itinerary table

Agency Through Otherness: Portraits of Circus Performers, 1875-1925

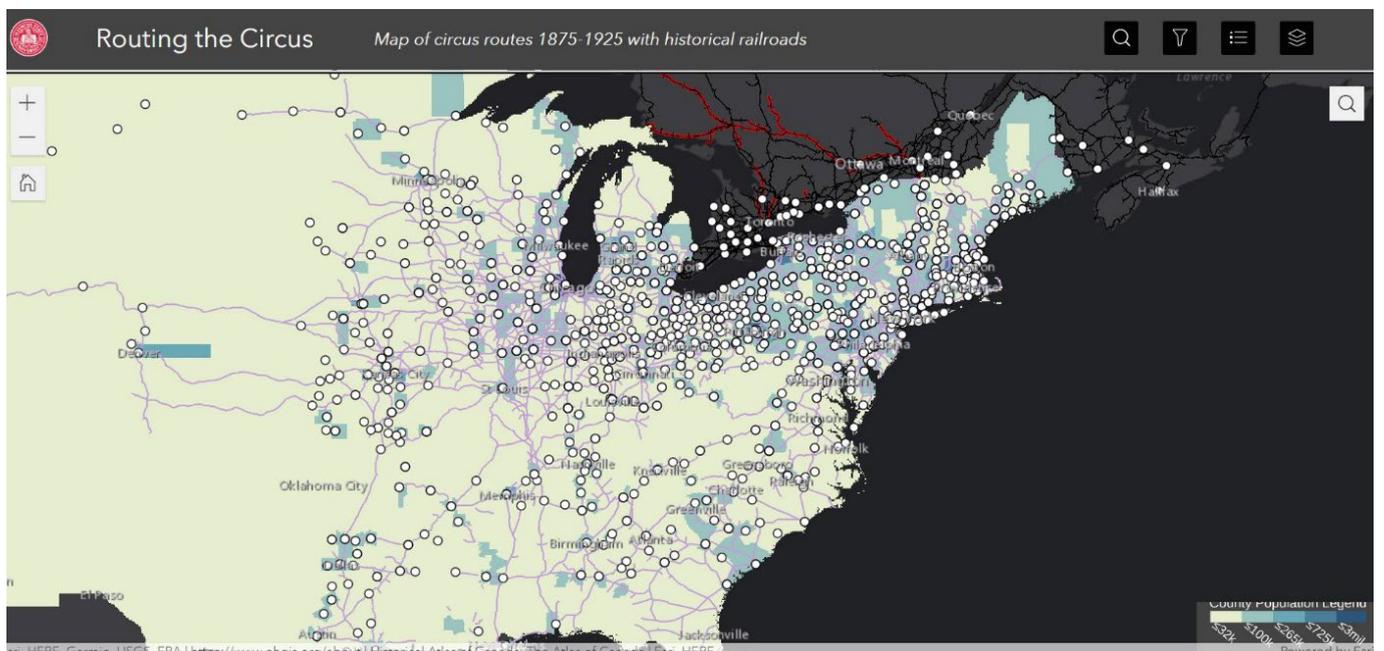
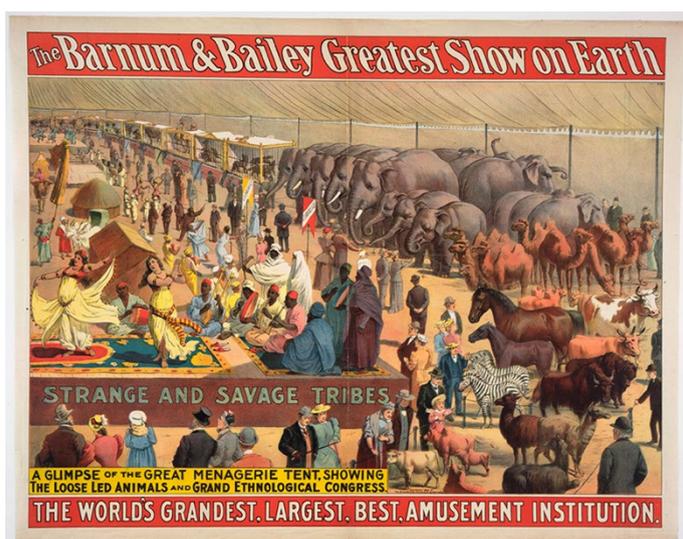


Image 4. "Routing the Circus 1875-1925" map, circus route stops overlaid with historical railroad lines and county population census data

The “[Routing the Circus 1875-1925](#)” map featured in the *Agency Through Otherness: Portraits of Circus Performers, 1875-1925* exhibit provides important historical context for the circus in the country. It shows the circus’ development with the advent of the railroad alongside population growth and national territorial expansion (Image 4). It is in this historical context that the exhibit explores narratives about circus performers with interactive experiences. In America, the circus became a form of mass cultural entertainment with little competition due to national expansion and the use of railroads to travel huge distances. The reach and appeal of the circus is significant and can be traced partially through the route books that include ticket sales revenue on the cities where the circus stopped.



Barnum & Bailey greatest show on Earth: Strange and savage tribes: A glimpse of the great menagerie tent, showing the loose led animals and grand ethnological congress, 1894. Source: Huntington Digital Library

In the formative period from 1875-1925, the notion of Western imperialism, colonialization, and expansion prevailed. This is well evident in numerous circus acts. These presented the otherness, exoticism, and racist views of people from non-Western cultures as entertainment with spectacles, ethnological congresses, human zoos, curiosities, and side shows. Through performance this became the dominant narrative circuses helped to spread, reinforcing colonialist notions

of power and racist hierarchy. The map of the circus-stops at numerous cities and towns alongside population data illustrate the proliferation of these beliefs to the masses. The circus captures a fundamental paradox of racism and prejudice in the United States: otherness is valuable only when it is consumable.

On analysis of the metadata generated for the digital collection, performers from misrepresented and underrepresented populations contributed largely to the circus. From the 306 books in the collection, under the category for circus acts - 85% feature sideshow acts and 80% human curiosities acts. 69% of these books are in the exhibit’s fifty-year time span of 1875-1925. Displaying and commercially exploiting human difference was business.

In reversing this narrative constructed by the circus, the exhibit counters against this space the circus presented. The individual accounts examine the possibilities of independent, self-determining choices, and the performer’s agency in a societal structure built on oppression and exploitation. Exhibit chapters include specific examples of disparities in race and gender that undoubtedly affected these individuals.

In Mariah Wahl’s chapter “[Native Performance and Identity in The Wild West Show](#)” route book data and the data of Native lands (both ceded and unceded) are combined in ArcGIS. This creates a map designed to contrast the route of the Buffalo Bill Wild West Show and the unlawful seizure of Native lands throughout the 19th and 20th century (Image 5 and 6). Routes identified in the books traversed and disrupted the Native land of countless tribes across the United States. The routes are illustrated alongside the genocide and forced relocation of Native communities, to use the circus routes history to underscore these atrocities. The map provides important context for Native performers in the colonial environment. These performers traveled and performed with the Wild West Show even as their own lands were reduced and seized by the American government. The integration of this interpretative map visualization alongside narrative text, images and audio was conceivable with the Scalar publishing platform.

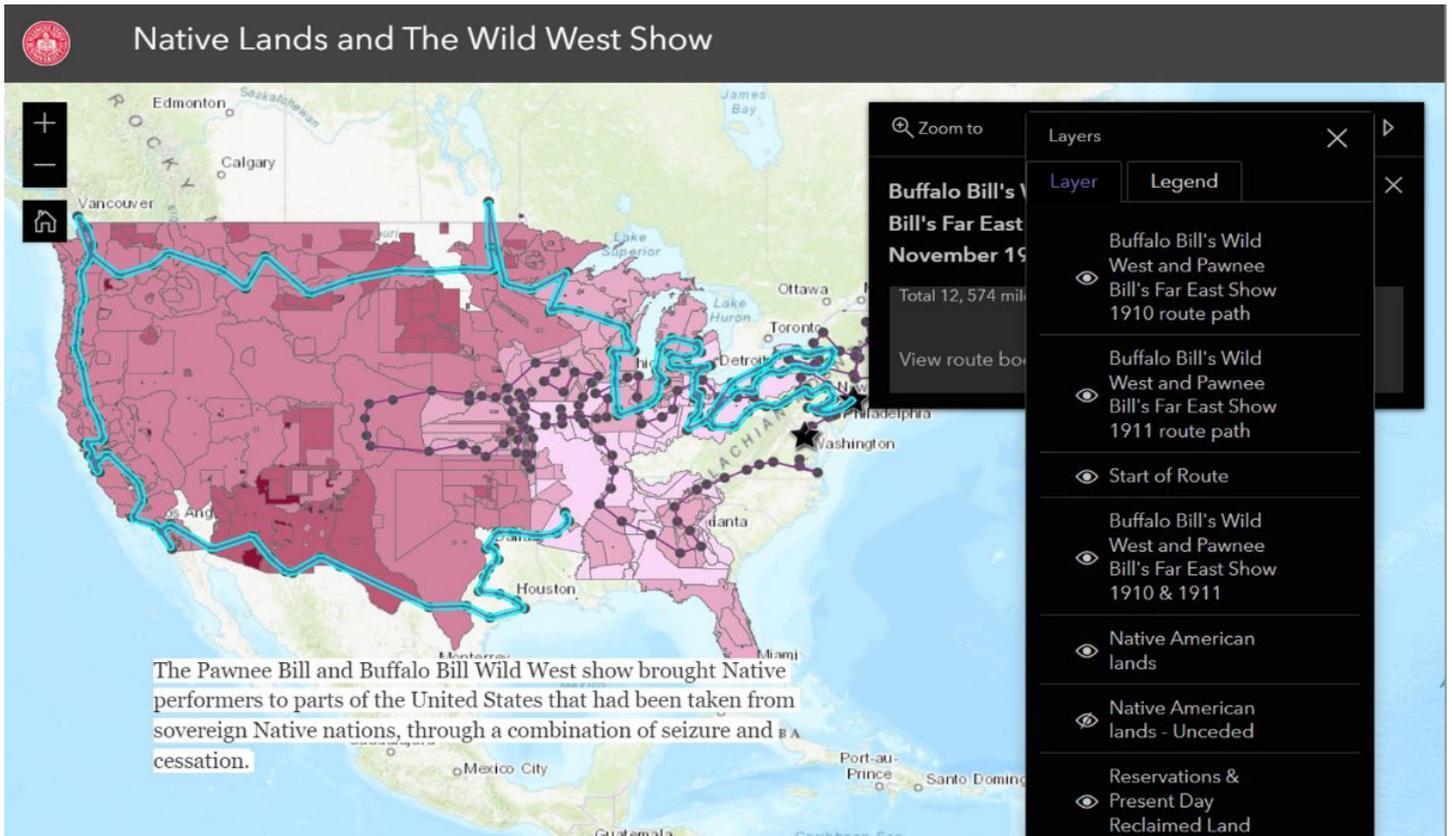


Image 5. "Native Lands and the Wild West Show" map, Buffalo Bill's Wild West and Pawnee Bill's Far East Show 1910 and 1911 route paths overlaid with Native American lands ceded and unceded



Image 6. "Native Lands and the Wild West Show" map, Buffalo Bill's Wild West and Pawnee Bill's Far East Show 1910 and 1911 route paths overlaid with Native American Reservations and present day reclaimed land

Digital Humanities Tools



The project team chose the Scalar platform to host the exhibit. Scalar is a free open-source publishing platform designed for authors to create digital scholarship online and offers collaborative authoring. It places a strong emphasis on multimedia publication which allows for multiple images, video and audio to be published with accompanying text. Scalar is a project of the Alliance of

Networking Visual Culture (ANVC) that was released in 2013 with the support of the Andrew W. Mellon Foundation and the National Endowment for the Humanities. It is hosted by University of Southern California with the option to host on an internal server. Due to limited resources, the exhibit is hosted externally. While this version is limited on customization, it does allow third party plugins. These come from a variety of platforms, enabling users to assemble media from multiple sources alongside writing in a structured essay, exhibition-like content, or book length works with a variety of layout options and minimal technical experience required. Scalar has the capability for nested, recursive, and non-linear formats. It supports collaborative authoring and editing and encourages improvisation with the data model. All these features were advantageous for this multi-author exhibit. Moreover, the team found it easy to use and to build on which is important for the project's longevity.

Adored and Mocked: Japonisme in American Culture

After the onset of the 19th-century ended Japanese isolation, a fascination began in all things Japanese in both North America and Europe. The opening of the ports fostered an active market in screens, fans, vases, kimonos and other Japanese goods. Few Americans had a clear understanding of Japanese culture just as few Japanese began to draw popular attention. European and Americans alike perceived Japan through the lens of Japonisme and Japonisette.



Thomas Edward (Edgar) Ingham was an actor initially known as Little Tommy in minstrel shows, but with the popularity of Japonisme, changed the name to Japanese Tommy. He was reported to be of Native American and African American ancestry. His name referred to "Tartar" (Tommy) Otagiri Nozaki, an admitted young interpreter for the Japanese diplomatic embassy, who was frequently reported in the newspapers. Japanese Tommy presented in acts such as the "Japanese Butler" with adopted butlers. Ingham performed with white minstrel troupes and was one of the only two African American men to do so before the Civil War.

This cultural prestige for Japan, novelty of Japanese acrobats and Japonisme would not equate to acceptance of Japanese persons in America like the Chinese. They also endured anti-Asian discrimination and violence. The Japanese were regularly referred to as "saffron-skinned, copper-colored, swarthy, ugly, oily, and small, and the children as 'little monkeys'." If referred to positively, it was often with a condescending type of cultural humor. Reporters reflected their readers' fear and disdain for many aspects of Asian culture, including food, dress, fashion, and music.

An account in the New York Times, May 14, 1860:

On the whole, it can't be said to be a *lap*. *Setting aside the harr-kari business, and the color and the hair and the grease and the prevailing notions in regard to clothing, there are insupportable objections connected with their ideas of privacy - brother, sister, another man and wife, a third man and two boys, all sleeping in a little box for a room - their tastes in food, their habits of spitting, their infernal music, and all that sort of thing, which would forever interfere with the establishment of a genuine Yankee into a regular-built up. These specimens are civil, quiet, orderly, kind and peaceable; - they certainly are wonderful in their line of art but beyond that nothing.*

The Chinese American population dropped soon after the 1854 Chinese Exclusion Act. "With the rise of Japanese immigrants, studies on race promote that contempt for Chinese transcended itself onto the Japanese as the new "Oriental." Anti-Chinese sentiment, too, had originally been a transference of anti-Black sentiment in the wake of emancipation. White representations with little consistency had simply overlaid old hatreds onto new people."

Commercial Orientalism and Commodified Bodies

During this period, exhibits, circuses, theaters, such as the Exposition Universelle in 1867, and the 1893 St. Louis World's Fair (The American Purchase Exposition) presented the commodification of racialized bodies. These fairs offered the middle classes a commercial orientalism, Asian objects and people for consumption.



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Such is the way orientalist and postcolonialists engaged in travel writing, the urban middle classes could now consume a visual array of commercial "exoticism" (curiosity to discover their own people's relationship to other cultures, peoples, and parts of the world) to survey a panorama of China, a miniature of a primitive village, or a living animal or exoticized human on display or to witness an "oriental conqueror" all evoked a sense of an undermind and situated their place in the world.



In the performance of *The Ghibli and the Knight* by the Kawakami Troupe in 1869, reviews reported a conversation between two women, "she looks just like a picture on a fan," and "something the Kawakami on kimonos (with hanging) come alive or an animated figure, thus objectifying the actors as commodities available for purchase." "The comparison clearly displays their dehumanization of the performers for the audience's pleasure. The viewers allowed themselves permission to impose this critique upon persons in the guise of appreciation of Japanese art and aesthetics.

Japanese-ness was associated with commodity objects, and how the performance of Asian-ness by white female bodies often created or commodified racialized bodies.

From the chapter "Outsiders in Demand: Chinese and Japanese Immigrant Performers," narrative text and accompanying images from the circus route book collection and other cited sources

The exhibit integrates images and media from multiple cited sources including archival newspapers and Wikimedia. The project team embedded three third-party plug-ins for richer digital storytelling in its chapters:

ArcGIS is a proprietary industry-standard software platform for GIS professionals to create, analyze, manage, and share geographic information. It provides

multiple methods to visualize, map, and analyze data and contains multiple data formats to import in projects.

ArcGIS map visualizations in the exhibit are "[Routing the Circus 1875-1925](#)," "[Native Lands and the Wild West Show](#)," and "[Showmen's Rest](#)."

Knightlab's Timeline JS is an open-source tool that

builds interactive timelines and allows integration of multiple media types such as maps, photos, and videos.

The chapter "[Outsiders in Demand: Japanese and Chinese Immigrant Performers](#)" begins with the timeline

to illustrate the mounting immigration policies and laws to stop Asians from entering the United States. Timeline JS is also featured in the biographical storytelling of [individuals](#) in the chapter segment "[Portraits of Midwest Musicians](#)" (Image 7).

PORTRAITS OF MIDWEST MUSICIANS (7/7)

The Big Band: James Wolfscale (~1868-1921)

JAMES WOLFSCALE (~1868-1921)

Wolfscale was inducted into the Windjammers Hall of Fame in 2020. Known for big, bigger, and biggest bands. Played cornet and violin and baritone. For more information on Wolfscale, see *Ragged but Right*, pages 166-174.

PROF. JAMES WOLFSCALE,
Leader of Annex Band.

Ringling Archives

Source: First Annual Route Book of the Great William Sells and James H. Gray United Shows Season 1900, Page 22

Timeline JS

1855 1857 1859 1860 1862 1864 1866 1868 1870 1871 1873 1875 1877 1879 1880

Image 7. The Big Band: James Wolfscale (~1868-1921) biographical timeline from the "Portraits of Midwest Musicians" segment in the chapter "Side Show Sounds: Black Bandleaders Respond to Exoticism"

Histropedia uses data from Wikipedia and Wikidata and generates interactive timelines with events.

The "[American Experiment: Circus in Context](#)" timeline in the exhibit showcases the circus performers in the historical context of compounding conflicts, resistance and innovations during the period in which they lived. The timeline joins many elements of the four-year

project: images from the digitized books, access into the digital collection, access into the exhibit, and access to the Wikidata linked data entries. With a scheduled Wikidata Query for the performers, Wikidata entries are populated in real time into the timeline with the selected event pages from Wikipedia (Image 8).

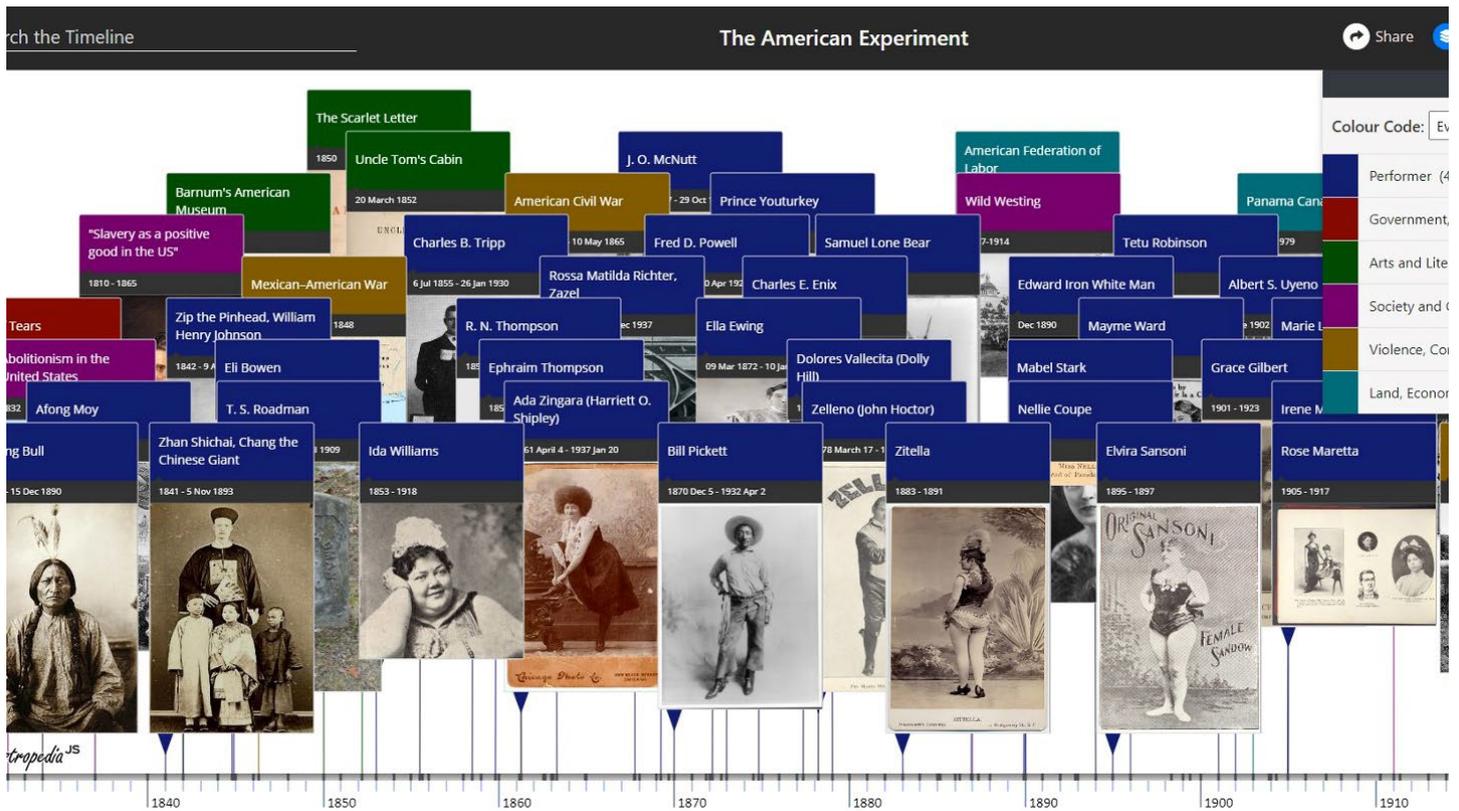


Image 8. Timeline in the “The American Experiment: Circus in Context” showcases the circus performers in their space and time.

Conclusion

With a linked data and collections as data approach, *Agency Through Otherness: Portraits of Circus Performers, 1875-1925* incorporated metadata and data analysis, data visualization, and digital storytelling components to bring the Circus Route Books collection to a wider audience for research. The exhibit demonstrates the potential of digital technologies, computational tools, and open data for exploring critical questions in the humanities and for presenting scholarship in new forms and interpretations. Importantly in this work, the project team recognized the opportunity to address gaps of representation and expressed a plurality of human experience to diversify the historical record and global knowledge environment.

Acknowledgments

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Links to additional sources:

1. ArcGIS <https://www.esri.com/en-us/home>
2. GeoNames <https://www.geonames.org/>
3. Harvard Dataverse <https://dataverse.harvard.edu/>
4. Histropedia <http://www.histropedia.com/>
5. ISU ReD <https://ir.library.illinoisstate.edu/>
6. OpenRefine <https://openrefine.org/>
7. PCC Wikidata Pilot/Illinois State University https://www.wikidata.org/wiki/Wikidata:WikiProject_PCC_Wikidata_Pilot/Illinois_State_University
8. Scalar <https://scalar.me/anvc/scalar/>
9. Stanford Earthworks <https://earthworks.stanford.edu/>
10. Timeline JS by Knightlab <https://timeline.knightlab.com/>
11. Wikidata https://www.wikidata.org/wiki/Wikidata:Main_Page



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Primary Contacts

Chair

Edmund Balnaves, Prosentient Systems, Australia;
ejb@prosentient.com.au

Section Coordinator

Elena Sánchez Nogales, Biblioteca Nacional de España, Spain; elena.sanchez@bne.es

Secretary

Cory Lampert, University of Nevada Las Vegas, United States; cory.lampert@unlv.edu

Information Coordinator

François-Xavier Boffy, Université de Lyon, France; francois-xavier.boffy@univ-lyon1.fr

Standing Committee Members

- Alenka Kavčič Čolić, National and University Library, Slovenia; alenka.kavcic@nuk.uni-lj.si
- Almudena Caballos Villar, Biblioteca de la Universidad Computense de Madrid, Spain ; acaballo@ucm.es
- Anna Tereza Barbosa da Silva, Oslo Police District, Norway; anna.tereza.barbosa.da.silva@politiet.no
- Katherine Zwaard, Library of Congress, United States; kzwa@loc.gov
- Leda Bultrini, ARPA Lazio, Italy; leda.bultrini@gmail.com
- Lynn Kleinveldt, Cape Peninsula University of Technology, South Africa; lynn.kleinveldt@gmail.com
- Maria Kadesjö, National Library of Sweden; maria.kadesjo@kb.se
- María Loretto Puga, Biblioteca del Congreso Nacionalde Chile, Chile; mpuga@bcn.cl
- Ngozi Blessing Ukachi, University of Lagos, Nigeria; nukachi@unilag.edu.ng
- Peter Leinen, Deutsche Nationalbibliothek, Germany; p.leinen@dnb.de
- Qiang Xie, National Library of China; XIEQ@NLC.CN
- Ray Uzwyshyn, Mississippi State University Libraries, United States; rju13@msstate.edu
- Sogoba Souleymane, University of Ségou, Mali; Sogoba.souleymane@gmail.com
- Sylvain Bélanger, Library and Archives Canada; sylvain.belanger@canada.ca
- Wouter Klapwijk, Stellenbosch University, South Africa; wklap@sun.ac.za
- Yeon-Soo Lee, National Library of Korea; myth4ys@korea.kr

Mentor

May Chang, University of Cincinnati, United States; may.chang@uc.edu

Big Data SIG Convenor

Patrick Cher, National Library Board, Singapore; patrick_cher@nlb.gov.sg

Artificial Intelligence SIG Convenor

Andrew Cox, University of Sheffield, United Kingdom; a.m.cox@sheffield.ac.uk