Connecting Libraries and Learning Analytics for Student Success

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Megan Oakleaf
Ken Varnum
Jan Fransen
Shane Nackerud
Cary Brown
Bracken Mosbacker
Steve McCann
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PARTICIPANTS

Rob Abel
Chief Executive Officer
IMS Global Learning Consortium

Noah Botimer
Solutions Architect, Library Information Technology
University of Michigan

Cary Brown
Director of Higher Education Programs
IMS Global Learning Consortium

Jan Fransen
Service Lead for Research Information Management
University of Minnesota

Don Hamparian
Senior Product Manager, EZproxy and Identity Management
OCLC

Sebastien Korner
Head, Architecture and Engineering, Library Information Technology
University of Michigan

Dennis Krieb
Director of Institutional Research and Library Services, Reid Memorial Library
Lewis and Clark Community College

Mark Leuba
Vice President, Product Management
IMS Global Learning Consortium

Steve McCann
Product Manager
OCLC

Joshua McGhee
Technical Program Manager
IMS Global Learning Consortium
Bracken Mosbacker
Technical Standards Architect
IMS Global Learning Consortium

Shane Nackerud
Technology Lead, Library Initiatives
University of Minnesota

Andrew K. Pace
Executive Director, Technical Research
OCLC

Etienne Pelaprat
Chief Technology Officer
Unizin

Ken Varnum
Senior Program Manager for Discovery, Delivery, and Library Analytics
University of Michigan

Anthony Whyte
ITS Program Manager
University of Michigan

Maurice York
Associate University Librarian for Information Technology
University of Michigan

ADVISORY BOARD

Rob Abel
Chief Executive Officer
IMS Global Learning Consortium

Malcolm Brown
Director of Learning Initiatives
EDUCAUSE

Mary Ellen Davis
Executive Director
Association of College and Research Libraries

Sean DeMonner
Executive Director of Teaching and Learning, Information Technology and Services
University of Michigan

Katherine Furlong
Executive Director, Research Services and Digital Scholarship
Bucknell University

Dennis Krieb
Director of Institutional Research and Library Services
Lewis and Clark Community College
Joan Lippincott
Associate Executive Director
Coalition for Networked Information

Ross McIntyre
Head of Library Analytics
Jisc

Tim McKay
Arthur F. Thurnau Professor of Physics, Astronomy, and Education,
Director of the Digital Innovation Greenhouse
University of Michigan

Andrew K. Pace
Executive Director, Technical Research
OCLC

Jenn Stringer
Chief Academic Technology Officer, Assistance Vice Chancellor, Teaching and Learning
University of California, Berkeley

Scott Walter
Dean, University Library
San Diego State University

John Whitmer
Learning Analytics and Research Director
Blackboard
EXECUTIVE SUMMARY

Library Involvement in Learning Analytics

The foremost purpose of higher education is to educate students, and a key component of any educational endeavor is assessment. As active contributors to the educational mission of their institutions, academic librarians use assessment to understand what students have learned or have yet to learn and to discover what helps or hinders student learning. Librarians apply what they learn through assessment processes to expand student access to learning; ensure students are able to persist and attain their goals; scaffold student experiences to aid attainment of independent learning capacity; and help students develop productive self-awareness, metacognition, and self-actualization in a variety of contexts, including their immediate learning environments, the broader community, and the world around them.

Over the last decade, higher education institutions have committed to the next wave of assessment capability in the form of learning analytics initiatives. Learning analytics is often defined as the “collection and analysis of usage data associated with student learning…to observe and understand learning behaviors in order to enable appropriate interventions” or the “measurement, collection, analysis, and reporting of data about learners and their contexts, for the purposes of understanding and optimizing learning and the environments in which it occurs.” In short, learning analytics employs data to improve learning contexts and help learners succeed. Throughout academia, learning analytics is operationalized as the use of institution-level systems that collect individual-level student learning data, centralize it in a warehouse or “record store,” and serve as a unified source for research seeking to understand and support student learning and success. Learning analytics can also be used as an umbrella term to include centralized or decentralized learner record stores, Integrated Planning and Advising for Student Success (iPASS) systems, early alert systems, and engagement tracking systems.

Currently, few academic libraries participate in institutional learning analytics initiatives. However, in alignment with their long-standing commitment to use assessment to understand and facilitate student learning, librarians should explore opportunities to engage with emergent institutional learning analytics tools, systems, and strategies. In recognition of the need to advance librarian understanding and engagement with learning analytics, IMLS funded the Library Integration in Institutional Learning Analytics (LIILA) project in 2017. The LIILA project produced a set of recommended “next steps” for librarian involvement in learning analytics, advocating that librarians:

1. increase awareness and deepen professional discussion about learning analytics;
2. be informed and forthright about current data practices;
3. communicate and negotiate with vendor and institutional partners;
4. situate learning analytics among other assessment approaches;
5. engage the learning analytics conversation at the institutional level;
6. identify and analyze questions or problems meriting a learning analytics approach;
7. envision library data contributions;
8. explore interoperability standards;
9. identify key user stories; and
10. pursue pilot studies.

In 2018, IMLS funded the Connecting Libraries and Learning Analytics for Student Success (CLLASS) project to advance the ability of libraries to engage learning analytics work in several of these areas.

The Next Step in Library Integration into Learning Analytics

The CLLASS project brought together a diverse group of library and higher education leaders and experts to:

• develop models for library inclusion in institutional learning analytics,
• explore strategies for bringing the models to fruition,
• design technologies to support library-enabled learning analytics, and
• anticipate ways in which this work will increase library impact on student learning and success.

The broad intent of the CLLASS project was to advance the role of libraries within their higher education communities; enable libraries to provide indispensable data to students, faculty, and other educational team members and leaders in order to contribute to a complete picture of institutional student learning; and facilitate student learning and success by contributing to the identification, development, deployment, and assessment of improvements resulting from learning analytics initiatives.

The primary output of the CLLASS project was the development of a library profile for Caliper, an interoperability standard used to label learning data and provide the means for capturing, presenting, and conveying learning activities to centralized data stores in order to facilitate the analysis, visualization, and increased awareness of student learning behaviors. Caliper standardizes learning data, enabling data from disparate systems to be ingested and combined to allow educators and researchers to expand their understanding of student experiences and improve, design, or redesign student support for achievement of learning outcomes. The Caliper standard includes a number of metric profiles that model learning activities; each profile provides a domain-specific set of terms and concepts that describe student interactions using a shared format and vocabulary. The Caliper library profile is available in draft form at https://www.imsglobal.org/spec/caliper-library/v1p2.

The Caliper library profile developed through the CLLASS project addresses several problems created by libraries’ complex infrastructure and content environments. Libraries acquire systems from a wide range of sources and vendors; often these sources differ from those that produce institutional systems. Each vendor and system produces different levels of data in varying formats. Without a standard, any holistic approach to integrating institutional learning analytics is a challenge. Therefore, a Caliper library profile provides a vehicle for integrating library data with other institutional data while maintaining library autonomy over the data type, amount, and level of detail provided. In short, the CLLASS project made significant strides in the technical ability of libraries to contribute data to institutional learning analytics efforts while ensuring that individual libraries can control the collection and use of library data in alignment with their values, ethics, and standards, as well as library and institutional policies and practices.

Librarians have long committed to supporting students, assessing student learning, and acting on their assessment findings to improve library services and resources. Still, learning analytics represents a significant evolution in the ways librarians can use assessment approaches to listen to students, make decisions, and take actions to increase library support and dismantle hurdles that can harm students’ ability to persist in and complete their educational journeys. Expanded possibilities generate new opportunities as well as new challenges, and librarians seeking to engage in learning analytics must grapple with both.

Advance Dialogue in Your Library and Institution
To support dialogue both among librarians and between librarians and their educational partners, this document includes a series of discussion questions throughout the text and closes with suggested reading lists, including relevant privacy resources. It is hoped that this report will stimulate discussions about the role of libraries in institutional learning analytics, enable the technical capabilities necessary for libraries to contribute to institutional understanding of student learning, and ultimately enable libraries to employ a new approach to supporting student learning and success.
1.0 INTRODUCTION

The foremost purpose of higher education is to educate students, and a key component of any educational endeavor is assessment. Indeed, it is hard to overstate the importance of assessment: it is the lifeblood of teaching and learning. Without assessment, educators sever their relationships with learners, resulting in instructional efforts that succeed only by chance and may often fail to reach, support, or empower learners. In contrast, educational practitioners who conduct assessments 1) gain insights into the needs, goals, and values of their learners; 2) design learning experiences that meet students where they are, engage them in meaningful ways, and enable them to attain greater agency in their own lives; and 3) reflect and improve throughout each iterative teaching cycle, ultimately increasing the value of education for their present and future learners. As active contributors to the educational mission of their institutions, academic librarians use assessment to listen to students in order to understand what they have learned or have yet to learn and to discover what helps or hinders student learning. Academic librarians who practice assessment participate in “triple-loop” learning, thereby exploring whether they’re providing library services, resources, and facilities in the “right” ways, for the “right” reasons, and whether those “right” reasons align with professional convictions about information, education, and the role of libraries in higher education. Librarians apply what they learn through assessment processes to expand student access to learning; ensure students are able to persist and attain their goals; scaffold student experiences to aid attainment of independent learning capacity; and help students develop productive self-awareness, metacognition, and self-actualization in a variety of contexts, including their immediate learning environments, the broader community, and the world around them.

1.1 Learning Analytics Defined

Over the last decade, higher education institutions have committed to the next wave of assessment capability in the form of learning analytics initiatives. Learning analytics is often defined as the “collection and analysis of usage data associated with student learning…to observe and understand learning behaviors in order to enable appropriate interventions” or the “measurement, collection, analysis, and reporting of data about learners and their contexts, for the purposes of understanding and optimizing learning and the environments in which it occurs.” Essentially, learning analytics employs data to improve learning contexts and help learners succeed. Learning analytics helps educators discover, diagnose, and predict challenges to learning and learner success and points the way to successful and active interventions to benefit students—especially those who might be less familiar with the unwritten and often opaque rules for success in higher education, including first-generation students, community college students, students of diverse backgrounds, students with disabilities, and veterans. Interventions include systematic and structural changes to practices, processes, and policies to improve learner experiences and remove obstacles to student success. Interventions also facilitate individual-level communication and connection. For example, they may provide learners with insights into their own learning behaviors; notify students and their educational support partners of important events, patterns, or milestones; prompt or refer students to gain assistance from support services; or otherwise link students with learning supports. Throughout academia, learning analytics is operationalized as the use of institution-level systems that collect individual-level student learning data, centralize it in a warehouse or “record store,” and serve as a unified source for research seeking to understand and support student learning and success. Learning analytics can also be used as an umbrella term to include centralized or decentralized learner record stores, Integrated Planning and Advising for Student Success (iPASS) systems, early alert systems, and engagement tracking systems.
1.2 Academic Libraries and Learning Analytics

Currently, few academic libraries participate in institutional learning analytics initiatives. However, in alignment with their long-standing commitment to use assessment to understand and facilitate student learning, librarians should commit to exploring the opportunity to engage with emergent institutional learning analytics partners, tools, systems, and strategies. In many ways, the trajectory from librarian engagement in traditional learning assessments to involvement in learning analytics is a natural one. Past learning assessments and new learning analytics approaches share a number of common values that librarians espouse. Both approaches demonstrate the importance librarians place on students’ opinions, positive affect, confidence, self-efficacy, attainment of learning outcomes, commitment to growth and improvement, and ultimate success—whether that success is represented by retention in a program, minimized time to degree, GPA or similar achievement measures, speedy and appropriate employment, lifelong learning, or some other long-range goal.

In recognition of the need for librarians to engage with learning analytics, the Institute of Museums and Library Services (IMLS) has funded a number of projects investigating the logistical, technical, and ethical principles necessary to navigate this next step in supporting student learning. The Data Doubles and Prioritizing Privacy projects considered the privacy implications of learning analytics; the Library Learning Analytics Project explored the library’s role in learning; and the Library Integration in Institutional Learning Analytics (LIILA) project developed the rationale for library involvement in learning analytics, use cases to describe the benefits of library engagement in learning analytics, and concrete next steps for librarians engaging in this use of data to support student success. LIILA’s “next steps” advocate that librarians pursue a number of goals, including identifying and analyzing questions and problems meriting a learning analytics approach; envisioning library data contributions; exploring interoperability standards; identifying key user stories; and commencing pilot studies. The Connecting Libraries and Learning Analytics for Student Success (CLiASS) project advances the ability of libraries to engage learning analytics work in several of these areas.
2.0 CLLASS

In 2018, the Institute of Museum and Library Services awarded funding to Syracuse University, with collaborators Lewis and Clark Community College, OCLC, University of Michigan Library, and University of Minnesota Libraries and partners IMS Global Learning Consortium and Unizin, to perform preliminary planning activities to pioneer the integration of library data into institutional learning analytics and develop detailed proofs of concept and models to guide academic libraries preparing to engage in this emerging and important use of data to support student success.

2.1 Taking the LIILA “Next Steps”

The LIILA project brought together academic library administrators and librarians, library association leaders, and other learning analytics thought leaders to increase librarian awareness and engagement in learning analytics; craft a plan for integrating academic libraries into learning analytics initiatives that support student learning and success; develop sustaining partnerships and collaborations among librarians and learning analytics linchpins, institutional and library systems professionals, and library vendor communities; and draft library use cases and data profiles that can be used with learning analytics standards to integrate library data with institutional data stores. In many ways, the LIILA project helped librarians imagine what learning analytics might look like for libraries. Because most librarians are new to learning analytics, envisioning library involvement in learning analytics is difficult. Librarians can’t know definitively what library engagement could look like because the dialogue about what it should look like is still nascent. In order to advance the understanding of library involvement in learning analytics, the LIILA project utilized eight strategies to help librarians and interested institutional partners envision library involvement in learning analytics including:

- identifying problems to solve and stakeholders to support (LIILA, section 3.1);
- articulating questions about library impact on student learning and success support (LIILA, section 3.2);
- imagining learning analytics-enabled decision-making and action-taking (LIILA, section 3.3);
- ideating librarian roles in institutional learning analytics (LIILA, section 3.5);
- conceptualizing scenarios to convey what library involvement in learning analytics might look like in the future (LIILA, section 3.6);
- inventorying existing library data that may contribute to the understanding and improvement of student learning and success initiatives (LIILA, section 3.7); and
- brainstorming and prioritizing user stories that could be used to integrate libraries into institutional learning analytics efforts (LIILA, sections 3.8-4.2).

The results of the visioning work of the LIILA project—including identifying the problems that learning analytics can help librarians solve, the questions learning analytics can help answer, the decisions and actions that learning analytics can enable, the roles librarians can play in learning analytics at an institutional level, the library data that can complete an institutional picture of student learning and success, and the user stories that describe rationales and benefits to undertaking library involvement in learning analytics—all serve as a springboard for the CLLASS project.

CLLASS is predicated on the idea that learning analytics can help students, faculty, librarians, and higher education leaders solve problems and achieve their goals; likewise, learning analytics helps students, faculty, librarians, and higher education leaders answer questions about student learning and success. The belief that learning analytics can help all of these stakeholders make decisions and take actions to help themselves and others is foundational to CLLASS. From a library perspective, CLLASS advances the notion that learning analytics can establish librarians as essential and influential educational partners in the lives of students and their institutions. Libraries can round out institutional
understanding of student learning and success by enriching a data picture that has thus far omitted student-library interactions. Perhaps most importantly, CLLASS centers the potential power of the nearly 100 user stories surfaced in LIILA, moving the potential benefits for students closer to reality.

The user stories developed by LIILA participants serve as driving forces as well as guiding principles of the CLLASS project. User stories are tools used in designing systems. Intended as a methodology for describing system capabilities or outputs from a user perspective, user stories describe who the user is, what the user needs to accomplish, and why that outcome is desirable. User stories can be formatted in a number of ways:

- As [who], I want [what], so that [why].
- As a [user], I want [goal] so that [reason].
- As [stakeholder], I want [to be able to do an activity, to have an awareness, to take an action] in order to [achieve outcome, solve problem, meet need].

In a library context, user stories describe what students, librarians, faculty, advisors, institutional researchers, administrators, and other stakeholders need to know in order to achieve goals or solve problems. In each user story, the “user” is followed by a “want” statement. Want statements focus on the ability to do an activity, build an awareness, or accomplish a task requiring library and/or institutional data. When library or institutional data is necessary for the “want” to be achieved, that data can be separated into two categories (“library” and “institutional”) for clarity. To conclude each user story, a rationale for the “want” is included. Rationales articulate aims like achieving outcomes, solving problems, and meeting needs. Many rationales focus on planning and deploying interventions to support student learning and success; some are augmented with ways to improve instructional and institutional environments as well. Most LIILA user stories concentrate on what librarians need to know in order to better support student learning; the examples below represent ways librarians can apply a user story approach to describe necessary knowledge for making decisions and taking actions to increase their support of student learning and success.

- As a librarian, I want to know whether students who interact with library reference services attain more learning outcomes, earn better assignment or course grades, are more engaged, are retained, transfer successfully, graduate/complete on time, get jobs, and/or earn more money so that I can advocate for more (or more appropriate) reference resources, encourage more faculty and students to interact with reference librarians, and improve reference services.

- As a librarian, I want to know whether students who participate in library instruction attain more learning outcomes, earn better assignment or course grades, are more engaged, are retained, transfer successfully, graduate/complete on time, get jobs, and/or earn more money so that I can advocate for more (or more appropriate) instruction resources, encourage more faculty and students to schedule/participate in library instruction, and improve library instructional services and decision-making.

- As a librarian, I want to know whether the amount, degree, or relative rank of student library resource use or other library participation impacts learning outcomes attainment, assignment or course grades, GPA or test scores, engagement indicators, and/or semester-to-semester retention, transfer success, employment rates or earnings after graduation/completion so that I can encourage faculty to require use of more library resources in their teaching content and assignment design, and encourage students to increase their library resource use.
• As a librarian, I want to know whether any relationships between the use of library services/resources and institutional outcomes vary by student population/status/characteristics so that I can tailor library services/resources to meet the needs of populations with specialized needs and engage in appropriate instruction, outreach, etc. and help the institution prepare for changing student demographics.

Beyond the contribution of user stories that can guide future library learning analytics efforts, LIIA recommended ten “next steps” for advancing library engagement in learning analytics:

1. Increase awareness of and discussion about the role of libraries in institutional learning analytics both within the academic library community and among institutional participants in learning analytics.
2. Investigate current library data practices and commit to transparent communication about the ways in which data is gathered, maintained, stored, secured, and used within libraries.
3. Communicate and negotiate data rights with library vendors and institutional partners.
4. Situate learning analytics among other assessment approaches as a tool for student learning and success support.
5. Include libraries in learning analytics conversations at the institutional level.
6. Identify and analyze questions or problems that require a learning analytics approach.
7. Envision the contributions that library data makes to the development of a holistic picture of student learning and success.
8. Explore interoperability standards that enable disparate information systems to connect in real time.
9. Identify and prioritize user stories linking libraries and student learning and success that merit further development.
10. Pursue pilot studies that investigate the feasibility of developing library user stories into achievable integrations of library data into institutional learning analytics.¹⁶

CLLASS made significant advances in a number of these areas, including increasing understanding of current library data practices, anticipating library data contributions to an institutional picture of student learning and success, pursuing user stories that outline the goals that library data can help accomplish, and exploring the ability of interoperability standards to bridge disparate library systems and convey data to centralized data stores.

2.2 Project Participants

The CLLASS project convened a carefully selected group of participants with experience in learning analytics, data exchange, real-world use cases, and library data, including:

• academic library staff from Lewis and Clark Community College, the University of Michigan, and the University of Minnesota;
• representatives from IMS Global, an educational technology standards organization that manages the Caliper specification;
• representatives from OCLC, a global library services provider that, among other activities, licenses the EZproxy proxy server product to libraries which stores transactional data to licensed resources on behalf of libraries; and
• a representative from Unizin, an academic library technology consortium that provides the Unizin Data Platform, a learning data store for use by member institutions that can enable intra- and inter-institutional data research.
2.3 Project Goals

The CLLASS project sought to achieve four goals:

1. To cement sustaining partnerships and collaborations among academic librarians and learning analytics linchpins, including institutional information technology and library systems professionals as well as library and higher education technology vendor communities.
2. To design library prototypes that serve as proofs of concepts and models for future projects connecting library data with institutional learning analytics.
3. To develop, as a part of prototype planning, library data profiles for a common interoperability standard, enabling the integration of library data with institutional data repositories.
4. To recommend ways in which drafted prototypes can enable the use of library data to expand library support for student learning and success in ways that are achievable, scalable, actionable, and ethical.

2.4 Project Meetings

Two CLLASS in-person meetings took place at OCLC Headquarters in Dublin, Ohio (March 2019 and August 2019); subsequent meetings took place virtually throughout 2020.

At the first meeting, CLLASS participants broke into three task-focused teams. Team 1, comprised of librarians from the University of Minnesota and OCLC representatives, focused on identifying ways in which library data might be used to understand student library behaviors that contribute to a holistic picture of student success and ideating how that data might be contributed to centralized data stores. Targeting on-campus and off-campus library resource use, Team 1 considered strategies for enriching EZproxy logs to capture data that may be useful for learning analytics purposes and including EZproxy transaction logs in a learning data store. EZproxy is a tool commonly used by libraries to enable off-campus users to access licensed content as if they were on campus, giving those users full access to the library’s resources. EZproxy logs can also be configured to capture both off-campus and on-campus use. As a result, these logs can provide insight into licensed content use to enhance the full picture of student educational interactions. Team 1 also discussed ways to allow libraries to control capture and submission of individual user-level information, in alignment with organizational privacy policies and procedures. Based on these discussions, OCLC proposed a new feature to post-process EZproxy logs to transform access log data into the new standardized Caliper format. A crucial component to this new procedure would be a configurable privacy filter useful to individual libraries complying with local policy requirements. Prior to sharing post-processed EZproxy logs via the new Caliper standard, libraries would have the ability to enable the de-specification of resources and/or users.

Team 2 included a librarian from Lewis and Clark Community College and a representative from IMS Global, an educational technology standards organization. This team focused on student participation in library reference service and instruction sessions and explored ways to convey student engagement in library services to centralized data stores.

Team 3, made up of University of Michigan library staff and representatives from IMS Global and Unizin, considered ways to use interoperability standards to send data about these interactions from a library data warehouse to the Unizin Data Platform. Team 3 focused on three kinds of student-library interactions: checking out physical resources, accessing electronic resources, and attending an instruction session.

By the close of the first meeting, the three teams recognized significant overlap among the three projects and decided to move forward as one working group.
At the second meeting, all project team members met as one group to collectively and interactively define the characteristics of a Caliper library profile and sources of data to populate it. Recognizing that the use cases defined at the end of the first meeting were critical to creating a profile for library use, team members spent considerable time focusing on specific user stories related to those use cases in order to understand what questions those user stories were asking and what data was needed to answer those questions. Through a series of brainstorming and whiteboarding exercises and attempts to cast the data into the “actor–action–object” model of a Caliper event, team members developed a minimum set of data elements for three interaction types. By the end of the second meeting, team members created rough outlines of the necessary “action” verbs, but they still needed refinement and discussion, work that continued over the virtual meetings in the remainder of the 2019-2020 academic year.

After the second meeting, and continuing through the 2020 travel restrictions, the group met virtually to hone the library profile and focus on clear and carefully defined vocabulary for the “actions” and “objects.” The resulting specification is awaiting formal approval through the IMS Global process but is available in draft form at https://www.imsglobal.org/spec/caliper-library/v1p2.

2.5 Project Outputs

The main output of the CLLASS project was the development of a library profile for Caliper, an interoperability standard used to define a common language for labeling learning data and provide the means for capturing, presenting, and conveying learning activities to centralized data stores in order to support the analysis, visualization, and increased awareness of student learning behaviors. Caliper standardizes the format of learning data, permitting data from disparate systems to be ingested and combined to enable educators and researchers to improve their understanding of student experiences and improve, design, or redesign student support for achievement of learning outcomes. The Caliper standard includes a number of metric profiles that model learning activities; each profile provides a domain-specific set of terms and concepts that describe student interactions using a shared format and vocabulary. By offering a library profile for Caliper, CLLASS empowers libraries to overcome the technical obstacles to integrating student-library interaction data with student data generated by other institutional systems. The library profile standardizes outputs from a range of complex library- and vendor-provided systems so they can be treated analogously to those from other, often separate, institutional systems, while maintaining library autonomy over the type, amount, and level of detail emitted.
3.0 INTEROPERABILITY FOR LIBRARIES ENGAGING IN LEARNING ANALYTICS

Interoperability can be defined as the ability of disparate technical systems to exchange and use information. The technical ecosystem of higher education is an environment in which different systems, platforms, and services created by different manufacturers, engineers, and designers need to operate in conjunction with each other, but often don’t. Libraries, much like other administrative and educational services throughout higher education, are challenged by unwieldy and uncooperative systems. In the context of library integration into institutional learning analytics, LIILA participants noted the challenges presented by diverse and siloed library technologies: “Wrangling technology is difficult and library integration into learning analytics would require librarians to identify library data that is relevant and useful in understanding student learning and success obstacles and facilitators, identify the sources of that data (or if that data is not currently available, consider how to capture it), connect data sources (across library, vendor, and institutional silos), maintain the data in record stores, and analyze and communicate the data to enable its use in decision-making and action-taking.” LIILA participants also emphasized the dual difficulty of this data wrangling across systems the library owns as well as those they do not: “One obstacle to library integration in institutional learning analytics is the existence of silos within library-operated systems, such as an integrated library system. An even more challenging obstacle to library involvement with learning analytics is the challenge of gaining access to data housed in vendor-controlled systems.” Despite these obstacles, a comprehensive, “all hands on deck” approach to support of student learning requires a higher education digital ecosystem that enables the various solutions and applications to operate as a whole; in short, supporting students across the academy requires interoperability.

3.1 The Importance of Interoperability

In today’s higher education environment, a complex topology of systems makes up the digital learning ecosystem. No longer a handful of mission-critical enterprise systems, higher education relies on a complex web of dozens, even hundreds, of administrative systems, learning platforms, digital content, and learning tools, all of which need to share data at various stages to function and to understand, visualize, and analyze student experiences. Rather than individual systems solving a limited range of processes in isolation, numerous systems must be connected to solve complex problems that span organizational units, departments, programs, or other silos of operation. This requires making the data housed, sourced, or processed in one system available to any other system in a form that is usable by the consuming system. This interoperability requires an agreed-upon format, vocabulary, or semantics. Using a linguistic analogy, there needs to be agreement not only on the nouns and verbs, but on sentence structure. For example, data generated from a learning management system (e.g., Blackboard or Canvas) about student participation in an online class discussion needs to be merged with demographic data about the student maintained by the office of student statistical collection (e.g., an Oracle database). Often, these two systems are structured differently. Much as a translator might be needed to enable a speaker of one language to converse with a speaker of another language, standards for merging and sharing data need to be developed. The concept of interoperability is the guiding principle of those standards for educational learning systems. Interoperability standards provide a structure for sharing basic factual data with common identifiers across systems. Like a spoken language, each academic system has its own terminology and structure, but by leveraging interoperability standards, systems can export data elements in a common format that can be stored in a single database, merged, analyzed, and queried by learning outcomes researchers.
Interoperability enables a great deal of what seems invisible or automatic by a user. Students, faculty, and other stakeholders expect a seamless online experience. For example, when students enroll in a class that includes an online component for which they need to be provisioned, they expect an ability to seamlessly move from one step of the process to the next, not necessarily realizing that the traversing of “steps” actually entails the traversing of multiple applications. To explicate the example: a student’s enrollment is managed by a student information system (SIS); at the conclusion of a successful enrollment event, the enrolled student is provisioned into the learning management system (LMS), with their core personal, class, and enrollment data moving from the SIS to the LMS, potentially then with an additional communication with an identity management system that determines the appropriate authentication and resource authorizations. For students, this appears to be a simple process of enrolling in a class and clicking on a link that will take them to that class.

This seamless plug-and-play architecture is also increasingly fundamental in facilitating the availability of data for learning analytics. First, a consistent, standardized way to articulate data for transmission and ingestion for use in an analytics solution means that it will be easier and more efficient to include that data in a repository for processing and analysis, and that reduced effort and cost means that more data can and will be included in those repositories and available for institutional research departments and efforts. That is critical because the value of analytics lies in the ability to aggregate and correlate data from across multiple systems in a digital ecosystem. While data from one system may be valuable, the ability to enrich it and/or contextualize it leads to greater insight and deeper understanding. Event streams from a learning management system about accessing digital content or learning tools can provide some insight into elements of student engagement. But broadening the background of that data with information from the SIS about, for example, student academic history or potentially relevant demographic information can begin to construct a more complete view of students that can enable deeper understanding of learning interactions and their impact on student success.

**Continue the Conversation**

*Pause a moment and reflect upon the questions below, individually, in dialogue with your library colleagues, or in collaboration with institutional partners.*

- How would you describe interoperability?
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- What interoperability challenges are present in your library? At your institution?
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What questions do you have about interoperability?
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Who, in your library or at your institution, might be able to answer questions you have about interoperability in your institutional learning ecosystem?
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What action steps might you take to move forward?
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3.2 Caliper in a Nutshell

Caliper is an interoperability standard designed for educational technologies used to enable the collection of “learning data from digital resources to better understand and visualize learning activity and product usage data and present this information to students, instructors, and advisors in meaningful ways to help inform student recruitment and retention plans; program, curriculum, and course design; and student intervention measures.” The Caliper standard is segmented into defined profiles. Each Caliper profile “models a learning activity or a supporting activity that helps facilitate learning [and]...provides a domain-specific set of terms and concepts that application designers and developers can draw upon to describe common user interactions in a consistent manner using a shared vocabulary.” These profiles standardize the process of describing learning activities and tracking learner engagement across the learning technology ecosystem. In other words, Caliper profiles define structured data streams that enable data residing in disparate systems to be more easily exchanged, accumulated, and queried. This is accomplished by standardizing both the syntax and semantics for the data created using the Caliper specification. Each Caliper profile serves as a logical container comprising one or more defined events that together help describe a set of interactions. Each event centers on an “actor,” an “action,” and an “object,” and each element can be fleshed out by including additional relevant attributes.
3.3 Introducing a Caliper Profile for Libraries

A Caliper library profile can model activities related to library facilities, resources, and services that facilitate learning. Like other Caliper profiles, a library profile outlines events that are structured as “actor—action—object” to describe learning activities or activities that support learning. In academic libraries, the actors in this formulation could be students, faculty, or other library users. Actions might include using a library space, such as the general library facility or a more specific location within that space (e.g., a learning commons, study room, lab, makerspace); accessing a resource, (e.g., a book, article, reserve item, interlibrary loan); or attending a library service interaction, such as an instructional event, reference transaction, outreach event or exhibit.

A Caliper library profile could integrate carefully selected library data with institutional student data to better understand the impact of libraries and librarians on student learning and success and, more importantly, discern ways to expand helpful library facilities, resources, and services and discover any hurdles that libraries inadvertently place in students’ paths. A library profile could facilitate and automate the collection, transfer, storage, and querying of library data. A number of storage and viewing tools could be developed to enable librarians and others to understand, investigate, demonstrate, communicate, and grow library impact on student learning and success in new, more detailed, and more scalable ways. Leveraging an interoperability standard like Caliper, library data from multiple systems could populate a unified library data store or be included in an institutional Learning Record Store (LRS) or data warehouse, an Integrated Planning and Advising for Student Success (iPASS) system, or another learning analytics system. Learning data could be rendered in dashboards accessible by, or protected from, a variety of user groups—students, librarians, faculty, advisors, institutional research professionals, educational researchers, or administrators—based on permissions set by policies governed by the library or its overarching institution.

CLLASS project team members designed the Caliper library profile to ensure that librarians can achieve two seemingly contradictory goals: enabling those libraries whose values and practices reinforce an ethos of strong user privacy and anonymity to participate in institutional research efforts, while simultaneously allowing libraries that want a closer connection to institutional learning analytics efforts and are focused on careful application of user data to explore ways to do so. Caliper events can be specified with details about each element or de-specified by intentionally and purposefully omitting additional details; thus, these events can be designed by individual libraries and institutions to align with their values, ethics, and standards as well as library and institutional policies and practices. A critical requirement that permeated the planning for the Caliper library profile is flexibility in defining either “actor” or “object” so that librarians can control the data they capture and emit. This is a strength of the Caliper profile specification: a viable, yet minimal, packet of information asserts that “someone did something.” Therefore, as long as “someone,” “did,” and “something” fall within the standard’s vocabulary requirements, “student accessed book” and “faculty member accessed journal” are perfectly valid and conformant transactions that could be entered into a data store. Some libraries and universities may wish to further enhance either the “actor” or the “object” part of that data to provide more detail, at a level of specificity that is appropriate for that library and institution. At a less specified level, a Caliper event might convey that “an undergraduate student accessed a book” or, for libraries that need or require more specific data, “a graduate student in the department of history accessed a book with an LC classification beginning with JK.” Usefully, the standard allows for as much or as little specificity as is needed, and CLLASS project team members focused on finding a middle ground between being overly prescriptive—specifying so many carefully defined events that finding patterns would be difficult—and being overly general—resulting in large quantities of undifferentiated data.

Ultimately, CLLASS team members developed three event types: a LibraryUseEvent (for in-person use of a library facility), a LibraryResourceUseEvent (for use of physical and digital resources provided
by the library to its community), and a LibraryParticipationEvent (for participation in meetings or attendance at library-mediated information sessions, instruction sessions, reference transactions, exhibits, etc.). Each type of event comes with its own “action” and “object” lists; “actors” are more universal and are drawn from existing Caliper profile specifications for the broader institution. Each event is explained in detail in sections 5.1, 5.2, and 5.3 of this document.

**Continue the Conversation**

*Pause a moment and reflect upon the questions below, individually, in dialogue with your library colleagues, or in collaboration with institutional partners.*

How would you describe Caliper, in your own words?

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What systems are already compliant with interoperability standards (Caliper or others) in your institutional learning ecosystem? If you don’t know, who, in your library or at your institution, might?

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What questions do you have about Caliper?

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What action steps might you take to move forward?

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4.0 PRIVACY

Librarians have deeply entrenched privacy values and take care to follow professional ethics statements and institutional or organizational policies or legal requirements. Because of their strong concerns about risks to privacy, librarians have longstanding practices of not recording, not maintaining, and/or actively destroying personally identifiable information associated with library use. Any contemplation of change to library practices involving gathering, saving, or sharing individual-level data requires thorough consideration and discussion of risk. Personally identifiable information has value to the individuals who generate it, those who maintain it, and others who may use it. Because anything of value may be misused or misappropriated, it is reasonable to be concerned that bad things could happen if individual-level data is improperly secured technically and physically, unprotected by policy, bereft of an appropriate governance structure, or otherwise mismanaged or mishandled. The potential for data insecurity should raise concerns and inspire judicious use of data, but librarians must also consider the ways in which traditional privacy practices limit their ability to serve students and support their learning. New realities and new opportunities to serve students, particularly students who have been historically underserved, require librarians to have open minds and engage in clear-headed discussion and debate to consider and weigh new paths forward.

The LIILA report describes several areas for librarians to consider as they seek to update and clarify their understanding of privacy as it relates to library participation in learning analytics. For example, librarians must understand the important distinctions among anonymity, confidentiality, and privacy. In a technical world, complete anonymity is difficult to establish or maintain; therefore, true privacy, in which no recording takes place, may be impossible to ensure when interconnected institutional and third-party systems are part of an integrated educational ecosystem. Indeed, an important LIILA recommendation suggests that librarians conduct an audit of the policies, statements, requirements, contracts, or other agreements with systems used by or connected to the library and update library privacy policies, statements, and education to reflect new and emerging realities so that library users are not misled. Given the interconnected nature of technological systems, it is challenging to deliver on a promise of total privacy in which no temporary or long-term recording of engagement with library technology exists and all library interactions are anonymized immediately, completely, and irreversibly. In reality, library privacy hinges on confidentiality, an extension of privacy which requires protection of personally identifiable information through policies, procedures, and practices; upholding of agreements stating who maintains, has access to, or can disseminate personal data; and clear statements of any limitations including consent to disclose data. A shift in concept from library data as nonexistent to library data as confidential and protected would be significant in the library profession. At the same time, an acknowledgment that library data is often captured and retained for some period of time may be necessary to motivate and empower librarians to update their awareness and knowledge of privacy, revise policies and practices to reflect current realities, and build safeguards and governance to better protect user data. The LIILA report suggests a number of risk mitigation practices for librarians seeking to secure user data including investigating current practices within the library, the institution, and third-party vendors; connecting with institutional partners engaged in this work; and being purposeful and parsimonious with data collection.

4.1 Finding Middle Ground between Dual Purposes

A difficult challenge surrounding library involvement in learning analytics is balancing privacy with the ethical obligation to serve users in equitable ways. Both privacy and equitable access and support are entrenched in library values and ethics. These dual purposes are sometimes posited as “dueling” in nature and inaccurately and unfortunately set in juxtaposition to each other. In reality, knowledge of users and their needs is necessary to provide equitable and effective access and support. Many services including financial institutions, physical and mental health practices and organizations,
legal entities, businesses, and religious affiliations recognize the need to maintain confidential personal information and use it to better serve their users. It is right and necessary to use substantial protections to ensure personal information is secure; it is also true that breaches have occurred in all of the above service arenas. At the same time, providing mediocre, ill-informed, or “designed for average” services is also harmful. Insofar as one accepts that libraries can make a difference in students’ educational endeavors, support their intellectual development, open their horizons, and advance their potential, one must also accept that falling short in providing equitable services, resources, and spaces is detrimental to students’ achievement of those goals. Providing equitable support requires librarians to understand student challenges at an individual, not aggregate, level; interpret student data intersectionally, rather than simplistically; and recognize that designing for “average” students can mean ignoring or marginalizing some students’ experiences.

So how might librarians navigate two extreme positions: keeping no library data in an effort to protect privacy or keeping all data in an effort to support student learning and success? The answer is a middle ground in which only data that can help solve problems, answer questions, and empower students, faculty, librarians, and administrators to make decisions and take actions is 1) collected and maintained parsimoniously; 2) constantly reevaluated and assessed for bias; 3) protected with rigorous policies, procedures, practices, and personnel educated and dedicated to helping and not harming students; and 4) used descriptively to discern student experiences that have gone unnoticed or unaddressed. This middle ground requires understanding the risks, eliciting student concerns and perspectives, and establishing an ongoing dialogue to ensure that neither extreme position undercuts the dual focus of librarians: supporting and protecting students.

4.2 How Much Do We Need to Know?

It is worth noting that librarians, by the nature of their roles, often know less about the students they support than other members of the educational team. Other educational team members (e.g., faculty, advisors, mentors, care providers, and other support professionals) learn detailed information about their students, including their names, interests, engagement and co-curricular activities, coursework, majors, academic strengths and gaps, aspirations for the future, challenges faced, and strategies leveraged to overcome hurdles. In educational spheres, knowing students well is considered essential for understanding, communicating, serving, and caring for students. In contrast, librarians have traditionally engaged with students without knowing them as well as other educational team members do. Indeed, a sense of anonymity may be useful, preferred, or necessary for some student-library interactions. At the same time, librarians should consider what information might be essential for serving students equitably and effectively. While personal interests might be beyond the scope of what librarians need to know about students to serve them well, other information might be useful, advantageous, or required. Indeed, the dearth of educational information available to librarians may be detrimental to their ability to serve students at the level to which the profession aspires.

What kinds of information might be useful or essential for librarians to know about students? Librarians might be better equipped to design and deploy student supports in the form of library facilities, resources, and services for students if they have access to additional academic information, either individually or in the aggregate, such as what courses students are enrolled in, what resources are on their reading lists, what information resources their assignments require, what deadlines they face, etc. Librarians might also leverage information about what library facilities, resources, and services make a difference for student cohorts defined by shared majors, years of study, or other characteristics to inform and educate students and faculty about supports that might serve them at a particular time or to fulfill a particular need during their educational journey. While librarians have long operated without this detailed information, it is worth considering what librarians might do better or differently for students if they knew more about their academic needs and environment.
4.3 Privacy and CLLASS

Throughout the CLLASS project, team members centered privacy ethics in discussions and focused on planning learning analytics work that would align with library and higher education statements, including the ALA Code of Ethics; the NISO Consensus Principles on User’s Digital Privacy in Library, Publisher, and Software-Provider Systems; the Association of Institutional Research Code of Ethics; the Unizin Assurance Framework; the NIST Cybersecurity Framework; and the IMS Global Learning Data and Analytics Key Principles. In addition, team members considered institutional policies and practices, such as the University of Michigan Learning Analytics Guiding Principles and Library Privacy Statement and the library and institutional privacy policies at the University of Minnesota and Lewis and Clark Community College, and state and federal law (see section 7.3). Throughout the project, team members maintained their commitment to developing methodologies and designing technologies to ensure continued integrity with existing high standards for privacy and confidentiality as well as data security and assurance.

In designing a Caliper library profile, project team members were confronted with countless options. To guide their work, team members focused on ways to answer open questions about student learning and success, attain benefits and honor rationales defined by user stories, and embrace two core principles: parsimony and choice. Therefore, team members designed the profile to capture information that students, faculty, librarians, and other higher education professionals need—rather than just want—to know in order to make decisions and take actions. These needs may be expressed as questions or user stories; like any good assessment or research endeavor, learning analytics should be driven by well thought out research questions, hypotheses, or statements. CLLASS team members designed the library profile with this intentional approach in mind, rather than a “fishing expedition” or “big data” strategy in which all data is collected to “see what it reveals.” CLLASS team members also recognized that while there are shared goals across higher education and academic libraries, each library or institution has unique needs and concerns. Thus, individual libraries and/or their overarching institutions need autonomy to make individual, local, or customized decisions about what information is necessary to support students as well as what information is not desirable, or perhaps not ethical, to include. Thus, the library profile outlines information that can be included in a library Caliper event, but no identifiable information is required; rather the inclusion of detailed information is configurable to a specific library’s or institution’s needs. In this way, the library profile enables individual libraries to make choices about the amount and detail of data collected and shared with broader learning analytics initiatives.

As a result, the data conveyed by a library Caliper event can vary greatly. One library may choose to carry as little specific information as possible. In this case, an event may convey only, “a person used/accessed/attended some space/resource/activity.” Another library might decide to include identifiable information for the person, details about the use/access/attendance, and/or descriptions of the space/resource/activity. Individual libraries that opt to use the library profile to emit Caliper events have the ability to decide how much specificity to include or omit. Of course, the decision to include or omit specific information will impact the utility of the resulting data. For example, an entirely de-specified Caliper event that shares only that “someone did something” will be less useful in answering questions about how students, faculty, librarians, and other institutional partners can leverage library facilities, resources, or services in their student learning and success journey or initiatives. An event that specifies an individual student, but includes no details of their library use/access/attendance, would enable librarians and their institutional partners to describe, though vaguely and without detail, a student’s library interaction and share that information with students. It may enable students to benchmark their own library interactions, again vaguely defined, against those of their peers. It may also enable librarians to understand relative library use amongst different students, categorized in detailed ways or grouped into an aggregate.
A third level of specification might include a specified student using/accessing/attending a partially specified space/resource/activity. The space might be described as being within a building, but omit the area of the building; a resource might be described as a type or class, but leave out information identifying the particular resource; or an activity might be categorized as “instruction,” “reference interaction,” or “exhibit,” without inclusion of identifying details. This increased level of specificity would enable students, faculty, librarians, or other institutional partners to understand more detail about student library interactions and potential implications of those interactions. This might uncover more awareness of the ways in which libraries support student learning and success or unintentionally hinder it; this additional level of detail may be essential to increasing supports that are useful and clearing away previously invisible (at least to librarians) hurdles. Events could also describe more specifics, including not only the individual student who used/accessed/attended a library space/resource/activity but also identifying characteristics of the space/resource activity, such as a learning commons space in a library building, an article on a specific course reading list, or an English 101 instruction session. This level of specificity would reveal the most information about what library interactions help or hurt students; at the same time, such detailed information about individual library use requires the greatest protections against unauthorized or inappropriate use. Librarians, in consultation with students, can and must make the decisions about what information to capture and convey about student library interactions, balancing the ethical imperative to support students with the responsibility to collect and use only the data that is necessary to make positive change.

**Continue the Conversation**

Pause a moment and reflect upon the questions below, individually, in dialogue with your library colleagues, or in collaboration with institutional partners.

Does your library currently share its privacy policies and practices publicly? Are these policies and practices easily findable?

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Are your library privacy policies and practices up to date?

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What steps could be taken to conduct an initial or ongoing audit of the policies, statements, requirements, contracts, or other agreements with systems used by or connected to the library? Who would need to be involved?

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Who else at your institution, beyond the library, values privacy and has taken steps to protect it? How might establishing or developing partnerships with privacy-concerned colleagues provide benefits through connections and conversations?

What steps could be taken to update your library privacy policies to reflect new and emerging realities and ensure awareness and/or education of library users?

Do your library privacy policies describe or explain user confidentiality as an extension of privacy which requires protection of personally identifiable information through policies, procedures, and practices; upholding of agreements stating who maintains, has access to, or can disseminate personal data; and clear statements of any limitations including consent to disclose data? If not, how are anonymity and confidentiality described or explained? Are those descriptions or explanations current and accurate?

Do library policies describe or explain the safeguards and governance that protect any data retained by the library or library-connected vendors?

Is data maintained by the library (either briefly or over time) purposeful and parsimonious? What data is collected that is unnecessary or unused?
What data currently collected by the library helps librarians understand users and their needs sufficiently to provide equitable and effective access and support?

What data that is *not* currently collected by the library might help librarians better understand users and their needs sufficiently to ensure equitable and effective access and support?

Does your library design for “average” students? What harm might that cause to students who are not “average”?

What information would your library need in order to design for students who do not fit the “average” student conception? What could your library do for those students that it doesn’t do now?

What questions might your students have about the privacy or confidentiality of their library data? (Not a student? Ask some! Be sure to include students from underrepresented groups.)
How might your library navigate two extreme positions: keeping no library data (through purging) in an effort to protect privacy or keeping all data (without data security and protections) in an effort to support student learning and success?

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At your library, what information is necessary to support students equitably and effectively?

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What information is not desirable, or perhaps not ethical, to include in learning analytics, regardless of how useful it might be in serving students equitably and effectively?

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What else has your dialogue surfaced?

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What action steps might you take to move forward?

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5.0 CALIPER LIBRARY PROFILE

The primary output of the CLLASS project was the development of a library profile for Caliper, an interoperability standard used to define a common language for labeling learning data and provide the means for capturing, presenting, and conveying learning activities to centralized data stores in order to enable the analysis, visualization, and increased awareness of student learning behaviors.27 Caliper standardizes learning data, permitting data from disparate systems to be ingested and combined to allow educators and researchers to expand their understanding of student experiences and improve, design, or redesign support for student achievement of learning outcomes. The Caliper standard includes a number of metric profiles that model learning activities; each profile provides a domain-specific set of terms and concepts that describe student interactions using a shared format and vocabulary.28 By offering a library profile for Caliper, CLLASS empowers libraries to overcome the technical obstacles to integrating library-student interaction data with student data generated by other institutional systems. The library profile standardizes outputs from a range of complex library- and vendor-provided systems so they can be treated analogously to those from other, often separate, institutional systems, while maintaining library autonomy over the type, amount, and level of detail emitted. In general, the Caliper library profile can help librarians understand answers to questions like those posed by participants in the LIILA project:

- Do academic libraries impact student learning?
- Does library use correlate with student learning and success outcomes?
- What student behaviors or actions related to the library are positively linked with student learning and success indicators, including but not limited to outcomes, grades, persistence, retention, and lifelong learning?
- What patterns of library engagement behavior are linked to student learning and success?
- How much library use is necessary to meet benchmarks of student learning and success?

This list is neither exhaustive nor prescriptive. Additional questions that apply to each library profile event are included in sections 5.1.1, 5.2.1, and 5.3.1.

The Caliper library profile can also help librarians support users in ways described by the user stories brainstormed as part of the LIILA project. User stories are tools used in designing systems. Intended as a methodology for describing system capabilities or outputs from a user perspective, user stories describe who the user is, what the user needs to accomplish, and why that outcome is desirable (see section 2.1). A short list of prioritized user stories is included in the LIILA report.29 Those prioritized user stories served as guides for the development of the Caliper library profile. An aggregated and truncated version of these user stories is listed below. These abbreviated user stories include users and goals; the rationales for these user stories are embedded in each library profile event description (sections 5.1.2, 5.2.2, and 5.3.2).

As a librarian,

- I would like to understand the extent to which library spaces are used for course-assigned activities.
- I would like to control the level of specificity of the identity or interaction the library enters into the learner record store.

As a student,

- I would like to gauge my viewing of course readings and use of library resources in comparison to my peers.
- I would like to gauge my use of library services in comparison to my peers.
- I would like to have a record of the library resources I have used.
As a researcher, librarian, instructor, or student,

- I would like to determine if there is a correlation between student viewing of course readings or use of library resources and measures of student success.
- I would like to determine if there is a correlation between student use of library spaces and measures of student success.
- I would like to determine if there is a correlation between student engagement with library services and measures of student success.

These and other user stories can serve as inspiration for librarians beginning to envision possibilities for their own contexts. Individual libraries and institutions should create user stories that represent the needs and goals of their students, librarians, faculty, educational team members, institutional researchers, leaders, and other stakeholders, in collaboration and consultation with representatives of those groups. In the CLLASS project, user stories served as both driving forces and guiding principles in the development of the library profile. Based on prioritized LIILA user stories, the Caliper library profile models the use of library facilities, resources, and services in three separate “events:” a LibraryUseEvent, a LibraryResourceUseEvent, and a LibraryParticipationEvent.

5.1 LibraryUseEvent

A Caliper LibraryUseEvent models the use of library facilities and responds to user stories like the following:

- As a researcher, librarian, instructor, or student, I would like to determine if there is a correlation between student use of library spaces and measures of student success.
- As a librarian, I would like to understand the extent to which library spaces are used for course-assigned activities.

5.1.1 Questions to Answer about Library Facilities

The LibraryUseEvent can enable students, faculty, librarians, or researchers to answer a number of questions related to student use of library facilities. These questions represent a number of perspectives including students, faculty, librarians, and library administrators.

- What library facilities make the greatest impact in terms of supporting student learning and success and those involved in it (e.g., students, faculty, advisors)?
- How can libraries personalize and customize library facilities to maximize student learning and success?
- How can libraries adapt their facilities in response to changes in student populations, academic curricula, program requirements, and institutional priorities?
- What is the unique contribution of library facilities to student learning and success?
- How might linkages between student library facility use and student learning and success indicators be used to:
  - improve library facilities?
  - demonstrate the value of and need for continuance of current resources allocated to library facilities?
  - determine whether library budgets are allocated to facilities that most contribute to student learning and success?
  - increase library budgets for facilities that demonstrably support student learning and success?
  - identify potential institutional partners to be housed in library space or to
contribute to a shared service program delivered in library space?

- What is the optimal student library facility use level? How can librarians benchmark that level and seek to attain it?
- How can libraries capture data about facilities to ensure an accurate picture of student use?
- Most importantly, how can the answers to the questions above be employed to improve library support of student learning and success?
  - How can the data be used to inform and educate students about their own library interactions?
  - How can the data be used to empower students to take additional agency in their own learning?
  - How can the data be used to connect students with relevant services and their educational support team?
  - How will the data enable librarians to make decisions and take actions to “close the loop” in order to augment what works for student learning and dismantle what doesn’t?

The preceding list of questions about student use of library facilities is neither exhaustive nor prescriptive; these examples are intended for illustration and inspiration only.

**Continue the Conversation**

*Pause a moment and reflect upon the questions below, individually, in dialogue with your library colleagues, or in collaboration with institutional partners.*

Do any of the questions above resonate at your library? Which ones? If there are several, which questions might be most important to answer first?

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What questions might your students have about the impact of their use of library facilities? (Not a student? Ask some! Be sure to include students from underrepresented groups.)

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Librarians, what questions do you have about your students’ use of library facilities? (Not a librarian? Ask some!)

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________________________________________________________________________________________
________________________________________________________________________________________
________________________________________________________________________________________
Faculty, what questions do you have about your students’ use of library facilities? (Not faculty? Ask some!)

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________________________________________________________________________________________
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Academic advisors/support team, what questions do you have about your students’ use of library facilities? (Not an advisor/support team member? Ask some!)

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Library/institutional administrators, what questions do you have about students’ use of library facilities? (Not an administrator? Ask some!)

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Reflecting upon the questions you’ve recorded above…

Which of these questions might be answered by collecting additional data about student use of library facilities and linking it to other institutional data?

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What decisions might you be able to make or what actions might you be able to take to support student learning and success if you knew the answers to these questions?

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5.1.2 User Stories about Library Facilities

User stories are tools used in designing systems. Intended as a methodology for describing system capabilities or outputs from a user perspective, user stories describe who the user is, what the user needs to accomplish, and why that outcome is desirable (see section 2.1). The user stories below convey the ways in which students, librarians, educational team members, and researchers may find data from a LibraryUseEvent valuable in achieving goals, solving problems, and meeting needs.

<table>
<thead>
<tr>
<th>LIILA #</th>
<th>As [stakeholder], I WANT [to be able to do an activity, to have an awareness, to take an action]</th>
<th>IN ORDER TO [achieve outcome, solve problem, meet need].</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>As a student, I want to know whether studying in the library will improve my assignment/course grades or test scores or make it more likely that I stay in school so that I can make good choices about where to study in order to get good grades and stay in school.</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>As a student, I want to know whether using a presentation practice space in the library will help me earn a better assignment/course grade so I can sign up and get a slot before they fill up or decide to skip it altogether.</td>
<td></td>
</tr>
<tr>
<td>LIILA #</td>
<td>As [stakeholder],</td>
<td>I WANT [to be able to do an activity, to have an awareness, to take an action]</td>
</tr>
<tr>
<td>---------</td>
<td>-------------------</td>
<td>---------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>36</td>
<td>As a librarian,</td>
<td>I want to know whether students who spend (more) time in the library</td>
</tr>
<tr>
<td>37</td>
<td>As a librarian,</td>
<td>I want to know whether students who spend (more) time in the library</td>
</tr>
<tr>
<td>38</td>
<td>As a librarian,</td>
<td>I want to know which library facilities (learning commons, group study rooms, etc.) are used by students</td>
</tr>
<tr>
<td>39</td>
<td>As a librarian,</td>
<td>I want to know what students are doing in library facilities (learning commons, group study rooms, etc.) and whether those activities help students</td>
</tr>
<tr>
<td>LIILA #</td>
<td>As [stakeholder], I WANT [to be able to do an activity, to have an awareness, to take an action]</td>
<td>IN ORDER TO [achieve outcome, solve problem, meet need].</td>
</tr>
<tr>
<td>---------</td>
<td>--------------------------------------------------------------------------------------------------</td>
<td>--------------------------------------------------------</td>
</tr>
<tr>
<td>51</td>
<td>As a librarian, I want to know whether any relationships between the use of library services/resources and institutional outcomes (described in other user stories) vary by student population/status/characteristics so that I can tailor library services/resources to meet the needs of populations with specialized needs and engage in appropriate instruction, outreach, etc. and help the institution prepare for changing student demographics.</td>
<td></td>
</tr>
<tr>
<td>52</td>
<td>As a librarian, I want to know whether any relationships between the use of library services/resources and institutional outcomes (described in other user stories) impact learning outcomes attainment assessed at the assignment level (or some other more granular level that may actually get at learning directly) Learning outcomes might include: • Locating, evaluating, using information • Thinking critically, analytically • Analyzing, solving problems • Applying information skills to the real world • Disciplinary information skills so that I can tailor library services/resources to maximize and facilitate student learning.</td>
<td></td>
</tr>
<tr>
<td>LIILA #</td>
<td>As [stakeholder],</td>
<td>I WANT [to be able to do an activity, to have an awareness, to take an action]</td>
</tr>
<tr>
<td>---------</td>
<td>------------------</td>
<td>-----------------------------------------------------------------------------</td>
</tr>
<tr>
<td>54</td>
<td>As a librarian,</td>
<td>I want to know whether any relationships between the use of library services/resources and institutional outcomes (described in other user stories)</td>
</tr>
<tr>
<td>57</td>
<td>As a librarian,</td>
<td>I want to identify students who don’t use the library resources, skills or service</td>
</tr>
<tr>
<td>60</td>
<td>As a librarian,</td>
<td>I want to identify courses/departments/units who do not interact with the library to embed content or skills materials</td>
</tr>
<tr>
<td>LIILA #</td>
<td>As [stakeholder],</td>
<td>I WANT [to be able to do an activity, to have an awareness, to take an action]</td>
</tr>
<tr>
<td>---------</td>
<td>------------------</td>
<td>--------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>85</td>
<td>As an academic advisor,</td>
<td>I want to know whether students who are struggling financially are using library technology options</td>
</tr>
<tr>
<td>87</td>
<td>As an academic advisor,</td>
<td>I want to know whether students who are struggling are studying in the library facility</td>
</tr>
<tr>
<td>89</td>
<td>As an institutional researcher,</td>
<td>I want to know whether or the degree to which including library data in institutional learning analytics leads to more informed student success models</td>
</tr>
</tbody>
</table>

This list of user stories about student use of library facilities is neither exhaustive nor prescriptive; these examples are intended for illustration and inspiration only.

Librarians mining these user stories as inspiration for learning analytics work will note that many refer to metrics like attendance, engagement, persistence/retention, completion/graduation, course or cumulative grades, and other surrogates for student learning that can be easily captured but may be several steps removed from assessment of learning. Like other forms of higher education assessment, learning analytics tends to rely on large-grained metrics to gauge success to determine when students may be struggling and prompt educators to initiate an interaction or intervention. These metrics serve as a first step toward understanding student success and appear to be sufficient, even
at a rudimentary level, to spur interventions, initiate interactions, make connections, and develop relationships that support student learning.

Still, the lack of granularity and refinement of these guiding metrics leaves learning analytics open to criticisms that the approach rejects deep understanding of student learning, development, or other values. It is true that these success measures are easy to capture and track; it is likewise true that they do not assess student learning in a detailed way. Even so, students do not benefit from higher education learning experiences unless they are enrolled and in attendance. Students do not gain the advantages of a certification or degree unless they complete their programs. And students who do not earn their credentials can be thwarted from achieving their goals, including their advancement through meaningful and rewarding career progression and their ability to repay the debts incurred to participate in higher education in the first place. Undeniably, students do not go to college to be unsupported, fail, drop out, and incur debt for no return on their investment. For these reasons, large-grained success measures are the focus of national dialogue in higher education circles and often come under institutional and governmental scrutiny.

There is indeed a danger inherent in focusing exclusively on these metrics; assessment of learning can be eclipsed by this pursuit of metrics if these measures are allowed to remain the only focus and hallmark of success, rather than part of a multi-pronged effort to solve real student learning and success problems. Therefore, the fact that learning analytics currently emphasizes large-grained success metrics is a worthwhile area of discussion and deliberation by librarians seeking to determine library engagement with learning analytics.

At the same time, librarians should also consider that: 1) the focus on large-grained success metrics may be a by-product of this early stage of learning analytics development rather than a permanent condition of the approach; and 2) detailed assessment of learning is possible if learning analytics systems have access to more and different data, much of which is currently available in learning management systems but not yet tapped by learning analytics systems. Indeed, LIIA user story #52 points out that learning analytics may be able to link student library interactions not only with large-grain metrics, but also very specific assessments of artifacts of student learning, such as assignments evaluated by faculty or librarians, perhaps using a rubric, to assess student achievement of information literacy outcomes as defined by librarians, professional standards such as the ACRL Framework for Information Literacy for Higher Education, or institutional initiatives. Such capability may be a first step in moving beyond general metrics to fine-grained, expert-driven, direct assessments of the impact of libraries on information literacy or other disciplinary learning.

**Continue the Conversation**

*Pause a moment and reflect upon the questions below, individually, in dialogue with your library colleagues, or in collaboration with institutional partners.*

Do any of the user stories above resonate at your library? Which ones? If there are several, which user stories might be most important to consider first?

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________________________________________________________________________________________
What additional user stories might your students generate about their use of library facilities? (Not a student? Ask some! Be sure to include students from underrepresented groups.)

*Example: As [stakeholder], I want [to be able to do an activity, to have an awareness, to take an action] in order to [achieve outcome, solve problem, meet need].*

As a student, I want ______________________________________________________________
___________________________________________________________________________________
in order to __________________________________________________________________________
___________________________________________________________________________________.

As a student, I want ______________________________________________________________
___________________________________________________________________________________
in order to __________________________________________________________________________
___________________________________________________________________________________.

As a student, I want ______________________________________________________________
___________________________________________________________________________________
in order to __________________________________________________________________________
___________________________________________________________________________________.

As a student, I want ______________________________________________________________
___________________________________________________________________________________
in order to __________________________________________________________________________
___________________________________________________________________________________.

Librarians, what additional user stories might you create about your students’ use of library facilities? (Not a librarian? Ask some!)

*Example: As [stakeholder], I want [to be able to do an activity, to have an awareness, to take an action] in order to [achieve outcome, solve problem, meet need].*

As a librarian, I want ______________________________________________________________
___________________________________________________________________________________
in order to __________________________________________________________________________
___________________________________________________________________________________.

As a librarian, I want ______________________________________________________________
___________________________________________________________________________________
in order to __________________________________________________________________________
___________________________________________________________________________________.
Faculty, what additional user stories might you create about your students’ use of library facilities? (Not faculty? Ask some!)

*Example: As [stakeholder], I want [to be able to do an activity, to have an awareness, to take an action] in order to [achieve outcome, solve problem, meet need].*

As faculty, I want ________________________________________________________________

__________________________________________ in order to ________________________________

__________________________________________

As faculty, I want ________________________________________________________________

__________________________________________ in order to ________________________________

__________________________________________

As faculty, I want ________________________________________________________________

__________________________________________ in order to ________________________________

__________________________________________

As faculty, I want ________________________________________________________________

__________________________________________ in order to ________________________________

__________________________________________

As faculty, I want ________________________________________________________________

__________________________________________ in order to ________________________________

__________________________________________
Academic advisors/support team, what additional user stories might you create about your students' use of library facilities? (Not an advisor/support team member? Ask some!)

*Example:* As [stakeholder], I want [to be able to do an activity, to have an awareness, to take an action] in order to [achieve outcome, solve problem, meet need].

As an advisor or support team member, I want ______________________________________
___________________________________________________________________________________
in order to __________________________________________________________________________
___________________________________________________________________________________.

As an advisor or support team member, I want ______________________________________
___________________________________________________________________________________
in order to __________________________________________________________________________
___________________________________________________________________________________.

As an advisor or support team member, I want ______________________________________
___________________________________________________________________________________
in order to __________________________________________________________________________
___________________________________________________________________________________.

As an advisor or support team member, I want ______________________________________
___________________________________________________________________________________
in order to __________________________________________________________________________
___________________________________________________________________________________.

Library/institutional administrators, what additional user stories might you create about students' use of library facilities? (Not an administrator? Ask some!)

*Example:* As [stakeholder], I want [to be able to do an activity, to have an awareness, to take an action] in order to [achieve outcome, solve problem, meet need].

As an administrator, I want __________________________________________________________
___________________________________________________________________________________
in order to __________________________________________________________________________
___________________________________________________________________________________.

As an administrator, I want __________________________________________________________
___________________________________________________________________________________
in order to __________________________________________________________________________
___________________________________________________________________________________.
As an administrator, I want __________________________________________________________
___________________________________________________________________________________
in order to __________________________________________________________________________
___________________________________________________________________________________.
As an administrator, I want __________________________________________________________
___________________________________________________________________________________
in order to __________________________________________________________________________
___________________________________________________________________________________.

Reflecting upon the user stories you’ve recorded above…

Which of these user stories might be informed by collecting additional data about student use of library facilities and linking it to other institutional data?
________________________________________________________________________________________
________________________________________________________________________________________
________________________________________________________________________________________
________________________________________________________________________________________

What else has your dialogue surfaced?
________________________________________________________________________________________
________________________________________________________________________________________
________________________________________________________________________________________
________________________________________________________________________________________

What action steps might you take to move forward?
________________________________________________________________________________________
________________________________________________________________________________________
________________________________________________________________________________________
________________________________________________________________________________________
5.1.3 Selecting Data for the LibraryUseEvent

In order to answer questions or achieve the goals expressed in user stories related to student use of library facilities, librarians may need to identify and capture a variety of data. As an initial step, LIILA participants brainstormed data categories and sources that might be related to library facility use (see Figure A) and could be meaningfully paired with institutional student data (see examples in Figure B).

<table>
<thead>
<tr>
<th>STUDENT-LIBRARY INTERACTION</th>
<th>CATEGORY</th>
<th>SOURCE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Facilities usage</td>
<td>General library space usage</td>
<td>Space usage (WiFi, signups, …), Springshare bookings, door or turnstile card access, Bluetooth beacons…</td>
</tr>
<tr>
<td></td>
<td>Learning commons usage</td>
<td>WiFi, workstation logins</td>
</tr>
<tr>
<td></td>
<td>Makerspace usage</td>
<td>WiFi, swipe card, signup sheets</td>
</tr>
<tr>
<td></td>
<td>Room usage (presentation, group study, etc.)</td>
<td>Reservation system, LibCal, Springshare, …</td>
</tr>
<tr>
<td></td>
<td>Computer usage</td>
<td>Workstation logins, Cybrarian, …</td>
</tr>
</tbody>
</table>

Figure A. Student-Library Facility Interaction Data

<table>
<thead>
<tr>
<th>INSTITUTIONAL STUDENT DATA</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age</td>
</tr>
<tr>
<td>Ethnicity</td>
</tr>
<tr>
<td>Gender</td>
</tr>
<tr>
<td>High school GPA</td>
</tr>
<tr>
<td>SAT score</td>
</tr>
<tr>
<td>First generation</td>
</tr>
<tr>
<td>Veteran</td>
</tr>
<tr>
<td>Transfer</td>
</tr>
<tr>
<td>New or returning</td>
</tr>
<tr>
<td>Developmental or college-ready</td>
</tr>
<tr>
<td>Pell</td>
</tr>
<tr>
<td>Survey data (CIRP, SERU, NSSE, …)</td>
</tr>
<tr>
<td>----------------------------------</td>
</tr>
<tr>
<td>Major</td>
</tr>
<tr>
<td>Minor</td>
</tr>
<tr>
<td>Other program affiliation</td>
</tr>
<tr>
<td>Full- or part-time</td>
</tr>
<tr>
<td>GPA</td>
</tr>
<tr>
<td>Customer relationship management (Salesforce)</td>
</tr>
<tr>
<td>Tutoring participation</td>
</tr>
<tr>
<td>Advising participation</td>
</tr>
<tr>
<td>Student life, non-academic engagement participation (Campus Labs, …)</td>
</tr>
<tr>
<td>WIFI data, building and floor level</td>
</tr>
<tr>
<td>Scheduling data</td>
</tr>
<tr>
<td>Bookstore data (required textbooks, who purchases, who doesn’t when matched with class roster)</td>
</tr>
<tr>
<td>LMS data (Blackboard, Canvas, 2U, Moodle, …)</td>
</tr>
<tr>
<td>Assessment/assignment grades</td>
</tr>
<tr>
<td>Plagiarism detection (Turnitin)</td>
</tr>
<tr>
<td>Real time course progress</td>
</tr>
<tr>
<td>Course grades</td>
</tr>
<tr>
<td>Outcomes data (TK20, Academic Reporting Toolkit, …)</td>
</tr>
<tr>
<td>At-risk flag</td>
</tr>
<tr>
<td>Term-to-term enrollment persistence</td>
</tr>
<tr>
<td>Year-to-year enrollment retention</td>
</tr>
<tr>
<td>Course/degree completion</td>
</tr>
<tr>
<td>Time-to-completion, velocity</td>
</tr>
<tr>
<td>4- and 6-year graduation</td>
</tr>
<tr>
<td>Job placement/salary</td>
</tr>
<tr>
<td>Unizin Data Platform</td>
</tr>
<tr>
<td>Unizin Course Monitor</td>
</tr>
<tr>
<td>Unizin Engage (e-textbook usage platform)</td>
</tr>
</tbody>
</table>

Figure B. Institutional Student Data
In the Caliper library profile, the LibraryUseEvent includes data about student use of library spaces, including where the use occurred. Library spaces might be described by building names or numbers, floors, room numbers, or service points. The LibraryUseEvent may include the source used to indicate presence in a library, including WiFi, reservation, swipe card, or sign-in information. Importantly, the LibraryUseEvent may be de-specified to a level of “a person used a library space” with the time of use batched or scrambled, specified to a level of “a specific person used a specific library space at a specific time,” or described at some midpoint between the two, detailing the event only to a level of specificity that a library deems necessary to answer an important question or enable a stakeholder (e.g., student, faculty, librarian, educational partner, researcher, administrator) to achieve a goal, solve a problem, or meet a need and stopping short of gathering extra information that is not needed or perhaps not ethical to collect.

The design of the LibraryUseEvent enables libraries and institutions to determine the type, amount, and level of detail conveyed in an event, ensuring alignment with library values, ethics, and standards as well as both library and institutional policies and practices. At the de-specified end of this continuum (i.e., “a person used a library space”), little more than a count of usage might be achieved. At the specified end of the continuum (i.e., “a specific person used a specific library space at a specific time”), one might be able to link particular student characteristics typically maintained in institutional record stores (e.g., gender, major, GPA) with the use of individual library spaces (e.g., learning commons, makerspace) at a particular time (e.g., week of term, time of day) to learn about the contributions of student use of library spaces at particular times in a course, term, or overall educational journey to their learning and success outcomes (e.g., assignment rubric score, course grade, velocity to completion). Decisions about which, how much, and how detailed the collected information needs to be should be made by librarians based on the questions, goals, problems, and needs an individual library must address in order to serve its students equitably, effectively, and ethically and weighed against whether a library and its overarching institution has deployed and actively maintains policies, procedures, practices, and governance to protect student confidentiality.

**Continue the Conversation**

*Pause a moment and reflect upon the questions below, individually, in dialogue with your library colleagues, or in collaboration with institutional partners.*

What systems in your library collect data about student use of library facilities?

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What library facilities can be identified as sub-spaces within a larger library space? Would knowing about use of those spaces be useful in decision-making or action-taking for student support? Are there systems in those spaces that collect data about student use?

________________________________________________________________________________________
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________________________________________________________________________________________
What kind of information is necessary to answer questions or achieve goals expressed in user stories related to student use of library facilities? What type, amount, and/or level of detail about student facility use is required?

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What library facility use information is not desirable, or perhaps not ethical, to collect regardless of how useful it might be in serving students equitably and effectively?

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What action steps might you take to move forward?

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5.1.4 Using the LibraryUseEvent to Support Students

In the context of learning analytics and library facilities, librarians might use the LibraryUseEvent to learn whether students who spend time in the library learn more, earn better assignment or course grades, are more engaged, are retained, transfer successfully, graduate/complete on time, get jobs, earn an appropriate income, and/or feel more engaged and included in student-to-student relationships, student-to-faculty relations, or other engagement measures. They may also learn which library facilities (e.g., learning commons, group study rooms, presentation practice rooms) improve these learning and success markers. Knowing this information could help librarians make data-driven facility and space decisions, design new or redesign existing spaces, and/or advocate for additional library space. Librarians could also encourage students to spend (more) time using the library facility and point students toward library spaces aligned with their needs. As a result, students may discover new (to them) library facilities to aid them in achieving their goals. Students could benefit from increased outreach and instruction about good practices related to use of library facilities and potential gains they might acquire by spending (more) time in library spaces in general or using specific library facilities. Students could also benefit from the improvements, designs, and redesigns that librarians might enact based on learning analytics data.

In general, learning analytics could enable librarians to make data-driven decisions about their
facilities by uncovering which spaces are being accessed and used. Librarians could view breakdowns by space and explore how those spaces are attended by students from different curriculum areas, courses, or programs. Depending on the granularity of data capture, librarians may be able to identify over- or under-utilized spaces, discover gaps between expectations and actual space usage, and consider the balance of facilities costs vs. usage. Learning analytics could also help students understand what library facilities can support their learning or engagement goals; receive real-time encouragement to use spaces; request individualized assistance in using or reserving spaces; or avoid expenses associated with lack of awareness of what library facilities offer.

LibraryUseEvent analysis could help librarians grow in their understanding of the ways in which library spaces may support student learning and success and use that information to expand their services for or remove obstacles to productive student library space use. To ensure that students benefit from this use of their data, librarians should ground their efforts in research questions and/or user stories that help them anticipate, plan, and enact their analysis. Librarians should only collect and analyze data that can be used to power changes that benefit students, and they should do that work knowledgeably, thoughtfully, carefully, and responsibly. Only information that will be used and is required to make decisions and take actions should be collected.

5.1.5 LibraryUseEvent Walk-Through

The Caliper library profile LibraryUseEvent focuses on the use of library facilities. Like any Caliper event, the core structure of the LibraryUseEvent is a triple comprised of an “actor,” “action,” and “object.” For the LibraryUseEvent, the “action” of the event is defined as “used” and the object is defined as a “library” or “library space.” Any or all of the elements in the LibraryUseEvent can be de-specified to carry no identifying information. For example, an “actor” can be described as a generic “person” or “student.” Because the time stamp on a Caliper event is the time the event is created for transmission to a data store, these transmissions can be batched and/or reordered out of actual sequence or generalized to a particular day/month/year, so that the specific time of library facility use can be obscured. Individual libraries, in collaboration with their institutions and users, can decide to include a description of the source used to determine or indicate an actor’s presence in a library, a building name or number, a floor or room number within a building, a description of a service point, or an indication that some library space belongs to a larger library facility. All of this additional information is optional, not required, enabling libraries and institutions to align their data practices with their values, ethics, standards, policies, and practices. Details and examples of the LibraryUseEvent can be found in the draft Caliper library profile in section 7.1 and online at https://www.imsglobal.org/spec/caliper-library/v1p2.

Continue the Conversation

Pause a moment and reflect upon the questions below, individually, in dialogue with your library colleagues, or in collaboration with institutional partners.

What questions do you have about the Caliper LibraryUseEvent?

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________________________________________________________________________________________

________________________________________________________________________________________

________________________________________________________________________________________
What concerns do you have about the LibraryUseEvent?
________________________________________________________________________________________
________________________________________________________________________________________
________________________________________________________________________________________
What parts of the LibraryUseEvent would you want to anonymize? Why?
________________________________________________________________________________________
________________________________________________________________________________________
________________________________________________________________________________________
What parts of the LibraryUseEvent would you want to specify? Why?
________________________________________________________________________________________
________________________________________________________________________________________
________________________________________________________________________________________
What action steps might you take to move forward?
________________________________________________________________________________________
________________________________________________________________________________________
________________________________________________________________________________________

5.2 LibraryResourceUseEvent

A Caliper LibraryResourceUseEvent models the use of the library’s physical and electronic resources and responds to user stories like the following:

- As a student, I would like to gauge my viewing of course readings and use of library resources in comparison to my peers.
- As a student, I would like to have a record of the library resources I have used.
- As an instructor, I would like to know which course readings are being viewed, when, and by whom.
- As a researcher, librarian, instructor, or student, I would like to determine if there is a correlation between student viewing of course readings or use of library resources and measures of student success.
5.2.1 Questions to Answer about Library Resources

The LibraryResourceUseEvent can enable students, faculty, librarians, or researchers to answer a number of questions related to student use of library resources. These questions represent a number of perspectives including students, faculty, librarians, and library administrators.

- What library resources make the greatest impact in terms of supporting student learning and success and those involved in it (e.g., students, faculty, advisors)?
- How can libraries personalize and customize library resources to maximize student learning and success?
- Does evidence-based collection development support student learning and success? Where does it fall short? How could it be informed by learning analytics data?
- How can libraries adjust the resources they offer in response to changes in student populations, academic curricula, program requirements, and institutional priorities?
- What is the unique contribution of library resources to student learning and success?
- How might linkages between student library resource use and student learning and success indicators be used to:
  - improve library resources?
  - demonstrate the value of and need for continuance of current resources (e.g., funding, personnel) allocated to library resources?
  - determine whether library budgets are allocated to resources that most contribute to student learning and success?
  - increase library budgets for resources that demonstrably support student learning and success?
- What is the optimal student library resource use level that indicates library effectiveness? How can librarians benchmark that level and seek to attain it?
- How can libraries capture resource use to ensure an accurate picture of student-library interaction?
- Most importantly, how can the answers to the questions above be employed to improve library support of student learning and success?
  - How can the data be used to inform and educate students about their own library interactions?
  - How can the data be used to empower students to take additional agency in their own learning?
  - How can the data be used to connect students with relevant services and their educational support team?
  - How will the data enable librarians to make decisions and take actions to “close the loop” in order to augment what works for student learning and dismantle what doesn’t?

This list of questions about student use of library resources is neither exhaustive nor prescriptive; these examples are intended for illustration and inspiration only.
Continue the Conversation

Pause a moment and reflect upon the questions below, individually, in dialogue with your library colleagues, or in collaboration with institutional partners.

Do any of the questions above resonate at your library? Which ones? If there are several, which questions might be most important to answer first?
________________________________________________________________________________________
________________________________________________________________________________________
________________________________________________________________________________________
________________________________________________________________________________________

What questions might your students have about the impact of their use of library resources? (Not a student? Ask some! Be sure to include students from underrepresented groups.)
________________________________________________________________________________________
________________________________________________________________________________________
________________________________________________________________________________________
________________________________________________________________________________________

Librarians, what questions do you have about your students’ use of library resources? (Not a librarian? Ask some!)
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________________________________________________________________________________________
________________________________________________________________________________________
________________________________________________________________________________________

Faculty, what questions do you have about your students’ use of library resources? (Not faculty? Ask some!)
________________________________________________________________________________________
________________________________________________________________________________________
________________________________________________________________________________________
________________________________________________________________________________________

Academic advisors/support team, what questions do you have about your students’ use of library resources? (Not an advisor/support team member? Ask some!)
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________________________________________________________________________________________
________________________________________________________________________________________
________________________________________________________________________________________
Library/institutional administrators, what questions do you have about students’ use of library resources? (Not an administrator? Ask some!)

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Reflecting upon the questions you’ve recorded above…

Which of these questions might be answered by collecting additional data about student use of library resources and linking it to other institutional data?

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What decisions might you be able to make or what actions might you be able to take to support student learning and success if you knew the answers to these questions?

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What else has your dialogue surfaced?

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What action steps might you take to move forward?

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5.2.2 User Stories about Library Resources

The user stories below convey the ways in which students, librarians, faculty, educational team members, researchers, and institutional leaders may find data from a LibraryResourceUseEvent valuable in achieving goals, solving problems, and meeting needs.

<table>
<thead>
<tr>
<th>LIILA #</th>
<th>As [stakeholder],</th>
<th>I want [to be able to do an activity, to have an awareness, to take an action]</th>
<th>in order to [achieve outcome, solve problem, meet need].</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>As a student,</td>
<td>I want to know whether my use of the library is more/less/equal to other students</td>
<td>so that I can match my library use with other students who are successful.</td>
</tr>
<tr>
<td>4</td>
<td>As a student,</td>
<td>I want to know whether I use more/less/equal amount of library resources to complete my assignments (compared to other students)</td>
<td>so that I can adjust my library use to get better grades.</td>
</tr>
<tr>
<td>5</td>
<td>As a student,</td>
<td>I want to know which library resources successful (grade attainment, retention, other?) students are using</td>
<td>so that I can match my library resource use with other students who are successful and improve my assignment/course grades.</td>
</tr>
<tr>
<td>6</td>
<td>As a student,</td>
<td>I want to know whether using library resources will help me get better grades on my assignments</td>
<td>so that I can match my library resource use with other students who are successful and improve my assignment/course grades.</td>
</tr>
<tr>
<td>9</td>
<td>As a student,</td>
<td>I want to know whether using resources provided by the library will save me money on textbooks</td>
<td>so that I can afford to stay in school or accumulate less debt.</td>
</tr>
<tr>
<td>10</td>
<td>As a student,</td>
<td>I want to know whether using technology provided by the library will save me money on computers, printers, or other equipment</td>
<td>so that I can afford to stay in school or accumulate less debt.</td>
</tr>
<tr>
<td>LIILA #</td>
<td>As [stakeholder],</td>
<td>I want [to be able to do an activity, to have an awareness, to take an action]</td>
<td>in order to [achieve outcome, solve problem, meet need].</td>
</tr>
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<td>---------</td>
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<td>---------------------------------------------------------------------------------</td>
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</tr>
<tr>
<td>11</td>
<td>As a student,</td>
<td>I want to know whether using technology provided by the library</td>
<td>will save me time/frustration needing/using my own computers, printers, or other equipment so that I can be more efficient and productive.</td>
</tr>
<tr>
<td>17</td>
<td>As a student,</td>
<td>I want to know what databases (or other online reference materials)</td>
<td>are most frequently used by successful students in my course of study so that I can match my use and improve my grades.</td>
</tr>
<tr>
<td>18</td>
<td>As an online student,</td>
<td>I want to know my use of library resources and services</td>
<td>is more/less/equal to the use of campus-based students so that I can develop strategies to better engage with the library as an online student, so that the library could improve support for online students, or even to decide whether I’d like to enroll as an online student in the first place.</td>
</tr>
<tr>
<td>19</td>
<td>As a campus-based student,</td>
<td>I want to know whether using only online library resources</td>
<td>will help me achieve more learning outcomes (or do so faster or more easily), earn higher GPA or test scores (CAAP, CLA, GRE, LSAT MCAT, MAPP), engage more with peers and others, stay in school, transfer successfully, graduate/complete, find an appropriate job and earn more money so that I can know whether I actually need to visit the library in person and make more informed choices about how to interact with the library.</td>
</tr>
<tr>
<td>LIILA #</td>
<td>As [stakeholder],</td>
<td>I want [to be able to do an activity, to have an awareness, to take an action]</td>
<td>in order to [achieve outcome, solve problem, meet need].</td>
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</tr>
<tr>
<td>20</td>
<td>As a student,</td>
<td>I want to know which courses (sections) use more freely available (through the library) resources so that I can choose courses (sections) that will allow me to spend less on textbooks or other resources in order to afford to stay in school or accumulate less debt.</td>
<td></td>
</tr>
<tr>
<td>25</td>
<td>As a librarian,</td>
<td>I want to know whether students who take courses that require extensive use of library resources have improved learning outcomes, GPA or test scores (CAAP, CLA, GRE, LSAT, MCAT, MAPP), engagement indicators, semester-to-semester retention, transfer success, employment rates or earnings after graduation/completion so that I can advocate that faculty use more library resources in their courses, review and improve courses that should but do not use library resources, ensure maximum quality/match of library resources with library resource-intensive courses.</td>
<td></td>
</tr>
<tr>
<td>27</td>
<td>As a librarian,</td>
<td>I want to know whether the amount, degree, or relative rank of student library resource use or other library participation impacts learning outcomes attainment, assignment or course grades, GPA or test scores, engagement indicators, and/or semester-to-semester retention, transfer success, employment rates or earnings after graduation/completion so that I can encourage faculty to require use of more library resources in their teaching content and assignment design, and encourage students to increase their library resource use.</td>
<td></td>
</tr>
<tr>
<td>LIILA #</td>
<td>As [stakeholder],</td>
<td>I want [to be able to do an activity, to have an awareness, to take an action]</td>
<td>in order to [achieve outcome, solve problem, meet need].</td>
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</tr>
<tr>
<td>28</td>
<td>As a librarian,</td>
<td>I want to know whether the amount of time (or amount of engagement) students spend reading (or other interactions like highlighting, annotating) library resources</td>
<td>impacts learning outcomes attainment, assignment or course grades, GPA or test scores, engagement indicators, and/or semester-to-semester retention, transfer success, employment rates or earnings after graduation/completion so that I can encourage students to spend more time interacting with library resources and educate faculty about the benefits (hopefully) of reading and in-depth interaction with library resources.</td>
</tr>
<tr>
<td>29</td>
<td>As a librarian,</td>
<td>I want to know whether the degree of student library resource use or other library participation classified by Bloom's taxonomy of knowledge/ comprehension/ application/analysis/synthesis/evaluation impacts learning outcomes attainment, assignment or course grades, GPA or test scores, engagement indicators, and/or semester-to-semester retention, transfer success, employment rates or earnings after graduation/completion so that I can encourage faculty to require use of more library resources in their teaching content and assignment design.</td>
<td></td>
</tr>
<tr>
<td>30</td>
<td>As a librarian,</td>
<td>I want to know whether students who engage with primary sources (archives, special collections, digitized collections, government documents)</td>
<td>attain more learning outcomes, earn better assignment or course grades, are more engaged, are retained, transfer successfully, graduate/complete on time, get jobs, and/or earn more money so that I can nudge more faculty to encourage student engagement with these resources in their courses, and grow more library instruction partnering with archives and special collections.</td>
</tr>
<tr>
<td>LIILA #</td>
<td>As [stakeholder],</td>
<td>I want [to be able to do an activity, to have an awareness, to take an action]</td>
<td>in order to [achieve outcome, solve problem, meet need].</td>
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</tr>
<tr>
<td>31</td>
<td>As a librarian,</td>
<td>I want to know whether the amount, degree, or relative rank of student library resource or technology use or other library participation</td>
<td>impacts institutional affordability and or debt minimization for students so that I can encourage students (and faculty) to engage with the library in ways that enable students to save money and train/retrain librarians to consider this criterion in their collections decisions.</td>
</tr>
<tr>
<td>32</td>
<td>As a librarian,</td>
<td>I want to know which print materials are used by students</td>
<td>who attain more learning outcomes, earn better assignment or course grades, are more engaged, are retained, transfer successfully, graduate/complete on time, get jobs, and/or earn more money so that I can make better collection decisions, inform faculty of how resources are being used, point students toward better resources, and improve library instruction.</td>
</tr>
<tr>
<td>33</td>
<td>As a librarian,</td>
<td>I want to know which electronic materials are used by students</td>
<td>who attain more learning outcomes, earn better assignment or course grades, are more engaged, are retained, transfer successfully, graduate/complete on time, get jobs, and/or earn more money so that I can make better collection decisions, inform faculty of how resources are being used, point students toward better resources, and improve library instruction.</td>
</tr>
<tr>
<td>LIILA #</td>
<td>As [stakeholder], I want [to be able to do an activity, to have an awareness, to take an action]</td>
<td>in order to [achieve outcome, solve problem, meet need].</td>
<td></td>
</tr>
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<td></td>
</tr>
<tr>
<td>34</td>
<td>As a librarian, I want to know which disciplinary collections are used by students who attain more learning outcomes, earn better assignment or course grades, are more engaged, are retained, transfer successfully, graduate/complete on time, get jobs, and/or earn more money</td>
<td>so that I can make better collection decisions, inform faculty of how resources are being used, point students toward better resources, and improve library instruction.</td>
<td></td>
</tr>
<tr>
<td>35</td>
<td>As a librarian, I want to know whether students who use library resources in the first X weeks of a term pass midterms/assignments/courses at greater rates</td>
<td>so that I can educate students and faculty about early library resource use.</td>
<td></td>
</tr>
<tr>
<td>40</td>
<td>As a librarian, I want to know whether students who use (which) library discovery tools attain more learning outcomes, earn better assignment or course grades, are more engaged, are retained, transfer successfully, graduate/complete on time, get jobs, and/or earn more money</td>
<td>so that I can improve library resource discovery.</td>
<td></td>
</tr>
<tr>
<td>41</td>
<td>As a librarian, I want to know whether students who begin their library research at the library website rather than Google or another freely available search tool have improved GPA, semester-to-semester retention, transfer success, employment rates or earnings after graduation/completion</td>
<td>so that I can advocate for more staff and resources for the library website, hosted search tools, and discovery layers.</td>
<td></td>
</tr>
<tr>
<td>LIILA #</td>
<td>As [stakeholder],</td>
<td>I want [to be able to do an activity, to have an awareness, to take an action]</td>
<td>in order to [achieve outcome, solve problem, meet need].</td>
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</tr>
<tr>
<td>42</td>
<td>As a librarian,</td>
<td>I want to know whether students who use (which) library-coordinated digital reading lists and/or course packs</td>
<td>attain more learning outcomes, earn better assignment or course grades, are more engaged, are retained, transfer successfully, graduate/complete on time, get jobs, and/or earn more money so that I can advocate an increased library role in coordination or development of digital reading lists and/or course packs.</td>
</tr>
<tr>
<td>43</td>
<td>As a librarian,</td>
<td>I want to know whether students who use library-managed course reading lists/course reserves</td>
<td>demonstrate increased course engagement so that I can advocate with faculty for increase used of library-managed course reading lists/course reserves.</td>
</tr>
<tr>
<td>44</td>
<td>As a librarian,</td>
<td>I want to know whether students who use library-managed course reading lists/course reserves (use or use more) library resources, services, or facilities</td>
<td>so I can advocate an increased library role in management of reading lists and/or course reserves.</td>
</tr>
<tr>
<td>45</td>
<td>As a librarian,</td>
<td>I want to know whether students who use (which) library-provided textbooks</td>
<td>attain more learning outcomes, earn better assignment or course grades, are more engaged, are retained, transfer successfully, graduate/complete on time, get jobs, and/or earn more money so that I can review collection policies and decisions and ensure maximum use and impact of library-provided textbooks.</td>
</tr>
<tr>
<td>46</td>
<td>As a librarian,</td>
<td>I want to know whether students who take courses in which include course-specific library materials/services/resources into the LMS (e.g. library resources aligned with course content)</td>
<td>attain more learning outcomes, earn better assignment or course grades, are more engaged, are retained, transfer successfully, graduate/complete on time, get jobs, and/or earn more money so that I can justify and promote to faculty the inclusion of a library presence in the LMS.</td>
</tr>
<tr>
<td>LIILA #</td>
<td>As [stakeholder],</td>
<td>I want [to be able to do an activity, to have an awareness, to take an action]</td>
<td>in order to [achieve outcome, solve problem, meet need].</td>
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<td>-----------------------------------------------------------------------------</td>
<td>----------------------------------------------------------</td>
</tr>
<tr>
<td>47</td>
<td>As a librarian,</td>
<td>I want to know whether students who cite more (which) library resources in their assignments</td>
<td>attain more learning outcomes, earn better assignment or course grades, are more engaged, are retained, transfer successfully, graduate/complete on time, get jobs, and/or earn more money</td>
</tr>
<tr>
<td>48</td>
<td>As a librarian,</td>
<td>I want to know whether students who request items via ILL</td>
<td>attain more learning outcomes, earn better assignment or course grades, are more engaged, are retained, transfer successfully, graduate/complete on time, get jobs, and/or earn more money</td>
</tr>
<tr>
<td>51</td>
<td>As a librarian,</td>
<td>I want to know whether any relationships between the use of library services/resources and institutional outcomes (described in other user stories)</td>
<td>vary by student population/status/characteristics</td>
</tr>
<tr>
<td>LIILA #</td>
<td>As [stakeholder],</td>
<td>I want [to be able to do an activity, to have an awareness, to take an action]</td>
<td>in order to [achieve outcome, solve problem, meet need].</td>
</tr>
<tr>
<td>--------</td>
<td>-------------------</td>
<td>---------------------------------------------------------------------------------</td>
<td>--------------------------------------------------------</td>
</tr>
</tbody>
</table>
| 52     | As a librarian,   | I want to know whether any relationships between the use of library services/resources and institutional outcomes (described in other user stories) | impact learning outcomes attainment assessed at the assignment level (or some other more granular level that may actually get at learning directly) Learning outcomes might include:  
- Locating, evaluating, using information  
- Thinking critically, analytically  
- Analyzing, solving problems  
- Applying information skills to the real world  
- Disciplinary information skills so that I can tailor library services/resources to maximize and facilitate student learning. |
<p>| 54     | As a librarian,   | I want to know whether any relationships between the use of library services/resources and institutional outcomes (described in other user stories) | vary across (peer) institutional comparisons so that I can identify best practices that I can borrow from other institutions, understand how different practices impact outcomes, and advocate to improve library services/resources at my institution to reflect those at institutions with better outcomes. |</p>
<table>
<thead>
<tr>
<th>LIILA #</th>
<th>As [stakeholder],</th>
<th>I want [to be able to do an activity, to have an awareness, to take an action]</th>
<th>in order to [achieve outcome, solve problem, meet need].</th>
</tr>
</thead>
<tbody>
<tr>
<td>57</td>
<td>As a librarian,</td>
<td>I want to identify students who don’t use the library resources, skills or service</td>
<td>so that I can work with faculty/advisors to understand if there is a reason for the lack of student engagement with the library and to share with them the benefit the library could provide their students.</td>
</tr>
<tr>
<td>60</td>
<td>As a librarian,</td>
<td>I want to identify courses/departments/units who do not interact with the library to embed content or skills materials</td>
<td>so that I can investigate reasons for the lack of engagement with the library and to share the benefit the library could provide to students.</td>
</tr>
<tr>
<td>66</td>
<td>As faculty,</td>
<td>I want to know whether my students are using library resources</td>
<td>so that I can counsel them to use more or better resources.</td>
</tr>
<tr>
<td>67</td>
<td>As faculty,</td>
<td>I want to know whether my students who use (more) library resources are getting better grades on assignments or in my course</td>
<td>so that I can encourage more students to increase their library resource use.</td>
</tr>
<tr>
<td>68</td>
<td>As faculty,</td>
<td>I want to know which library resources my students are using (call number ranges, databases, journal titles, etc.)</td>
<td>so that I can check to see whether they’re using what my discipline requires and re-teach as needed.</td>
</tr>
<tr>
<td>LIILA #</td>
<td>As [stakeholder],</td>
<td>I want [to be able to do an activity, to have an awareness, to take an action]</td>
<td>in order to [achieve outcome, solve problem, meet need].</td>
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<td>---------</td>
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<td>--------------------------------------------------------</td>
</tr>
<tr>
<td>69</td>
<td>As faculty,</td>
<td>I want to know which courses in my department have students using the most library resources</td>
<td>so I can emulate the practices of those instructors and/or develop the instruction skills of faculty with low resources use if appropriate.</td>
</tr>
<tr>
<td>72</td>
<td>As faculty,</td>
<td>I want to know the numbers of library resources cited in articles or grant publications in my department or discipline</td>
<td>so I can adjust my publications or proposals to make them more competitive.</td>
</tr>
<tr>
<td>73</td>
<td>As faculty,</td>
<td>I want to know the numbers of library resources included in syllabi in my department or discipline</td>
<td>so that I can adjust my syllabi to bring them more in line with standard practice.</td>
</tr>
<tr>
<td>75</td>
<td>As faculty,</td>
<td>I want to know what library resources in my discipline are most cited in funded grant proposals</td>
<td>so that I can prepare more competitive grants.</td>
</tr>
<tr>
<td>76</td>
<td>As faculty</td>
<td>I want to know what library resources in my discipline are most cited on course syllabi in my department</td>
<td>so that I can match what my colleagues are using, reduce duplication across courses, etc.</td>
</tr>
<tr>
<td>77</td>
<td>As faculty,</td>
<td>I want to know how the use/citation of library resources in my publications correlates with successful tenure and/or promotion cases</td>
<td>so that I can alter my use/citation practices to increase the likelihood of earning tenure and/or promotion.</td>
</tr>
<tr>
<td>LIILA #</td>
<td>As [stakeholder],</td>
<td>I want [to be able to do an activity, to have an awareness, to take an action]</td>
<td>in order to [achieve outcome, solve problem, meet need].</td>
</tr>
<tr>
<td>--------</td>
<td>------------------</td>
<td>---------------------------------------------------------------------------------</td>
<td>-------------------------------------------------------</td>
</tr>
<tr>
<td>78</td>
<td>As faculty,</td>
<td>I want to know whether my inclusion of library resources in my syllabus</td>
<td>so that I can change the amount of my inclusion of library resources in my syllabus in order to receive better teaching evaluation scores.</td>
</tr>
<tr>
<td>79</td>
<td>As faculty,</td>
<td>I want to know whether my inclusion of library resources in student assignment requirements</td>
<td>so that I can change the amount of my inclusion of library resources in student assignment requirements to increase student learning or receive better teaching evaluation scores.</td>
</tr>
<tr>
<td>81</td>
<td>As an academic advisor,</td>
<td>I want to know whether students who are struggling are using fewer library resources than more successful students</td>
<td>so that I can suggest that they use more library resources as part of an intervention plan.</td>
</tr>
<tr>
<td>86</td>
<td>As an academic advisor,</td>
<td>I want to know whether students who are struggling financially are gaining access to required resources like textbooks and resources listed on syllabi</td>
<td>so that I can suggest that they investigate free textbook options as part of an intervention plan, or that I could encourage my faculty to use more open educational resources to cut down on textbook costs.</td>
</tr>
<tr>
<td>LIILA #</td>
<td>As [stakeholder],</td>
<td>I want [to be able to do an activity, to have an awareness, to take an action]</td>
<td>in order to [achieve outcome, solve problem, meet need].</td>
</tr>
<tr>
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<td>---------------------------------------------------</td>
</tr>
<tr>
<td>89</td>
<td>As an institutional researcher,</td>
<td>I want to know whether or the degree to which including library data in institutional learning analytics</td>
<td>leads to more informed student success models so that I can identify existing and/or predict future individual students or student populations in need of intervention and identify existing and/or predict future courses, departments, or other divisions in need of improvement.</td>
</tr>
<tr>
<td>91</td>
<td>As a senior institutional leader,</td>
<td>I want to know whether (which) library expenditures</td>
<td>impact student success measures, faculty research productivity, faculty grant productivity, institutional brand/image/prestige, institutional affordability, and/or institutional accreditation so that I can make resource decisions that will maximize institutional outcomes.</td>
</tr>
<tr>
<td>92</td>
<td>As faculty,</td>
<td>I want to know whether the inclusion of library resources in student assignment requirements</td>
<td>impacts student learning outcomes so that I can make informed instructional choices regarding library resources when designing course assignments.</td>
</tr>
</tbody>
</table>

This list of user stories about student use of library resources is neither exhaustive nor prescriptive; these examples are intended for illustration and inspiration only.
Continue the Conversation

Pause a moment and reflect upon the questions below, individually, in dialogue with your library colleagues, or in collaboration with institutional partners.

Do any of the user stories above resonate at your library? Which ones? If there are several, which user stories might be most important to consider first?
________________________________________________________________________________________
________________________________________________________________________________________
________________________________________________________________________________________
________________________________________________________________________________________

What additional user stories might your students generate about their use of library resources? (Not a student? Ask some! Be sure to include students from underrepresented groups.)

Example: As [stakeholder], I want [to be able to do an activity, to have an awareness, to take an action] in order to [achieve outcome, solve problem, meet need].

As a student, I want ________________________________________________________________
___________________________________________________________________________________
in order to __________________________________________________________________________
___________________________________________________________________________________.

As a student, I want ________________________________________________________________
___________________________________________________________________________________
in order to __________________________________________________________________________
___________________________________________________________________________________.

As a student, I want ________________________________________________________________
___________________________________________________________________________________
in order to __________________________________________________________________________
___________________________________________________________________________________.

As a student, I want ________________________________________________________________
___________________________________________________________________________________
in order to __________________________________________________________________________
___________________________________________________________________________________.
Librarians, what additional user stories might you create about your students’ use of library resources? (Not a librarian? Ask some!)

Example: As [stakeholder], I want [to be able to do an activity, to have an awareness, to take an action] in order to [achieve outcome, solve problem, meet need].

As a librarian, I want ____________________________________________________________
___________________________________________________________________________________
in order to __________________________________________________________________________
___________________________________________________________________________________.

As a librarian, I want ____________________________________________________________
___________________________________________________________________________________
in order to __________________________________________________________________________
___________________________________________________________________________________.

As a librarian, I want ____________________________________________________________
___________________________________________________________________________________
in order to __________________________________________________________________________
___________________________________________________________________________________.

As a librarian, I want ____________________________________________________________
___________________________________________________________________________________
in order to __________________________________________________________________________
___________________________________________________________________________________.

Faculty, what additional user stories might you create about your students’ use of library resources? (Not faculty? Ask some!)

Example: As [stakeholder], I want [to be able to do an activity, to have an awareness, to take an action] in order to [achieve outcome, solve problem, meet need].

As faculty, I want ____________________________________________________________
___________________________________________________________________________________
in order to __________________________________________________________________________
___________________________________________________________________________________.

As faculty, I want ____________________________________________________________
___________________________________________________________________________________
in order to __________________________________________________________________________
___________________________________________________________________________________.
As faculty, I want ________________________________________________________________
________________________________________________________________________________
in order to ______________________________________________________________________
________________________________________________________________________________.

As faculty, I want ________________________________________________________________
________________________________________________________________________________
in order to ______________________________________________________________________
________________________________________________________________________________.

Academic advisors/support team, what additional user stories might you create about your
students’ use of library resources? (Not an advisor/support team member? Ask some!)

Example: As [stakeholder], I want [to be able to do an activity, to have an awareness, to
take an action] in order to [achieve outcome, solve problem, meet need].

As an advisor or support team member, I want ________________________________________
___________________________________________________________________________________
in order to __________________________________________________________________________
___________________________________________________________________________________.

As an advisor or support team member, I want ________________________________________
___________________________________________________________________________________
in order to __________________________________________________________________________
___________________________________________________________________________________.

As an advisor or support team member, I want ________________________________________
___________________________________________________________________________________
in order to __________________________________________________________________________
___________________________________________________________________________________.

As an advisor or support team member, I want ________________________________________
___________________________________________________________________________________
in order to __________________________________________________________________________
___________________________________________________________________________________.
Library/institutional administrators, what additional user stories might you create about students’ use of library resources? (Not an administrator? Ask some!)

Example: As [stakeholder], I want [to be able to do an activity, to have an awareness, to take an action] in order to [achieve outcome, solve problem, meet need].

As an administrator, I want __________________________________________________________
___________________________________________________________________________________
in order to __________________________________________________________________________
___________________________________________________________________________________.

As an administrator, I want __________________________________________________________
___________________________________________________________________________________
in order to __________________________________________________________________________
___________________________________________________________________________________.

As an administrator, I want __________________________________________________________
___________________________________________________________________________________
in order to __________________________________________________________________________
___________________________________________________________________________________.

As an administrator, I want __________________________________________________________
___________________________________________________________________________________
in order to __________________________________________________________________________
___________________________________________________________________________________.

Reflecting upon the user stories you’ve recorded above...

Which of these user stories might be informed by collecting additional data about student use of library resources and linking it to other institutional data?

________________________________________________________________________________________
________________________________________________________________________________________
________________________________________________________________________________________
________________________________________________________________________________________
What else has your dialogue surfaced?

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________________________________________________________________________________________
________________________________________________________________________________________
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What action steps might you take to move forward?

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5.2.3 Selecting Data for the LibraryResourceUseEvent

In order to answer questions or achieve the goals expressed in user stories related to student use of library resources, librarians may need to identify and capture a variety of data. As an initial step, LIILA participants brainstormed data categories and sources that might be related to library resource use (see Figure C) and could be meaningfully paired with institutional student data (see examples in Figure B in section 5.1.3).
<table>
<thead>
<tr>
<th>STUDENT-LIBRARY INTERACTION</th>
<th>CATEGORY</th>
<th>SOURCE</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Physical circulation (books, technology, …)</td>
<td>ILS (SirsiDynix, ExLibris Alma, Innovative, OCLC WMS, …) open source ILS (Koha, Evergreen, FOLIO, …)</td>
</tr>
<tr>
<td></td>
<td>Renews</td>
<td>ILS (SirsiDynix, ExLibris Alma, Innovative, OCLC WMS, …) Open source ILS (Koha, Evergreen, FOLIO, …)</td>
</tr>
<tr>
<td></td>
<td>Database usage, full text downloads, etc.</td>
<td>Authentication (OCLC EZproxy to Ebsco, Credo, Gale, …) Link data from LMS to library content</td>
</tr>
<tr>
<td></td>
<td>e-book usage, full text downloads, etc.</td>
<td>Authentication (OCLC EZproxy to Gale, Salem, …) Link data from LMS to library content</td>
</tr>
<tr>
<td></td>
<td>Multimedia usage, downloads, etc.</td>
<td>Authentication (OCLC EZproxy to database vendor) Link data from LMS to library content</td>
</tr>
<tr>
<td></td>
<td>Digital video</td>
<td>Authentication (OCLC EZproxy to Alexander Street Press, …) Link data from LMS to library content</td>
</tr>
<tr>
<td></td>
<td>Institutional repository usage</td>
<td>BePress, Dspace, …</td>
</tr>
<tr>
<td></td>
<td>Discovery/search system usage</td>
<td>Primo, Summon, VuFind, …</td>
</tr>
<tr>
<td></td>
<td>Reserves/Reading List usage</td>
<td>Reserves Direct, Ex Libris Leganto Link data (LTI) from LMS to library content</td>
</tr>
<tr>
<td></td>
<td>ILL usage</td>
<td>ILLiad</td>
</tr>
<tr>
<td></td>
<td>Subject guide usage</td>
<td>(LibGuides, …)</td>
</tr>
<tr>
<td></td>
<td>Technology/device usage</td>
<td>System logins, swipe card, …</td>
</tr>
<tr>
<td></td>
<td>Computer usage</td>
<td>Workstation logins, Cybrarian, …</td>
</tr>
</tbody>
</table>

Figure C. Student-Library Resource Interaction Data
In the Caliper library profile, the LibraryResourceUseEvent includes data about student use of library resources. Library resources might be described by whether the resource is accessed physically or digitally, the user’s physical location from which the resource was accessed, the resource type (e.g., database, e-journal, article, e-book, book), a learning outcome that describes what a learner is expected to comprehend or accomplish after engaging with the resource, or a system identifier such as a DOI, ISBN, ISSN, OCLC number, LC class/subclass, Dewey Decimal call number, SuDoc number, PubMed identifier, MARC 008 field, barcode, or LibGuide identifier. Importantly, the LibraryResourceUseEvent may be de-specified to a level of “a person accessed a library resource,” specified to a level of “a specific person accessed a specific library resource at a specific time,” or it may rest at some midpoint in between the two, describing the event to a level of specificity that a library deems necessary to answer an important question or enable a stakeholder (e.g., student, faculty, librarian, educational partner, researcher, administrator) to achieve a goal, solve a problem, or meet a need.

The design of the LibraryResourceUseEvent enables libraries and institutions to determine the type, amount, and level of detail conveyed in an event, ensuring alignment with library values, ethics, and standards as well as both library and institutional policies and practices. At the de-specified end of this continuum (i.e., “a person accessed a library resource”), little more than a count of usage might be achieved. At the specified end of the continuum (i.e., “a specific person accessed a specific library resource at a specific time”), one might be able to link particular student characteristics typically maintained in institutional record stores (e.g., gender, major, GPA) with the use of a specific resource type (e.g., database, book, journal) or even an individual resource (e.g., labeled with a call number or other system identifier) at a particular time (e.g., week of term) to learn about the contributions of student use of library resources at particular times in a course, term, or overall educational journey to their learning and success outcomes (e.g., assignment rubric score, course grade, velocity to completion). Decisions about which, how much, and how detailed the collected information needs to be should be made by librarians based on the questions, goals, problems, and needs an individual library must address in order to serve its students equitably, effectively, and ethically and should be weighed against whether a library and its overarching institution has deployed and actively maintains policies, procedures, practices, and governance to protect student confidentiality.

Student use of individual identified resources is among the most valuable—and most vulnerable—information libraries hold; librarians should consider carefully the potential benefits and possible harm associated with this information. It is likely that in many cases aggregated information by type (e.g., database, book, e-book, journal, e-journal) or by a “one-level up” aggregation (e.g., journal title rather than article title, LC subclass rather than full call number) may be sufficient to answer questions and support stakeholders to achieve goals, solve problems, and meet needs. De-specification and/or aggregation blurs the picture achieved through data analysis and may render the experience of marginalized users opaque; at the same time, in cases of potential harm, de-specification and/or aggregation may be necessary to protect marginalized users. Thus vigorous, clear-headed debate is required to navigate these difficult decisions and all options—including access permissions limited to individuals charged with inspecting the data for bias, spurious content, and systematic omission or deletion of the experience of vulnerable populations—should be considered and discussed transparently.
Continue the Conversation

Pause a moment and reflect upon the questions below, individually, in dialogue with your library colleagues, or in collaboration with institutional partners.

What systems in your library collect data about student use of library resources?
________________________________________________________________________________________
________________________________________________________________________________________
________________________________________________________________________________________
________________________________________________________________________________________

What library resources can be identified as sub-categories within the larger library collection? Would knowing about use of those resource categories be useful in decision-making or action-taking for student support? How?
________________________________________________________________________________________
________________________________________________________________________________________
________________________________________________________________________________________
________________________________________________________________________________________

What kind of information is necessary to answer questions or achieve goals expressed in user stories related to student use of library resources? What type, amount, and/or level of detail about student facility use is required?
________________________________________________________________________________________
________________________________________________________________________________________
________________________________________________________________________________________
________________________________________________________________________________________

What library resource use information is not desirable, or perhaps not ethical, to collect regardless of how useful it might be in serving students equitably and effectively?
________________________________________________________________________________________
________________________________________________________________________________________
________________________________________________________________________________________
________________________________________________________________________________________

What action steps might you take to move forward?
________________________________________________________________________________________
________________________________________________________________________________________
________________________________________________________________________________________
________________________________________________________________________________________
5.2.4 Using the LibraryResourceUseEvent to Support Students

Librarians might be better equipped to make informed decisions and ensure timely and equitable access to library resources if they possessed more detailed information about student academics. Librarians who know, either individually or in the aggregate, what courses students are enrolled in, what resources are on their reading lists, what information resources their assignments require, what deadlines they face, etc., could use that information to connect students with the resources they need at the time they need them, ensuring—rather than hoping—that students connect with necessary library collections in a timely way.

In the context of learning analytics and library resources, librarians could serve students more effectively if they learn which library resources make a difference for students. This information might help librarians understand whether students who engage with library resource collections (e.g., print and electronic materials, reserves items, interlibrary loan materials, textbook collections, primary sources, special collections, archives materials, digitized collections, government documents, specific disciplinary collections) learn more, earn better assignment or course grades, are more engaged, are retained, transfer successfully, graduate/complete on time, get jobs, earn an appropriate income, or attain other success markers. Librarians could investigate whether the amount, degree, intensity, or relative rank of student library resource use impacts those markers; they may also explore whether the placement of resources (e.g., in a learning management system, on a reading list, in a LibGuide, accessible through some other medium) or timing of use (e.g., beginning of a term, a number of weeks prior to an assignment or assessment deadline) is a significant factor. They might also examine the affordability implications of student use of various library resources.

This knowledge and the decisions librarians make and actions they take with this information could be leveraged to ensure that students benefit from more targeted, affordable, or accessible resource collections. Students might also experience improved instruction in the use of resources. This use of information might enable librarians to inform students about their individual resource use (including comparisons to aggregated peer usage or linkages between resources used and successful outcomes like grade attainment) and use that knowledge to discover new library resources, adjust their resource usage to match their individual goals, uncover previously unknown learning practices, or make more informed choices about their engagement with the library. Students could investigate which courses utilize or require particular resources and/or the costs of resource use; this knowledge may empower them to reduce their expenses or accumulate less debt.

By adding academic context to librarian understanding of student needs, learning analytics could enable librarians to make data-driven decisions about their collections by revealing which resources are being accessed and used. Librarians could view breakdowns by resource content or type and explore how those resource groupings are used in a variety of curriculum areas, courses, or programs. Depending on the granularity of data capture, librarians may be able to identify trouble spots in accessing or using resources, discover gaps between expectations and actual resource engagement, make informed decisions about the costs vs. use of resources, and so on. Learning analytics could also help students gauge their individual resource participation against norms; learn about resource use best practices; receive real-time encouragement or instruction on the discovery, access, or use of resources; request individualized assistance in using resources; or avoid unnecessary resource expenses.

To ensure that students benefit from this use of their data, librarians should begin with carefully vetted research questions and/or user stories that help them plan their analysis and surface—before data collection commences—resources and populations that might be vulnerable. Librarians should employ risk mitigation strategies and proactively design their data collection and analysis to protect user information that could be misused or mishandled. As in any analysis of student data, librarians
should ensure that only the data necessary for making changes that benefit students is collected and used; parsimonious data collection is essential. Superfluous data that is not necessary for decision-making and action-taking should not be collected or retained.

5.2.5 LibraryResourceUseEvent Walk-Through

The Caliper library profile LibraryResourceUseEvent focuses on the use of library resources. Like other Caliper events, the core structure of the LibraryUseEvent is comprised of an “actor,” “action,” and “object.” For the LibraryResourceUseEvent, the “action” of the event is defined as “accessed” and the object is defined as a “library resource.” Any or all of the elements in the LibraryResourceUseEvent can be de-specified to prevent transferring identifying information. For example, an “actor” can be described as a generic “person” or “student.” Because the time stamp on a Caliper event is the time the event is created for transmission to a data store, these transmissions can be batched and/or reordered out of actual sequence or generalized to a particular day/month/year, so that the specific time of library resource use can be obscured. Individual libraries, in collaboration with their institutions and users, can decide to include an access location (e.g., on-campus, off-campus), how the resource was accessed (e.g., physical, digital); the type of resource (e.g., database, article, e-journal, journal, book, e-book); a course offering or section associated with the resource (e.g., reading lists, reserve materials), learning outcomes associated with the resource; and other identifiers that might be useful to individual libraries (e.g., DOI, ISBN, ISSN, OCLC number, LC call number, Dewey Decimal call number, SuDoc number, PMID (PubMed identifier), barcode, LibGuide identifier). All of this additional information is optional, not required, enabling libraries and institutions to align their data practices with their values, ethics, standards, policies, and practices. Details and examples of the LibraryResourceUseEvent can be found in the Caliper library profile in section 7.1 and online at https://www.imsglobal.org/spec/caliper-library/v1p2.

Continue the Conversation

Pause a moment and reflect upon the questions below, individually, in dialogue with your library colleagues, or in collaboration with institutional partners.

What questions do you have about the Caliper LibraryResourceUseEvent?

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________________________________________________________________________________________
________________________________________________________________________________________
________________________________________________________________________________________

What concerns do you have about the LibraryResourceUseEvent?

________________________________________________________________________________________
________________________________________________________________________________________
________________________________________________________________________________________
________________________________________________________________________________________
What parts of the LibraryResourceUseEvent would you want to anonymize? Why?
________________________________________________________________________________________
________________________________________________________________________________________
________________________________________________________________________________________
________________________________________________________________________________________

What parts of the LibraryResourceUseEvent would you want to specify? Why?
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________________________________________________________________________________________
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What action steps might you take to move forward?
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5.3 LibraryParticipationEvent

A Caliper LibraryParticipationEvent models a person attending an appointment, meeting, lecture, workshop, or any other library function, whether ad-hoc or scheduled, and responds to user stories like the following:

- As a student, I would like to gauge my use of library services in comparison to my peers.
- As a researcher, librarian, instructor, or student, I would like to determine if there is a correlation between student engagement with library services and measures of student success.

5.3.1 Questions to Answer about Library Services

The LibraryParticipationEvent can enable students, faculty, librarians, or researchers to answer a number of questions related to student use of library services. These questions represent a number of perspectives including students, faculty, librarians, and library administrators.

- What library services make the greatest impact in terms of supporting student learning and success and those involved in it (e.g., students, faculty, advisors)?
- What library interactions and/or relationships are (most) positively linked with student learning and success indicators?
• What best practices can library interventions (e.g., reference, instruction) apply to maximize support for student learning and success?
• How can libraries personalize and customize library services, resources, and facilities to maximize student learning and success?
• When is the best time (e.g., at touchpoints, within a term, within a college career) for library interventions to support student learning and success?
• How can libraries identify students who can benefit from support and intervene to empower them, supply choices, and support their own agency for learning and success?
• How can libraries use learning analytics data to augment existing library assessments, both quantitative and qualitative, to gain a more complete understanding of the role of librarian interactions in student learning and success?
• How can libraries augment other institutional learning analytics efforts to ensure that the resulting picture of student learning and success is complete, accurate, and actionable?
• How can libraries share data across student support units to increase an integrated approach to student learning and success?
• What unique contributions do libraries make to student learning and success?
• How might linkages between student library service use and student learning and success indicators be used to:
  o improve library services?
  o demonstrate the value of and need for continuance of current resources allocated to library services?
  o determine whether library budgets are allocated to services that most contribute to student learning and success?
  o increase library budgets for services that demonstrably support student learning and success?
• What is the optimal student library service use level that indicates library effectiveness? How can librarians benchmark that level and seek to attain it?
• How can libraries capture library service use to ensure an accurate picture of student-library interaction?
• Most importantly, how can the answers to the questions above be employed to improve library support of student learning and success?
  o How can the data be used to inform and educate students about their own library interactions?
  o How can the data be used to empower students to take additional agency in their own learning?
  o How can the data be used to connect students with relevant services and their educational support team?
  o How will the data enable librarians to make decisions and take actions to “close the loop” in order to augment what works for student learning and dismantle what doesn’t?

This list of questions about student use of library services is neither exhaustive nor prescriptive; these examples are intended for illustration and inspiration only.
Continue the Conversation

Pause a moment and reflect upon the questions below, individually, in dialogue with your library colleagues, or in collaboration with institutional partners.

Do any of the questions above resonate at your library? Which ones? If there are several, which questions might be most important to answer first?

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What questions might your students have about the impact of their use of library services? (Not a student? Ask some! Be sure to include students from underrepresented groups.)

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________________________________________________________________________________________

Librarians, what questions do you have about your students’ use of library services? (Not a librarian? Ask some!)

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________________________________________________________________________________________

Faculty, what questions do you have about your students’ use of library services? (Not faculty? Ask some!)

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Academic advisors/support team, what questions do you have about your students’ use of library services? (Not an advisor/support team member? Ask some!)

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________________________________________________________________________________________
________________________________________________________________________________________

41
Library/institutional administrators, what questions do you have about students’ use of library services? (Not an administrator? Ask some!)

________________________________________________________________________________________
________________________________________________________________________________________
________________________________________________________________________________________
________________________________________________________________________________________

Reflecting upon the questions you’ve recorded above…

Which of these questions might be answered by collecting additional data about student use of library services and linking it to other institutional data?
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________________________________________________________________________________________
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________________________________________________________________________________________

What decisions might you be able to make or what actions might you be able to take to support student learning and success if you knew the answers to these questions?
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________________________________________________________________________________________

What else has your dialogue surfaced?
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What action steps might you take to move forward?
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________________________________________________________________________________________
### 5.3.2 User Stories about Library Services

The user stories below convey the ways in which students, librarians, educational team members, and researchers may find data from a LibraryParticipationEvent valuable in achieving goals, solving problems, and meeting needs.

<table>
<thead>
<tr>
<th>LIILA #</th>
<th>As [stakeholder],</th>
<th>I want [to be able to do an activity, to have an awareness, to take an action]</th>
<th>in order to [achieve outcome, solve problem, meet need].</th>
</tr>
</thead>
<tbody>
<tr>
<td>14</td>
<td>As a student,</td>
<td>I want to know whether asking a question at the reference desk</td>
<td>will improve my assignment/course grades or test scores</td>
</tr>
<tr>
<td>16</td>
<td>As a student,</td>
<td>I want to know what kinds of questions successful students (in my field of study) ask of the reference librarians</td>
<td></td>
</tr>
<tr>
<td>13</td>
<td>As a student,</td>
<td>I want to know whether other students use the reference desk or reference librarian consultations more/less/equal amount than I do</td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>As a student,</td>
<td>I want to know whether attending a library instruction session/workshop</td>
<td>will improve my assignment/course grades or test scores</td>
</tr>
<tr>
<td>8</td>
<td>As a student,</td>
<td>I want to know whether enrolling in a for-credit information literacy course</td>
<td>will improve my grades in other courses</td>
</tr>
<tr>
<td>LIILA #</td>
<td>As [stakeholder],</td>
<td>I want [to be able to do an activity, to have an awareness, to take an action]</td>
<td>in order to [achieve outcome, solve problem, meet need].</td>
</tr>
<tr>
<td>---------</td>
<td>------------------</td>
<td>-------------------------------------------------------------------------------</td>
<td>------------------------------------------------------</td>
</tr>
<tr>
<td>15</td>
<td>As a student,</td>
<td>I want to know what experiences (courses? other?) will teach me the information literacy skills employers expect</td>
<td>so that I can get a (better, more highly paid, more selective) job or graduate school admission offer.</td>
</tr>
<tr>
<td>12</td>
<td>As a student,</td>
<td>I want to know what library exhibits/events other students attend</td>
<td>so that I don’t miss out on academic and social benefits.</td>
</tr>
<tr>
<td>21</td>
<td>As a librarian,</td>
<td>I want to know whether students who interact with library reference services attain more learning outcomes, earn better assignment or course grades, are more engaged, are retained, transfer successfully, graduate/complete on time, get jobs, and/or earn more money</td>
<td>so that I can advocate for more (or more appropriate) reference resources, encourage more faculty and students to interact with reference librarians, and improve reference services.</td>
</tr>
<tr>
<td>22</td>
<td>As a librarian,</td>
<td>I want to know whether students who participate in library instruction attain more learning outcomes, earn better assignment or course grades, are more engaged, are retained, transfer successfully, graduate/complete on time, get jobs, and/or earn more money</td>
<td>so that I can advocate for more (or more appropriate) instruction resources, encourage more faculty and students to schedule/participate in library instruction, and improve library instructional services and decision-making.</td>
</tr>
<tr>
<td>LIILA #</td>
<td>As [stakeholder], I want [to be able to do an activity, to have an awareness, to take an action]</td>
<td>in order to [achieve outcome, solve problem, meet need].</td>
<td></td>
</tr>
<tr>
<td>--------</td>
<td>--------------------------------------------------------------------------------------------------</td>
<td>---------------------------------------------------</td>
<td></td>
</tr>
<tr>
<td>23</td>
<td>As a librarian, I want to know whether students who participate in particular, identifiable library instruction sessions</td>
<td>attain more learning outcomes, earn better assignment or course grades, are more engaged, are retained, transfer successfully, graduate/complete on time, get jobs, and/or earn more money so that I can advocate for more instruction resources and encourage more faculty and students to schedule/participate in library instruction, and improve library instructional services.</td>
<td></td>
</tr>
<tr>
<td>24</td>
<td>As a librarian, I want to know whether students who take a for-credit information literacy course</td>
<td>attain more learning outcomes, earn better assignment or course grades (in other courses), are more engaged, are retained, transfer successfully, graduate/complete on time, get jobs, and/or earn more money so that I can advocate for students to take a for-credit information literacy course, develop basic, advanced, or discipline-specific versions of the course, and/or create an information-based minor program.</td>
<td></td>
</tr>
<tr>
<td>LIILA #</td>
<td>As [stakeholder],</td>
<td>I want [to be able to do an activity, to have an awareness, to take an action]</td>
<td>in order to [achieve outcome, solve problem, meet need].</td>
</tr>
<tr>
<td>---------</td>
<td>-------------------</td>
<td>------------------------------------------------------------------</td>
<td>-----------------------------------------------------</td>
</tr>
<tr>
<td>26</td>
<td>As a librarian,</td>
<td>I want to know whether students who take courses taught by faculty who have consulted with librarians on course/assignment design</td>
<td>have improved learning outcomes, GPA or test scores (CAAP, CLA, GRE, LSAT MCAT, MAPP), engagement indicators, semester-to-semester retention, transfer success, employment rates or earnings, after graduation/completion so that I can advocate that faculty consult with librarians in preparing their courses, figure out exactly what impactful contributions librarians are making to the courses, and ensure that all librarians are making impactful contributions in this context.</td>
</tr>
<tr>
<td>50</td>
<td>As a librarian,</td>
<td>I want to know whether students who use library resource guides or library tutorials</td>
<td>complete assignments faster or earn better grades so that I can assess and improve the quality of the library resource guides or tutorials to help more students save time and earn better grades.</td>
</tr>
<tr>
<td>LIILA #</td>
<td>As [stakeholder], I want [to be able to do an activity, to have an awareness, to take an action]</td>
<td>in order to [achieve outcome, solve problem, meet need].</td>
<td></td>
</tr>
<tr>
<td>---------</td>
<td>-------------------------------------------------------------------------------------------------</td>
<td>-----------------------------------------------------</td>
<td></td>
</tr>
<tr>
<td>51</td>
<td>As a librarian, I want to know whether any relationships between the use of library services/resources and institutional outcomes (described in other user stories) vary by student population/status/characteristics so that I can tailor library services/resources to meet the needs of populations with specialized needs and engage in appropriate instruction, outreach, etc. and help the institution prepare for changing student demographics.</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
| 52      | As a librarian, I want to know whether any relationships between the use of library services/resources and institutional outcomes (described in other user stories) impact learning outcomes attainment assessed at the assignment level (or some other more granular level that may actually get at learning directly) Learning outcomes might include:  
  - Locating, evaluating, using information  
  - Thinking critically, analytically  
  - Analyzing, solving problems  
  - Applying information skills to the real world  
  - Disciplinary information skills so that I can tailor library services/resources to maximize and facilitate student learning. |
<table>
<thead>
<tr>
<th>LIILA #</th>
<th>As [stakeholder], I want [to be able to do an activity, to have an awareness, to take an action]</th>
<th>in order to [achieve outcome, solve problem, meet need].</th>
</tr>
</thead>
<tbody>
<tr>
<td>54</td>
<td>As a librarian, I want to know whether any relationships between the use of library services/resources and institutional outcomes (described in other user stories) vary across (peer) institutional comparisons so that I can identify best practices that I can borrow from other institutions, understand how different practices impact outcomes, and advocate to improve library services/resources at my institution to reflect those at institutions with better outcomes.</td>
<td></td>
</tr>
<tr>
<td>55</td>
<td>As a librarian, I want to identify students who contact our helpdesk the most, when, about what by courses/ departments/units so that I can work with the course/ department/ unit teams to improve their learning design and empower the students to be more independent learners.</td>
<td></td>
</tr>
<tr>
<td>56</td>
<td>As a librarian, I want to identify which aspects of library service (resources, skills and/or support) has the highest impact on student satisfaction as measured through institutional survey tools so that I can support the institutional strategies to improve student satisfaction scores.</td>
<td></td>
</tr>
<tr>
<td>LIILA #</td>
<td>As [stakeholder],</td>
<td>I want [to be able to do an activity, to have an awareness, to take an action]</td>
</tr>
<tr>
<td>---------</td>
<td>------------------</td>
<td>-----------------------------------------------------------------------------</td>
</tr>
<tr>
<td>57</td>
<td>As a librarian,</td>
<td>I want to identify students who don’t use the library resources, skills or service</td>
</tr>
<tr>
<td>58</td>
<td>As a librarian,</td>
<td>I want to determine which library instruction by design (teaching method, one-shot vs multi-shot) and format (written, video, or live delivery) has the most impact on student success indicators</td>
</tr>
<tr>
<td>60</td>
<td>As a librarian,</td>
<td>I want to identify courses/departments/units who do not interact with the library to embed content or skills materials</td>
</tr>
<tr>
<td>LIILA #</td>
<td>As [stakeholder], I want [to be able to do an activity, to have an awareness, to take an action]</td>
<td>in order to [achieve outcome, solve problem, meet need].</td>
</tr>
<tr>
<td>---------</td>
<td>-------------------------------------------------------------------------------------------------</td>
<td>------------------------------------------------------</td>
</tr>
<tr>
<td>62</td>
<td>As a librarian, I want to know whether students who are referred to and meet with librarians and library resources by their instructors</td>
<td>so that I can advocate that faculty and instructors refer students to librarians and encourage them to take advantage of library resources and services.</td>
</tr>
<tr>
<td>63</td>
<td>As a librarian, I want to know whether students who have librarians as officially identified members of their academic support network (e.g., academic advisors, Residence Hall Librarians, learning-living community advisors)</td>
<td>have improved GPA, semester-to-semester retention, transfer success, employment rates or earnings, after graduation/completion so that I can advocate that librarians connect with students on campus in ways outside librarians’ traditional roles and responsibilities and determine the most effective ways for librarians to connect with students on campus, outside librarians’ traditional roles and responsibilities.</td>
</tr>
<tr>
<td>70</td>
<td>As faculty, I want to know which of the courses in my department work with librarians in a consulting or instructional capacity</td>
<td>so I can report to accreditors, create a curriculum map, or otherwise get organized.</td>
</tr>
<tr>
<td>71</td>
<td>As faculty, I want to know what library exhibits or events my students (or faculty colleagues) attend</td>
<td>so that I can build on those experiences in my class or practice.</td>
</tr>
<tr>
<td>LIILA #</td>
<td>As [stakeholder],</td>
<td>I want [to be able to do an activity, to have an awareness, to take an action]</td>
</tr>
<tr>
<td>---------</td>
<td>------------------</td>
<td>-----------------------------------------------------------------</td>
</tr>
<tr>
<td>74</td>
<td>As faculty,</td>
<td>I want to know the courses in my department that include library instruction</td>
</tr>
<tr>
<td>80</td>
<td>As an academic advisor,</td>
<td>I want to know if students who are contacted by or referred to librarians for consultations or instruction</td>
</tr>
<tr>
<td>82</td>
<td>As an academic advisor,</td>
<td>I want to know whether students who are struggling</td>
</tr>
<tr>
<td>83</td>
<td>As an academic advisor,</td>
<td>I want to know whether students who are struggling</td>
</tr>
<tr>
<td>84</td>
<td>As an academic advisor,</td>
<td>I want to know whether students who are struggling</td>
</tr>
<tr>
<td>LIILA #</td>
<td>As [stakeholder],</td>
<td>I want [to be able to do an activity, to have an awareness, to take an action]</td>
</tr>
<tr>
<td>---------</td>
<td>------------------</td>
<td>---------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>89</td>
<td>As an institutional researcher,</td>
<td>I want to know whether or the degree to which including library data in institutional learning analytics</td>
</tr>
<tr>
<td>90</td>
<td>As an institutional researcher,</td>
<td>I want to know whether and to what degree librarian interactions with identified student populations influence their short- or long-term student success so that I can facilitate connections with librarians and improve student outcomes.</td>
</tr>
<tr>
<td>93</td>
<td>As an institutional leader,</td>
<td>I want to know how academic support services (advising, library, tutoring, writing support, labs, learning technology, etc.) contribute to student success measures so that I can better understand the effectiveness of each and make informed resource decisions.</td>
</tr>
<tr>
<td>94</td>
<td>As an institutional leader,</td>
<td>I want to know how academic support services (advising, library, tutoring, writing support, labs, learning technology, etc.) contribute to student engagement measures so that I can better understand the effectiveness of each and make informed resource decisions.</td>
</tr>
<tr>
<td>LIILA #</td>
<td>As [stakeholder],</td>
<td>I want [to be able to do an activity, to have an awareness, to take an action]</td>
</tr>
<tr>
<td>--------</td>
<td>-----------------</td>
<td>--------------------------------------------------------------------------</td>
</tr>
<tr>
<td>95</td>
<td>As an institutional leader,</td>
<td>I want to know how research support services</td>
</tr>
</tbody>
</table>

This list of user stories about student use of library services is neither exhaustive nor prescriptive; these examples are intended for illustration and inspiration only.

**Continue the Conversation**

*Pause a moment and reflect upon the questions below, individually, in dialogue with your library colleagues, or in collaboration with institutional partners.*

Do any of the user stories above resonate at your library? Which ones? If there are several, which user stories might be most important to consider first?

________________________________________________________________________________________
________________________________________________________________________________________
________________________________________________________________________________________
________________________________________________________________________________________

What additional user stories might your students generate about their use of library services? (Not a student? Ask some! Be sure to include students from underrepresented groups.)

*Example: As [stakeholder], I want [to be able to do an activity, to have an awareness, to take an action] in order to [achieve outcome, solve problem, meet need].*

As a student, I want ________________________________________________
____________________________________________________________________________________________________________________________________
in order to __________________________________________________________________________
___________________________________________________________________________________.

As a student, I want ________________________________________________
____________________________________________________________________________________________________________________________________
in order to __________________________________________________________________________
___________________________________________________________________________________.
As a student, I want ____________________________
______________________________
in order to __________________________
______________________________.
As a student, I want ____________________________
______________________________
in order to __________________________
______________________________.

Librarians, what additional user stories might you create about your students’ use of library services? (Not a librarian? Ask some!)

Example: As [stakeholder], I want [to be able to do an activity, to have an awareness, to take an action] in order to [achieve outcome, solve problem, meet need].

As a librarian, I want ____________________________
______________________________
in order to __________________________
______________________________.
As a librarian, I want ____________________________
______________________________
in order to __________________________
______________________________.
As a librarian, I want ____________________________
______________________________
in order to __________________________
______________________________.
As a librarian, I want ____________________________
______________________________
in order to __________________________
______________________________.
Faculty, what additional user stories might you create about your students' use of library services? (Not faculty? Ask some!)

Example: As [stakeholder], I want [to be able to do an activity, to have an awareness, to take an action] in order to [achieve outcome, solve problem, meet need].

As faculty, I want __________________________________________________________________________
___________________________________________________________________________________
in order to __________________________________________________________________________
___________________________________________________________________________________.

As faculty, I want __________________________________________________________________________
___________________________________________________________________________________
in order to __________________________________________________________________________
___________________________________________________________________________________.

As faculty, I want __________________________________________________________________________
___________________________________________________________________________________
in order to __________________________________________________________________________
___________________________________________________________________________________.

As faculty, I want __________________________________________________________________________
___________________________________________________________________________________
in order to __________________________________________________________________________
___________________________________________________________________________________.

Academic advisors/support team, what additional user stories might you create about your students' use of library services? (Not an advisor/support team member? Ask some!)

Example: As [stakeholder], I want [to be able to do an activity, to have an awareness, to take an action] in order to [achieve outcome, solve problem, meet need].

As an advisor or support team member, I want ________________________________________
___________________________________________________________________________________
in order to __________________________________________________________________________
___________________________________________________________________________________.

As an advisor or support team member, I want ________________________________________
___________________________________________________________________________________
in order to __________________________________________________________________________
___________________________________________________________________________________.

As an advisor or support team member, I want ________________________________________
___________________________________________________________________________________
in order to __________________________________________________________________________
___________________________________________________________________________________.
As an advisor or support team member, I want ________________________________
__________________________________________________________________________
in order to ________________________________________________________________
__________________________________________________________________________.

As an advisor or support team member, I want ________________________________
__________________________________________________________________________
in order to ________________________________________________________________
__________________________________________________________________________.

As an advisor or support team member, I want ________________________________
__________________________________________________________________________
in order to ________________________________________________________________
__________________________________________________________________________.

Library/institutional administrators, what additional user stories might you create about students’ use of library services? (Not an administrator? Ask some!)

Example: As [stakeholder], I want [to be able to do an activity, to have an awareness, to take an action] in order to [achieve outcome, solve problem, meet need].

As an administrator, I want ________________________________________________
__________________________________________________________________________
in order to ________________________________________________________________
__________________________________________________________________________.

As an administrator, I want ________________________________________________
__________________________________________________________________________
in order to ________________________________________________________________
__________________________________________________________________________.

As an administrator, I want ________________________________________________
__________________________________________________________________________
in order to ________________________________________________________________
__________________________________________________________________________.

As an administrator, I want ________________________________________________
__________________________________________________________________________
in order to ________________________________________________________________
__________________________________________________________________________.
Reflecting upon the user stories you’ve recorded above…

Which of these user stories might be informed by collecting additional data about student use of library services and linking it to other institutional data?
________________________________________________________________________________________
________________________________________________________________________________________
________________________________________________________________________________________
________________________________________________________________________________________

What else has your dialogue surfaced?
________________________________________________________________________________________
________________________________________________________________________________________
________________________________________________________________________________________
________________________________________________________________________________________
________________________________________________________________________________________

What action steps might you take to move forward?
________________________________________________________________________________________
________________________________________________________________________________________
________________________________________________________________________________________
________________________________________________________________________________________

5.3.3 Selecting Data for the LibraryParticipationEvent

In order to answer questions or achieve the goals expressed in user stories related to student use of library services, librarians may need to identify and capture a variety of data. As an initial step, LIILA participants brainstormed data categories and sources that might be related to library service use (see Figure D) and could be meaningfully paired with institutional student data (see examples in Figure B in section 5.1.3).
<table>
<thead>
<tr>
<th>STUDENT-LIBRARY INTERACTION</th>
<th>CATEGORY</th>
<th>SOURCE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Reference</td>
<td>Physical desk transaction</td>
<td>DeskTracker, card swipes, …</td>
</tr>
<tr>
<td></td>
<td>Student/faculty librarian consultations</td>
<td>DeskTracker, spreadsheets, …</td>
</tr>
<tr>
<td></td>
<td>Peer research consultations</td>
<td>Desk Tracker</td>
</tr>
<tr>
<td></td>
<td>Reference chat/IM/text/ SMS participation</td>
<td>OCLC QuestionPoint, Library H3lp, transcripts, …</td>
</tr>
<tr>
<td></td>
<td>Reference email participation</td>
<td>QuestionPoint</td>
</tr>
<tr>
<td></td>
<td>Referrals to librarians from other systems (Advising/iPASS/Early Warning)</td>
<td>Starfish, APLUS, EAB, APAS, DARWin, Student Explorer, eCoach, …</td>
</tr>
<tr>
<td></td>
<td>Archives, special collections consultations</td>
<td>DeskTracker</td>
</tr>
<tr>
<td>Instruction</td>
<td>Library instruction participation</td>
<td>Class rosters, Springshare LibCal</td>
</tr>
<tr>
<td></td>
<td>Workshop registration/participation</td>
<td>Sign in sheet, Drupal, Springshare LibCal, …</td>
</tr>
<tr>
<td></td>
<td>Library instructional content usage (videos, tutorials, …)</td>
<td>Google Analytics</td>
</tr>
<tr>
<td></td>
<td>Event/exhibit participation</td>
<td>Class rosters, guest books, swipe card, sign in sheets, …</td>
</tr>
</tbody>
</table>

Figure D. Student-Library Service Interaction Data
In the Caliper library profile, the LibraryParticipationEvent includes data about student participation in library services. Library services might be described by activity type (e.g., reference, instruction, outreach, exhibit), the mode of interaction (e.g., in-person, online, chat, email), synchronicity, association with a particular course or term, etc. Importantly, the LibraryParticipationEvent may be de-specified to a level of “a person attended a library service or activity,” specified to a level of “a specific person attended a specific library service or activity at a specific time,” or determined at some midpoint in between the two, describing the event to a level of specificity that a library deems necessary to answer an important question or enable a stakeholder (e.g., student, faculty, librarian, educational partner, researcher, administrator) to achieve a goal, solve a problem, or meet a need.

The design of the LibraryParticipationEvent enables libraries and institutions to determine the type, amount, and level of detail conveyed in an event, ensuring alignment with library values, ethics, and standards as well as both library and institutional policies and practices. At the de-specified end of this continuum (i.e., “a person attended a library service or activity”), little more than an attendance count might be achieved. At the specified end of the continuum (i.e., “a specific person attended a specific library service or activity at a specific time”), one might be able to link particular student characteristics typically maintained in institutional record stores (e.g., gender, major, GPA) with participation in a specific service or activity type (e.g., reference, instruction) or even an individual service or activity interaction (e.g., recorded in a service transaction log, classified according to external reporting requirements) at a particular time (e.g., week of term) to learn about the contributions of student participation of library services at particular times in a course, term, or overall educational journey to their learning and success outcomes (e.g., assignment rubric score, course grade, velocity to completion). Decisions about which, how much, and how detailed the collected information needs to be should be made by librarians based on the questions, goals, problems, and needs an individual library must address in order to serve its students equitably, effectively, and ethically and weighed against whether a library and its overarching institution has deployed and actively maintains policies, procedures, practices, and governance to protect student confidentiality.

Continue the Conversation

Pause a moment and reflect upon the questions below, individually, in dialogue with your library colleagues, or in collaboration with institutional partners.

What systems in your library collect data about student use of library services?
________________________________________________________________________________________
________________________________________________________________________________________
________________________________________________________________________________________
________________________________________________________________________________________

What library services can be identified as sub-categories (e.g., reference, instruction, outreach, exhibits)? Would knowing about use of those categories be useful in decision-making or action-taking for student support? Are there systems in place to collect data about student use of these categories? What are those systems?
________________________________________________________________________________________
________________________________________________________________________________________
What kind of information is necessary to answer questions or achieve goals expressed in user stories related to student use of library services? What type, amount, and/or level of detail about student service use is required?

What library service use information is not desirable, or perhaps not ethical, to collect regardless of how useful it might be in serving students equitably and effectively?

What action steps might you take to move forward?

5.3.4 Using the LibraryParticipationEvent to Support Students

Library services might be better designed to meet the needs of all (not just “average”) students if librarians had access to more detailed information about student academic needs and environments. Librarians who know, either individually or in the aggregate, what courses student are enrolled in, what resources are on their reading lists, what information resources their assignments require, what deadlines they face, etc., could use that information to connect students with services in more timely and equitable ways.

Librarians could serve students more effectively if they knew more about what library services make a difference for students, which students can benefit the most, and when in a course or program the services are most needed. Information resulting from LibraryParticipationEvent data capture might help librarians determine whether students who interact with library reference services, participate in library instruction in its various forms (e.g., one-shots, tutorials, subject guides, drop-in workshops, course- or curriculum-integrated instruction, for-credit courses), attend outreach events, or view exhibits meet (or exceed) intended learning outcomes more deeply, more easily, or more speedily;
earn better assignment or course grades; are more engaged in learning experiences; persist in their educational pursuits; complete, transfer, or graduate successfully and/or on time; secure employment in accordance with their intent; earn an appropriate income; and/or achieve other goals or markers of success as defined by students themselves or their institutions.

This information might also enable librarians to better understand the efficacy of library services; improve, customize, or personalize services; advocate for more resources to support services including personnel, staffing, professional development, or collections; encourage students to interact with library services using evidence-based rationales; and/or engage faculty in curricular or assignment designs that incorporate library services more intentionally. By adding academic context to librarian understanding of student needs, learning analytics could enable librarians to capture the type, content, course connections, information literacy outcomes, or other content of service transactions; view course outcomes, curricular problem areas, assignment sticking points, and other aspects of specific courses students take; receive or recommend student referrals for learning support; provide feedback or ideas for follow up to students, advisors, or faculty; view student progress of information literacy outcomes over time individually, in the aggregate, or by cohort; or make other linkages that benefit students.

Librarians could share their new knowledge to ensure that students become aware of successful learning practices; gauge their own learning behaviors against uncovered “best practices” or—if they wish—an aggregated representation of peers’ learning behaviors; discover library services to support their learning; reduce anxiety associated with initiating service queries; sequence their academic workflows to include interactions with librarians when appropriate; save time and avoid frustration in completing their academic workload; and establish relationships with librarians as part of their support team within their institutions. In this way, learning analytics could enable librarians and students to co-create learning experiences via service interactions that help students learn information literacy and disciplinary content, connect them with librarians who play a unique role in their individual learning team, and empower them to achieve their personal and professional goals in a supported, customized, and facilitated environment.

Librarians who provide instructional services may be able to identify outcomes that are over-or under-taught; scaffold instruction through or across curricular and co-curricular programs; contribute to assessment of information literacy outcomes in assignments, courses, and programs; pinpoint learning content with which students struggle and advise or enact instructional improvements in those areas; encourage students to follow up or through with learning supports; provide real-time encouragement, support, or reinforcement as students engage with information literacy content, and the like. As a result, students could benefit from more relevant and timely instructional offerings, improved instructional delivery, more intentionally designed instructional experiences, and customized—or even personalized—library instruction powered by more evidence-based learner needs assessments. Students may discover library resources and services, previously unknown to them, that support their learning. They may experience less instructional repetition and engage with different or deeper learning outcomes and concepts. Students may receive faster, more useful feedback on their learning activities as well as encouragement or extra support for personal trouble spots in their individual learning journey or engagement with difficult curriculum. They may benefit from a stronger rapport and connection with librarians and faculty instructors who are better able to target and time instruction; students may therefore build stronger instructional relationships.

Across the institution, more informed understanding of student needs could enable librarians to become full partners in the academic team by linking them to course and curricular information, engaging them in assessments of information literacy learning, and allowing real time librarian assistance and feedback to students engaged in curricular and co-curricular learning activities.
Learning analytics could enable librarians to build ongoing educational relationships with students, observe longitudinal student progress toward information literacy learning; contribute more substantially to department-, unit-, or institution-level information literacy learning outcomes; and generally transform the level of integration of librarians in the teaching and learning process. As a result of such informed, intentionally designed, and responsive instruction, students may experience greater agency, feel more connected, overcome learning hurdles, and ultimately learn more.35

5.3.5 LibraryParticipationEvent Walk-Through

The Caliper library profile LibraryParticipationEvent focuses on the use of library services. Like all Caliper events, the core structure of the LibraryParticipationEvent is comprised of an “actor,” “action,” and “object.” For the LibraryParticipationEvent, the “action” of the event is defined as “attended” and the object is defined as a “library activity.” Any or all of the elements in the LibraryParticipationEvent can be de-specified so that no identifying information is conveyed. For example, an “actor” can be described as a generic “person” or “student.” Because the time stamp on a Caliper event is the time the event is created for transmission to a data store, these transmissions can be batched and/or reordered out of actual sequence or generalized to a particular day/month/year, so that the specific time of library service use can be obscured. Individual libraries, in collaboration with their institutions and users, can decide to include a description of the type of activity (e.g., reference, instruction, outreach, exhibit); the mode of interaction (e.g., in-person, online conference, email, chat, text, phone, social media, appointment, consultation, roving, embedded); how the interaction was intended to be consumed (e.g., synchronous, asynchronous); how the actor participated in the activity (e.g., in-person, online); the location of the activity; a scheduled or actual time for or duration of the activity; learning outcomes associated with the activity; a course offering or section associated with the activity; an academic term in which the activity occurred; for reference, a description for reporting purposes (e.g., directional, reference); and for exhibits, the mode of the activity (e.g., in-person, online, traveling, pop-up). All of this additional information is optional, not required, enabling libraries and institutions to align their data practices with their values, ethics, standards, policies, and practices. Details and examples of the LibraryParticipationEvent can be found in the Caliper library profile in section 7.1 and online at https://www.imsglobal.org/spec/caliper-library/v1p2.

Continue the Conversation
Pause a moment and reflect upon the questions below, individually, in dialogue with your library colleagues, or in collaboration with institutional partners.

What questions do you have about the Caliper LibraryParticipationEvent?
________________________________________________________________________________________
________________________________________________________________________________________
________________________________________________________________________________________
________________________________________________________________________________________

What concerns do you have about the LibraryParticipationEvent?
________________________________________________________________________________________
________________________________________________________________________________________
What parts of the LibraryParticipationEvent would you want to anonymize? Why?
________________________________________________________________________________________
________________________________________________________________________________________
________________________________________________________________________________________
________________________________________________________________________________________
What parts of the LibraryParticipationEvent would you want to specify? Why?
________________________________________________________________________________________
________________________________________________________________________________________
________________________________________________________________________________________
________________________________________________________________________________________
What action steps might you take to move forward?
________________________________________________________________________________________
________________________________________________________________________________________
________________________________________________________________________________________
6.0 CLLASS NEXT STEPS

The CLLASS project resulted in the creation of the first library profile for an industry-recognized interoperability standard for education. The Caliper library profile enables siloed library systems to provide uniform data about student library interactions in a simple format and convey that data to centralized institutional record stores, thereby enabling analysis of library data in conjunction with institutional data to increase understanding of student learning and success. This advance marks a significant step in the technical ability of libraries to contribute data to institutional learning analytics efforts. At the same time, the design of the profile ensures that individual libraries can control the collection and use of library data in alignment with their values, ethics, and standards, as well as with library and institutional policies and practices. Building upon the user stories developed as a part of the LIILA project and the library profile created by the CLLASS project, the next logical step of library learning analytics is pilot testing the implementation of the profile and validating its efficacy in capturing and conveying library data to centralized locations to enable analysis and action in support of student success.
7.0 APPENDICES

A number of resources are useful in understanding the Caliper library profile, including the profile itself, recommended reading, and selected privacy resources.

7.1 Caliper Library Profile

While interoperability standards evolve, the initial version of the Caliper library profile can be found below. For updates, please reference the library profile online at: https://www.imsglobal.org/spec/caliper-library/v1p2.
Caliper Analytics®
Library Use Profile
IMS Candidate Final Public
Version 1.2-extension

IMS Candidate Final Public

Date Issued: 20 November 2020

Status: This document is for review and adoption by the IMS membership.

This version: https://www.imsglobal.org/spec/caliper-libraryuse/v1p2-extension/

Latest version: https://www.imsglobal.org/spec/caliper-libraryuse/latest/

Errata: https://www.imsglobal.org/spec/caliper-libraryuse/v1p2-extension/errata/

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1. ABSTRACT

This document extends Caliper 1.2 by defining a Library Profile that describes usage of library facilities, the library's physical and electronic resources, and interactions with library staff.

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2. OVERVIEW

2.1 Design Goals and Rationale

This section is non-normative.

This document extends Caliper 1.2 by defining a Library Profile that describes usage of library facilities, the library’s physical and electronic resources, and interactions with library staff.

The Caliper Library Profile models a Person making use of a Library, LibrarySpace, or a Library Resource. The profile defines a LibraryUseEvent, a LibraryResourceUseEvent, and a LibraryParticipationEvent for describing library-related activities all with the end goal of improving library support of student learning and success.

2.2 User Stories

This section is non-normative.

The Library Profile supports the following user stories:

- As a librarian,
  - I would like to understand the extent to which library spaces are used for course-assigned activities.
  - I would like to control the level of specificity of the identity or interaction the library enters into the learner record store.

- As a student,
  - I would like to gauge my viewing of course readings and use of library resources in comparison to my peers.
  - I would like to gauge my use of library services in comparison to my peers.
  - I would like to have a record of the library resources I have used.

- As a researcher, librarian, instructor, or student,
I would like to determine if there is a correlation between student viewing of course readings or use of library resources and measures of student success.

I would like to determine if there is a correlation between student use of library spaces and measures of student success.

I would like to determine if there is a correlation between student engagement with library services and measures of student success.

Additional user stories can be found in M. Oakleaf, *Library Integration in Institutional Analytics* (November, 2018).

2.3 Terminology

All terminology used in this specification is concordant with the term definitions in the Caliper 1.2 Specification [CALIPER-12].

2.4 Conformance Statements

As well as sections marked as non-normative, all authoring guidelines, diagrams, examples, and notes in this specification are non-normative. Everything else in this specification is normative.

The key words “MAY”, “MUST”, “MUST NOT”, “OPTIONAL”, “RECOMMENDED”, “REQUIRED”, “SHALL”, “SHALL NOT”, “SHOULD”, and “SHOULD NOT” in this document are to be interpreted as described in [RFC2119].

An implementation of this specification that fails to implement a MUST/REQUIRED/SHALL requirement or fails to abide by a MUST NOT/SHALL NOT prohibition is considered nonconformant. SHOULD/SHOULD NOT/RECOMMENDED statements constitute a best practice. Ignoring a best practice does not violate conformance but a decision to disregard such guidance should be carefully considered. MAY/OPTIONAL statements indicate that implementers are entirely free to choose whether or not to implement the option.

The Conformance and Certification Guide for this specification may introduce greater normative constraints than those defined here for specific service or implementation categories.

2.5 Document Set

2.5.1 Normative Documents

Caliper 1.2

This profile is an extension to the Caliper 1.2 specification [CALIPER-12]. All requirements in the Caliper 1.2 specification also apply to implementations of this specification.

JSON-LD Context

The JSON-LD Context for this profile defines all relevant term-IRI mappings [CALIPER-LIBRARY-12-CONTEXT].
Errata

The errata [CALIPER-LIBRARY-12-ERRATA] details any errata registered for this version of this specification since its publication.

Conformance and Certification guide

The conformance and certification guide that accompanies the Caliper 1.2 specification defines the conformance requirements for Caliper Sensors [CALIPER-12-CERT].

2.5.2 Informative Documents

This section is non-normative.

Caliper 1.2 Implementation Guide

The implementation guide that accompanies the Caliper 1.2 specification provides advice and guidance for implementors [CALIPER-12-IMPL].

3. EVENTS

The Library Profile is provisioned with a LibraryUseEvent for logging use of library facilities, a LibraryResourceUseEvent for describing the use of library-owned or licensed assets by library users, and a LibraryParticipationEvent for recording attendance at library-related activities.

3.1 LibraryUseEvent

A Caliper LibraryUseEvent models the use of library facilities.

IRI: https://purl.imsglobal.org/caliper/LibraryUseEvent

Term

LibraryUseEvent

Supertype

Event

Properties

The LibraryUseEvent inherits all properties defined by its supertype Event, of which id, type, actor, action, object, and eventTime are required. Profile-specific type restrictions are described below:

<table>
<thead>
<tr>
<th>Property</th>
<th>Type</th>
<th>Description</th>
<th>Disposition</th>
</tr>
</thead>
<tbody>
<tr>
<td>type</td>
<td>Term</td>
<td>The string value MUST be set to the Term LibraryUseEvent.</td>
<td>Required</td>
</tr>
<tr>
<td>Field</td>
<td>Type</td>
<td>Description</td>
<td></td>
</tr>
<tr>
<td>-------------------------------</td>
<td>----------</td>
<td>-----------------------------------------------------------------------------</td>
<td></td>
</tr>
<tr>
<td>actor</td>
<td>Person</td>
<td>The Person who initiated the action. The actor value MUST be expressed either as an object or as a string corresponding to the actor's IRI.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>IRI</td>
<td></td>
<td></td>
</tr>
<tr>
<td>action</td>
<td>Term</td>
<td>The action or predicate that binds the actor or subject to the object. The value range is limited to the Used action only.</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>object</td>
<td>Library</td>
<td>The Library or LibrarySpace that constitutes the object of the interaction. The object value MUST be expressed either as an object or as a string corresponding to the object's IRI.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>LibrarySpace</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>IRI</td>
<td></td>
<td></td>
</tr>
<tr>
<td>presenceDerivedFromSource</td>
<td>string</td>
<td>A non-standardized description of the source used to indicate presence in a Library. Examples include: wifi, reservation, swipe card, sign in.</td>
<td></td>
</tr>
<tr>
<td>presenceDerivedFromID</td>
<td>string</td>
<td>An identifier that correlates to the presenceDerivedFromSource to indicate which specific source was used if needed, for example, the MAC address of the WiFi router or the ID of the card swipe machine.</td>
<td></td>
</tr>
</tbody>
</table>

### 3.1.1 JSON Examples

Below are examples of LibraryUseEvents that describes the use of Library and LibrarySpace entities.
For example, the MAC address of the WiFi router or the ID of the card swipe machine.

Below are examples of LibraryUseEvents that describes the use of Library and LibrarySpace entities.

Figure 1 - A Person Used a LibrarySpace. In this example:

- The actor is not identified.
- The object is not identified.

{
  "@context": "http://purl.imsglobal.org/ctx/caliper/v1p2/LibraryProfile-extension",
  "id": "urn:uuid:fd245e24-d9fa-4384-8b0a-7d08d632e63f",
  "type": "LibraryUseEvent",
  "profile": "LibraryProfile",
  "actor": {
    "id": "http://purl.imsglobal.org/caliper/Person",
    "type": "Person"
  },
  "action": "Used",
  "object": {
    "id": "http://purl.imsglobal.org/caliper/LibrarySpace",
    "type": "LibrarySpace"
  },
  "eventTime": "2021-11-15T10:15:00.000Z"
}

Figure 2 - A Person Used a LibrarySpace. In this example:

- The actor is not identified.
- The object is identified by the MAC address of the WiFi router in that space.

{
  "@context": "http://purl.imsglobal.org/ctx/caliper/v1p2/LibraryProfile-extension",
  "id": "urn:uuid:fd245e24-d9fa-4384-8b0a-7d08d632e63f",
  "type": "LibraryUseEvent",
  "profile": "LibraryProfile",
  "actor": {
    "id": "http://purl.imsglobal.org/caliper/Person",
    "type": "Person"
  },
  "action": "Used",
  "object": {
    "id": "https://example.edu/library/alcove2",
    "type": "LibrarySpace"
  },
  "eventTime": "2021-11-15T10:15:00.000Z",
  "presenceDerivedFromSource": "wifi",
  "presenceDerivedFromID": "00:A0:C9:14:C8:29"
}
3.2 LibraryResourceUseEvent

A Caliper **LibraryResourceUseEvent** models the use of the library's physical and electronic resources.

<table>
<thead>
<tr>
<th>IRI</th>
<th><a href="https://purl.imsglobal.org/caliper/LibraryResourceUseEvent">https://purl.imsglobal.org/caliper/LibraryResourceUseEvent</a></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Term</strong></td>
<td>LibraryResourceUseEvent</td>
</tr>
<tr>
<td><strong>Supertype</strong></td>
<td>Event</td>
</tr>
<tr>
<td><strong>Properties</strong></td>
<td>The <strong>LibraryResourceUseEvent</strong> inherits all properties defined by its supertype <strong>Event</strong>, of which id, type, actor, action, object, and eventTime are required. Profile-specific type restrictions are described below:</td>
</tr>
</tbody>
</table>

---

**Figure 3 - A Person Used the Library.** In this example:

- The actor is identified by a card swipe identifier.
- The object is identified.

```
{
  "@context": "http://purl.imsglobal.org/ctx/caliper/v1p2/LibraryProfile-extension",
  "id": "urn:uuid:fd245e24-d9fa-4384-8b0a-7d08d632e63f",
  "type": "LibraryUseEvent",
  "profile": "LibraryProfile",
  "actor": {
    "id": "https://example.edu/users/554433",
    "type": "Person"
  },
  "action": "Used",
  "object": {
    "id": "https://example.edu/library",
    "type": "Library",
    "name": "University Library"
  },
  "eventTime": "2021-11-15T10:15:00.000Z",
  "presenceDerivedFromSource": "swipe card",
  "presenceDerivedFromID": "951357456852"
}
```
<table>
<thead>
<tr>
<th>Property</th>
<th>Type</th>
<th>Description</th>
<th>Disposition</th>
</tr>
</thead>
<tbody>
<tr>
<td>type</td>
<td>Term</td>
<td>The string value MUST be set to the Term LibraryResourceUseEvent</td>
<td>Required</td>
</tr>
<tr>
<td>actor</td>
<td>Person</td>
<td>IRI</td>
<td>The Person who initiated the action. The actor value MUST be expressed either as an object or as a string corresponding to the actor's IRI.</td>
</tr>
<tr>
<td>action</td>
<td>Term</td>
<td>The action or predicate that binds the actor or subject to the object. The value range is limited to Accessed only.</td>
<td>Required</td>
</tr>
<tr>
<td>object</td>
<td>LibraryResource</td>
<td>DigitalResource</td>
<td>IRI</td>
</tr>
<tr>
<td>accessLocation</td>
<td>string</td>
<td>A non-standardized description of the user’s physical location from which the resource was accessed. Examples include: on-campus, off-campus.</td>
<td>Optional</td>
</tr>
<tr>
<td>forCourse</td>
<td>CourseOffering</td>
<td>CourseSection</td>
<td>IRI</td>
</tr>
</tbody>
</table>

### 3.2.1 JSON Examples

Below are examples of LibraryResourceUseEvent that describes the use of a LibraryResource entity.
Figure 4 - A Person Accessed a LibraryResource for a CourseOffering. In this example:

- The actor is not identified.
- The object is identified.

```json
{
    "@context": "http://purl.imsglobal.org/ctx/caliper/v1p2/LibraryProfile-extension",
    "id": "urn:uuid:ee80637e-0d57-4384-812b-f1f54810b195",
    "type": "LibraryResourceUseEvent",
    "profile": "LibraryProfile",
    "actor": {
        "id": "http://purl.imsglobal.org/caliper/Person",
        "type": "Person"
    },
    "action": "Accessed",
    "object": {
        "id": "https://example.edu/journals/231302",
        "type": "LibraryResource",
        "name": "Journal of Library Assessment"
    },
    "accessLocation": "off-campus",
    "eventTime": "2021-11-15T10:15:00.000Z",
    "forCourse": {
        "id": "https://example.edu/terms/202103/courses/7",
        "type": "CourseOffering",
        "courseNumber": "INFO 567"
    }
}
```
3.3 LibraryParticipationEvent

A Caliper LibraryParticipationEvent models a Person participating in an appointment, meeting, lecture, workshop, or any other library function, whether ad-hoc or scheduled or in any location.

IRI

https://purl.imsglobal.org/caliper/LibraryParticipationEvent

Term

LibraryParticipationEvent

Supertype

Event
The **LibraryParticipationEvent** inherits all properties defined by its supertype **Event**, of which *id*, *type*, *actor*, *action*, *object*, and *eventTime* are required. Profile-specific type restrictions are described below:

<table>
<thead>
<tr>
<th>Property</th>
<th>Type</th>
<th>Description</th>
<th>Disposition</th>
</tr>
</thead>
<tbody>
<tr>
<td>type</td>
<td>Term</td>
<td>The string value MUST be set to the <strong>Term</strong> LibraryParticipationEvent.</td>
<td>Required</td>
</tr>
<tr>
<td>actor</td>
<td>Person</td>
<td>IRI</td>
<td>The Person who initiated the action. The <strong>actor</strong> value MUST be expressed either as an <strong>object</strong> or as a string corresponding to the actor’s <strong>IRI</strong>.</td>
</tr>
<tr>
<td>action</td>
<td>Term</td>
<td>The action or predicate that binds the <strong>actor</strong> or subject to the <strong>object</strong>. The value range is limited to the <strong>Attended</strong> only.</td>
<td>Required</td>
</tr>
<tr>
<td>object</td>
<td>LibraryActivity</td>
<td>IRI</td>
<td>The <strong>LibraryActivity</strong> that constitutes the <strong>object</strong> of the interaction. The <strong>object</strong> value MUST be expressed either as an object or as a string corresponding to the object’s <strong>IRI</strong>.</td>
</tr>
<tr>
<td>participationMode</td>
<td>string</td>
<td>A non-standardized description of how the Person participated in the LibraryActivity. Examples include: <strong>online</strong>, <strong>in-person</strong>.</td>
<td>Optional</td>
</tr>
<tr>
<td>forCourse</td>
<td>CourseOffering</td>
<td>CourseSection</td>
<td>IRI</td>
</tr>
<tr>
<td>arrivalTime</td>
<td>DateTime</td>
<td>An ISO 8601 date and time value. The value MUST be set to UTC with no offset specified.</td>
<td>Optional</td>
</tr>
</tbody>
</table>
3.3.1 JSON Examples

Below are examples of LibraryParticipationEvent that describes participation in a LibraryActivity entity.

Figure 6 - A Person Attended a LibraryActivity for a CourseOffering. In this example:

- The actor is not identified.
- The object is identified.

```
{
  "@context": "http://purl.imsglobal.org/ctx/caliper/v1p2/LibraryProfile-extension",
  "id": "urn:uuid:fd245e24-d9fa-4384-8b0a-7d08d632e666",
  "type": "LibraryParticipationEvent",
  "profile": "LibraryProfile",
  "actor": {
    "id": "http://purl.imsglobal.org/caliper/Person",
    "type": "Person"
  },
  "action": "Attended",
  "object": {
    "id": "https://example.edu/library/events/3",
    "type": "LibraryActivity"
  },
  "eventTime": "2021-11-06T19:30:00.000Z",
  "participationMode": "in-person"
}
```
4. ACTIONS

4.1 Accessed

The Accessed action signals that some Entity was opened, loaded, or retrieved.

IRI

https://purl.imsglobal.org/caliper/actions/Accessed

Term

Accessed

Related Gloss(es)

WordNet: access - reach or gain access to

Supported by

Event, LibraryResourceUseEvent
4.2 Attended

The Attended action signals that a Person was present at a LibraryActivity.

IRI

https://purl.imsglobal.org/caliper/actions/Attended

Term

Attended

Related Gloss(es)

WordNet: attend - be present at

Supported by

Event, LibraryParticipationEvent

4.3 Used

The Used action signals that an Agent utilized or employed an Entity for some purpose.

IRI

https://purl.imsglobal.org/caliper/actions/Used

Term

Used

Related Gloss(es)

WordNet: utilise, use, employ, utilize, apply - put into service; make work or employ for a particular purpose or for its inherent or natural purpose

Supported by

Event, ToolUseEvent, LibraryUseEvent

5. ENTITIES

5.1 Library

A Caliper Library entity represents libraries, archives, museums, and other cultural memory institutions and their sub-organizations.

As a subtype of Organization, a Library can act as an Agent. It can be linked both to a parent Organization and to its members.

IRI

http://purl.imsglobal.org/caliper/Library

Term

Library
Supertype

**Organization**

Properties

Library inherits all properties defined by its supertype **Organization**, of which id and type are required. LibrarySpace is also provisioned with the additional properties buildingName, buildingNumber. Additional type restrictions are described below:

<table>
<thead>
<tr>
<th>Property</th>
<th>Type</th>
<th>Description</th>
<th>Disposition</th>
</tr>
</thead>
<tbody>
<tr>
<td>type</td>
<td>Term</td>
<td>The string value MUST be set to the Term Library.</td>
<td>Required</td>
</tr>
<tr>
<td>buildingName</td>
<td>string</td>
<td>The building name for this Library.</td>
<td>Optional</td>
</tr>
<tr>
<td>buildingNumber</td>
<td>string</td>
<td>The building number for this Library.</td>
<td>Optional</td>
</tr>
</tbody>
</table>

5.1.1 JSON Examples

Below are examples of **Library** entities.

Figure 8 - A simple Library entity.

```json
{
    "@context": "http://purl.imsglobal.org/ctx/caliper/v1p2/LibraryProfile-extension",
    "id": "https://example.edu/library",
    "type": "Library",
    "name": "University Library"
}
```

Figure 9 - A Library with building information and specifying a parent Organization.

```json
{
    "@context": "http://purl.imsglobal.org/ctx/caliper/v1p2/LibraryProfile-extension",
    "id": "https://example.edu/library",
    "type": "Library",
    "name": "University Library",
    "description": "The primary library building on campus."
    "buildingName": "Main Library Building",
    "buildingNumber": "100",
    "subOrganizationOf": {
        "id": "https://example.edu/coolschool",
        "type": "Organization"
    }
}
```
5.2 LibraryActivity

A Caliper LibraryActivity entity represents an activity organized or led by library staff or convened in a LibrarySpace.

IRI

https://purl.imsglobal.org/caliper/LibraryActivity

Term

LibraryActivity

Supertype

Entity

Properties

LibraryActivity inherits all properties defined by its supertype Entity, of which id and type are required. Additional type restrictions are described below:

<table>
<thead>
<tr>
<th>Property</th>
<th>Type</th>
<th>Description</th>
<th>Disposition</th>
</tr>
</thead>
<tbody>
<tr>
<td>type</td>
<td>Term</td>
<td>The string value MUST be set to the Term LibraryActivity.</td>
<td>Required</td>
</tr>
<tr>
<td>activityType</td>
<td>string</td>
<td>A non-standardized description of type of activity. Examples include: reference, instruction, outreach, exhibit.</td>
<td>Optional</td>
</tr>
<tr>
<td>interactionMode</td>
<td>string</td>
<td>A non-standardized description of the mode of interaction. Examples include: in-person, online conference, chat, text, social media, phone, appointment, consultation, roving, embedded, email.</td>
<td>Optional</td>
</tr>
<tr>
<td>synchronicity</td>
<td>Term</td>
<td>A description of how the LibraryActivity was intended to be consumed. Allowable values are: synchronous, asynchronous, both.</td>
<td>Optional</td>
</tr>
<tr>
<td>location</td>
<td>Library</td>
<td>LibrarySpace</td>
<td>IRI</td>
</tr>
<tr>
<td>Field</td>
<td>Type</td>
<td>Description</td>
<td>Optional</td>
</tr>
<tr>
<td>---------------------</td>
<td>--------------</td>
<td>-----------------------------------------------------------------------------</td>
<td>----------</td>
</tr>
<tr>
<td>scheduledTime</td>
<td>DateTime</td>
<td>An ISO 8601 date and time value. The value MUST be set to UTC with no offset specified.</td>
<td>Optional</td>
</tr>
<tr>
<td>actualTime</td>
<td>DateTime</td>
<td>An ISO 8601 date and time value. The value MUST be set to UTC with no offset specified.</td>
<td>Optional</td>
</tr>
<tr>
<td>duration</td>
<td>Duration</td>
<td>The duration of the LibraryActivity. If a duration is specified the value MUST conform to the ISO 8601 duration format.</td>
<td>Optional</td>
</tr>
<tr>
<td>forCourse</td>
<td>CourseOffering</td>
<td>If the LibraryActivity is intended for a specific CourseOffering or CourseSection it can be referenced here.</td>
<td>Optional</td>
</tr>
<tr>
<td>academicSession</td>
<td>string</td>
<td>A string value that constitutes a human-readable identifier of the designated period in which this LibraryActivity occurs. Examples include: Fall 2016, Spring 2021.</td>
<td>Optional</td>
</tr>
<tr>
<td>exhibitMode</td>
<td>string</td>
<td>A non-standardized description of the mode of the exhibit. Examples include: in-person, online, hybrid online, traveling, pop-up.</td>
<td>Optional</td>
</tr>
<tr>
<td>reportingCategory</td>
<td>string</td>
<td>A non-standardized description to classify the type of interaction for external reporting (e.g., ACRL, ARL). Examples include: directional, technical, reference.</td>
<td>Optional</td>
</tr>
</tbody>
</table>
5.2.1 JSON Examples

Below are examples of LibraryActivity entities.

Figure 10 - A synchronous online instructional activity for a CourseOffering.

```json
{
    "@context": "http://purl.imsglobal.org/ctx/caliper/v1p2/LibraryProfile-extension",
    "id": "https://example.edu/library/events/3",
    "type": "LibraryActivity",
    "name": "Using Databases for Thesis Research",
    "activityType": "instruction",
    "interactionMode": "online conference",
    "synchronicity": "synchronous",
    "forCourse": {
        "id": "https://example.edu/terms/202103/courses/7",
        "type": "CourseOffering",
        "courseNumber": "EDU 601"
    },
    "scheduledTime": "2021-11-06T18:00:00.000Z",
    "duration": "18m",
    "academicSession": "Fall 2021"
}
```

Figure 11 - An asynchronous in-person exhibit in a LibrarySpace.

```json
{
    "@context": "http://purl.imsglobal.org/ctx/caliper/v1p2/LibraryProfile-extension",
    "id": "https://example.edu/library/events/56",
    "type": "LibraryActivity",
    "name": "A History of Dust",
    "activityType": "exhibit",
    "interactionMode": "in-person",
    "synchronicity": "asynchronous",
    "location": {
        "id": "https://example.edu/library/special_collections/22",
        "type": "LibrarySpace",
        "name": "Special Collections Reading Room"
    },
    "scheduledTime": "2021-11-06T18:00:00.000Z",
    "exhibitMode": "in-person"
}
```
5.3 LibraryResource

A Caliper LibraryResource is a generic type that represents any resource made available by a Library. Utilize LibraryResource only if no suitable subtype exists to represent the resource being described.

IRI

https://purl.imsglobal.org/caliper/LibraryResource

Term

LibraryResource

Supertype

Entity
**Properties**

*LibraryResource* inherits all properties defined by its supertype *Entity*, of which *id* and *type* are required. *LibraryResource* is also provisioned with the additional properties *name*, *physicalOrDigital*, *referrer*, *MARC008*, *resourceType*, and *otherIdentifiers* Additional type restrictions are described below:

<table>
<thead>
<tr>
<th>Property</th>
<th>Type</th>
<th>Description</th>
<th>Disposition</th>
</tr>
</thead>
<tbody>
<tr>
<td>type</td>
<td>Term</td>
<td>The string value MUST be set to the Term <em>LibraryResource</em>.</td>
<td>Required</td>
</tr>
<tr>
<td>physicalOrDigital</td>
<td>string</td>
<td>A description of how the LibraryResource is accessed. Values are: physical, digital.</td>
<td>Optional</td>
</tr>
<tr>
<td>marc008</td>
<td>string</td>
<td>A value drawn from the list of <em>MARC 008 Data Elements</em>.</td>
<td>Optional</td>
</tr>
<tr>
<td>learningObjectives</td>
<td>Array</td>
<td>An ordered collection of one or more <em>LearningObjective</em> entities that describe what a learner is expected to comprehend or accomplish after engaging with the resource. Each array item MUST be expressed either as an object or as a string corresponding to the item’s IRI.</td>
<td>Optional</td>
</tr>
</tbody>
</table>
### 5.3.1 JSON Examples

Below are examples of `LibraryResource` entities.

Figure 14 - A digital article with a DOI.

```json
{
  "@context": "http://purl.imsglobal.org/ctx/caliper/v1p2/LibraryProfile-extension",
  "id": "https://example.edu/articles/56445",
  "type": "LibraryResource",
  "physicalOrDigital": "digital",
  "resourceType": "article",
  "name": "Enriching College Students' Leadership Efficacy",
  "otherIdentifiers": [
    {
      "type": "SystemIdentifier",
      "identifier": "10.12806/V19/I4/R7",
      "identifierType": "DigitalObjectIdentifier"
    }
  ]
}
```

### 5.4 LibrarySpace

A Caliper `LibrarySpace` represents any space used for library services either permanently or temporarily.

**IRI**

http://purl.imsglobal.org/caliper/LibrarySpace

**Term**

LibrarySpace

**Supertype**

Entity
Figure 15 - A physical book with an ISBN.

{
    "@context": "http://purl.imsglobal.org/ctx/caliper/v1p2/LibraryProfile-extension",
    "id": "https://example.edu/equipment/0395487302",
    "type": "LibraryResource",
    "physicalOrDigital": "physical",
    "resourceType": "book",
    "name": "Dust: A History",
    "otherIdentifiers": [
        {
            "type": "SystemIdentifier",
            "identifier": "1234567890123",
            "identifierType": "InternationalStandardBookNumber"
        }
    ]
}

Figure 16 - A digital journal with a learning objective and an ISSN.

{
    "@context": "http://purl.imsglobal.org/ctx/caliper/v1p2/LibraryProfile-extension",
    "id": "https://example.edu/journals/231302",
    "type": "LibraryResource",
    "physicalOrDigital": "digital",
    "resourceType": "journal",
    "name": "Journal of Library Assessment",
    "learningObjectives": [
        {
            "id": "http://library.edu/services/library-instruction-services/library-learning-outcome",
            "type": "LearningObjective"
        }
    ],
    "otherIdentifiers": [
        {
            "type": "SystemIdentifier",
            "identifier": "1564-4587",
            "identifierType": "InternationalStandardSerialNumber"
        }
    ]
}
Figure 17 - An unidentified book with an LCCN class.

```
{
  "@context": "http://purl.imsglobal.org/ctx/caliper/v1p2/LibraryProfile-extension",
  "id": "https://purl.imsglobal.org/caliper/LibraryResource",
  "type": "LibraryResource",
  "resourceType": "book",
  "otherIdentifiers": [
    {
      "type": "SystemIdentifier",
      "identifier": "JK",
      "identifierType": "LibraryCongressCallNumber"
    }
  ]
}
```

Properties

`LibrarySpace` inherits all properties defined by its supertype `Entity`, of which `id` and `type` are required. `LibrarySpace` is also provisioned with the additional properties `buildingName`, `buildingNumber`, `roomNumber`, `floor`, `servicePoint`, `isPartOf`. Additional type restrictions are described below:

<table>
<thead>
<tr>
<th>Property</th>
<th>Type</th>
<th>Description</th>
<th>Disposition</th>
</tr>
</thead>
<tbody>
<tr>
<td>type</td>
<td><code>Term</code></td>
<td>The string value MUST be set to the <code>Term LibrarySpace</code>.</td>
<td>Required</td>
</tr>
<tr>
<td>buildingName</td>
<td><code>string</code></td>
<td>The building name for this space if it's in a building.</td>
<td>Optional</td>
</tr>
<tr>
<td>buildingNumber</td>
<td><code>string</code></td>
<td>The building number for this space if it's in a building.</td>
<td>Optional</td>
</tr>
<tr>
<td>roomNumber</td>
<td><code>string</code></td>
<td>The room number for this space if applicable.</td>
<td>Optional</td>
</tr>
<tr>
<td>floor</td>
<td><code>string</code></td>
<td>The floor for this <code>LibrarySpace</code>.</td>
<td>Optional</td>
</tr>
<tr>
<td>servicePoint</td>
<td><code>string</code></td>
<td>A non-standardized description of the location where the interaction happened. Examples include circulation desk, reference desk, roving reference.</td>
<td>Optional</td>
</tr>
</tbody>
</table>
isPartOf | Library | IRI
--- | --- | ---
A related Library that this LibrarySpace belongs to. The isPartOf value MUST be expressed either as an object or as a string corresponding to the associated entity’s IRI.
Optional

5.4.1 JSON Examples

Below are examples of **LibrarySpace** entities.

---

**Figure 18 - A reference desk in the 4th floor alcove.**

```json
{
    "@context": "http://purl.imsglobal.org/ctx/caliper/v1p2/LibraryProfile-extension",
    "id": "https://example.edu/library/alcoves/42",
    "type": "LibrarySpace",
    "name": "Alcove 4-2",
    "floor": "4",
    "servicePoint": "reference desk",
    "isPartOf": {
        "id": "https://example.edu/library",
        "type": "Library"
    }
}
```

**Figure 19 - An auditorium in another building used for a LibraryActivity.**

```json
{
    "@context": "http://purl.imsglobal.org/ctx/caliper/v1p2/LibraryProfile-extension",
    "id": "https://example.edu/humanities/auditoriums/1024",
    "type": "LibrarySpace",
    "name": "Humanities Auditorium",
    "buildingName": "Humanities Center of Excellence",
    "buildingNumber": "444",
    "roomNumber": "1024"
}
```

---

**A. SYSTEM IDENTIFIER TYPES**

Caliper provides a controlled vocabulary for enumerating various categories of **SystemIdentifier** types associated with a Caliper **Entity** that may prove meaningful when exchanging identifiers between systems (especially with respect to other IMS Global standards).
Digital Object Identifier (DOI)
Set the `SystemIdentifier.identifierType` string value to `DigitalObjectIdentifier` if the `SystemIdentifier` is a Digital Object Identifier (DOI).
IRI
http://purl.imsglobal.org/vocab/systemIdentifiers/DigitalObjectIdentifier
Term
DigitalObjectIdentifier

International Standard Book Number (ISBN)
Set the `SystemIdentifier.identifierType` string value to `InternationalStandardBookNumber` if the `SystemIdentifier` is an International Standard Book Number (ISBN).
IRI
http://purl.imsglobal.org/vocab/systemIdentifiers/InternationalStandardBookNumber
Term
InternationalStandardBookNumber

International Standard Serial Number (ISSN)
Set the `SystemIdentifier.identifierType` string value to `InternationalStandardSerialNumber` if the `SystemIdentifier` is an International Standard Serial Number.
IRI
http://purl.imsglobal.org/vocab/systemIdentifiers/InternationalStandardSerialNumber
Term
InternationalStandardSerialNumber

OCLC Number (OCN)
Set the `SystemIdentifier.identifierType` string value to `OCLCNumber` if the `SystemIdentifier` is an OCLC number.
IRI
http://purl.imsglobal.org/vocab/systemIdentifiers/OCLCNumber
Term
OCLCNumber

Library of Congress Call Number (LCCN)
Set the `SystemIdentifier.identifierType` string value to `LibraryCongressCallNumber` if the `SystemIdentifier` is a Library of Congress Call Number.
Dewey Decimal Call Number (DDC)
Set the SystemIdentifier.identifierType string value to DeweyDecimalCallNumber if the SystemIdentifier is a Dewey Decimal call number.

IRI
http://purl.imsglobal.org/vocab/systemIdentifiers/DeweyDecimalCallNumber

Term
DeweyDecimalCallNumber

Superintendent of Documents Classification (SuDoc)
Set the SystemIdentifier.identifierType string value to SuperintendentDocumentsClassification if the SystemIdentifier is a Superintendent of Documents Classification.

IRI
http://purl.imsglobal.org/vocab/systemIdentifiers/SuperintendentDocumentsClassification

Term
SuperintendentDocumentsClassification

Barcode
Set the SystemIdentifier.identifierType string value to Barcode if the SystemIdentifier is a Barcode.

IRI
http://purl.imsglobal.org/vocab/systemIdentifiers/Barcode

Term
Barcode

PubMed ID (PMID)
Set the SystemIdentifier.identifierType string value to PubMedID if the SystemIdentifier is a PubMed ID.

IRI
http://purl.imsglobal.org/vocab/systemIdentifiers/PubMedID

Term
PubMedID
LibGuide Identifier

Set the `SystemIdentifier.identifierType` string value to `LibGuideID` if the `SystemIdentifier` is a LibGuide identifier.

IRI

http://purl.imsglobal.org/vocab/systemIdentifiers/LibGuideID

Term

LibGuideID

B. REVISION HISTORY

This section is non-normative.

B.1 Version History

<table>
<thead>
<tr>
<th>Version No.</th>
<th>Release Date</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>IMS Candidate Final Public 1.0</td>
<td>20 November 2020</td>
<td>Public draft release.</td>
</tr>
</tbody>
</table>

B.2 Changes from previous version

As this is the first version of this document, no previous version change log exists.

C. REFERENCES

C.1 Normative references

[CALIPER-12]

Caliper® Analytics Specification 1.2. Whyte, Anthony; Haag, Viktor; Feng, Linda; Gylling, Markus; Ashbourne, Matt; LaMarche, Wes; Pelaprat, Etienne. IMS Global Learning Consortium. URL: https://www.imsglobal.org/spec/caliper/v1p2

[CALIPER-12-CERT]


[CALIPER-LIBRARY-12-CONTEXT]

Caliper Analytics® Library Use Profile Context 1.2 Extension. IMS Global Learning Consortium. URL: https://purl.imsglobal.org/spec/caliper-libraryuse/v1p2-extension/context/

[CALIPER-LIBRARY-12-ERRATA]

Caliper Analytics® Library Use Profile 1.2 Extension Errata. IMS Global Learning Consortium. URL: https://www.imsglobal.org/spec/caliper-libraryuse/v1p2-extension/errata/

[RFC2119]

C.2 Informative references

[CALIPER-12-IMPL]

*Caliper Analytics® Sensor Implementation Guide 1.2,* Mosbacker, Bracken; Whyte, Anthony. IMS Global Learning Consortium. URL: [https://www.imsglobal.org/spec/caliper/v1p2/impl](https://www.imsglobal.org/spec/caliper/v1p2/impl)

D. LIST OF CONTRIBUTORS

The following individuals contributed to the development of this document:

<table>
<thead>
<tr>
<th>Name</th>
<th>Organization</th>
<th>Role</th>
</tr>
</thead>
<tbody>
<tr>
<td>Noah Botimer</td>
<td>University of Michigan (USA)</td>
<td>Author</td>
</tr>
<tr>
<td>Jan Fransen</td>
<td>University of Minnesota (USA)</td>
<td>Author</td>
</tr>
<tr>
<td>Don Hamparian</td>
<td>OCLC (USA)</td>
<td>Author</td>
</tr>
<tr>
<td>Sebastien Korner</td>
<td>University of Michigan (USA)</td>
<td>Author</td>
</tr>
<tr>
<td>Dennis Krieb</td>
<td>Lewis &amp; Clark Community College (USA)</td>
<td>Author</td>
</tr>
<tr>
<td>Steve McCann</td>
<td>OCLC (USA)</td>
<td>Author</td>
</tr>
<tr>
<td>Joshua McGhee</td>
<td>IMS Global (USA)</td>
<td>Author</td>
</tr>
<tr>
<td>Bracken Mosbacker</td>
<td>IMS Global (USA)</td>
<td>Author</td>
</tr>
<tr>
<td>Shane Nackerud</td>
<td>University of Minnesota (USA)</td>
<td>Author</td>
</tr>
<tr>
<td>Megan Oakleaf</td>
<td>Syracuse University (USA)</td>
<td>Author</td>
</tr>
<tr>
<td>Andrew K. Pace</td>
<td>OCLC (USA)</td>
<td>Author</td>
</tr>
<tr>
<td>Etienne Pelaprat</td>
<td>Unizin (USA)</td>
<td>Author</td>
</tr>
<tr>
<td>Ken Varnum</td>
<td>University of Michigan (USA)</td>
<td>Author</td>
</tr>
<tr>
<td>Anthony Whyte</td>
<td>University of Michigan (USA)</td>
<td>Author</td>
</tr>
<tr>
<td>Maurice York</td>
<td>University of Michigan (USA)</td>
<td>Author</td>
</tr>
</tbody>
</table>

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Please contact IMS Global through our website at [http://www.imsglobal.org](http://www.imsglobal.org).

Please refer to Document Name: Caliper Analytics® Library Use Profile 1.2-extension

Date: 20 November 2020
7.2 Recommended Reading on Caliper

The following readings provide foundational information on Caliper.


7.3 Recommended Reading on Library Involvement in Learning Analytics

While the literature on learning analytics is voluminous, the following readings provide foundational information on learning analytics and suggest initial steps for librarian involvement. Additional readings can be found at the ACRL Learning Analytics Toolkit at https://acrl.libguides.com/val/latoolkit.


7.4 Privacy Resources

The following resources provide a basic framing for privacy considerations related to libraries and learning analytics.

7 Things You Should Know About How Learning Data Impacts Privacy
https://library.educause.edu/resources/2017/5/7-things-you-should-know-about-how-learning-data-impacts-privacy

ALA Code of Ethics

Association of Institutional Research Code of Ethics and Professional Practice
http://www.airweb.org/Resources/Pages/Code-of-Ethics.aspx

Consenting Adults? Privacy in an Age of Liberated Learning Data

Data Doubles
https://datadoubles.org/

Ethical Use of Student Data for Learning Analytics Policy

Ethics and Privacy in Learning Analytics – a DELICATE issue
https://www.researchgate.net/publication/293415524_Privacy_and_Analytics__it_s_a_DELICATE_Issue_A_Checlist_for_Trusted_Learning_Analytics

Ethics and Privacy in Learning Analytics
https://learning-analytics.info/index.php/JLA/issue/view/373

IMS Global Learning Data and Analytics Key Principles
http://www.imsglobal.org/learning-data-analytics-key-principles

JISC Effective Learning Analytics - Using Data and Analytics to Support Students
https://analytics.jiscinvolve.org/wp/


   Literature Review: http://repository.jisc.ac.uk/5661/1/Learning_Analytics_A_Literature_Review.pdf

   Taxonomy of Issues: https://analytics.jiscinvolve.org/wp/2015/03/03/a-taxonomy-of-ethical-legal-and-logistical-issues-of-learning-analytics-v1-0/

The Learning Analytics Landscape: Tension between Student Privacy and the Process of Data Mining

Library Learning Analytics Privacy Guide
National Web Privacy Forum
http://www.lib.montana.edu/privacy-forum/

NISO Consensus Principles on User’s Digital Privacy in Library, Publisher, and Software-Provider Systems

NIST Cybersecurity Framework
https://www.nist.gov/cyberframework

Prioritizing Privacy
https://prioritizingprivacy.org/

SPEC Kit 360: Learning Analytics
https://publications.arl.org/Learning-Analytics-SPEC-Kit-360/

University of California Learning Data Privacy Principles and Recommended Practices

University of Maryland, Baltimore County – Use of Student Data
https://my3.my.umbc.edu/about/studentdata

University of Michigan Learning Analytics Guiding Principles
http://ai.umich.edu/learning-analytics-guiding-principles/

University of Michigan Library Privacy Statement
https://www.lib.umich.edu/library-administration/library-privacy-statement
8.0 REFERENCES


2 Brown.


6 IMS Global Learning Consortium.


9 Brown; Brown, McCormack, Reeves, Brooks, and Grajek; Brooks, McCormack, and Shulman.

10 Brown.

11 Conole, Gaesvic, Long, and Siemens.


Oakleaf, *Library Integration in Institutional Learning Analytics*, 72.

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Scott Walter, email to author, November 3, 2017.

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Oakleaf, *Library Integration in Institutional Learning Analytics*, 55.

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