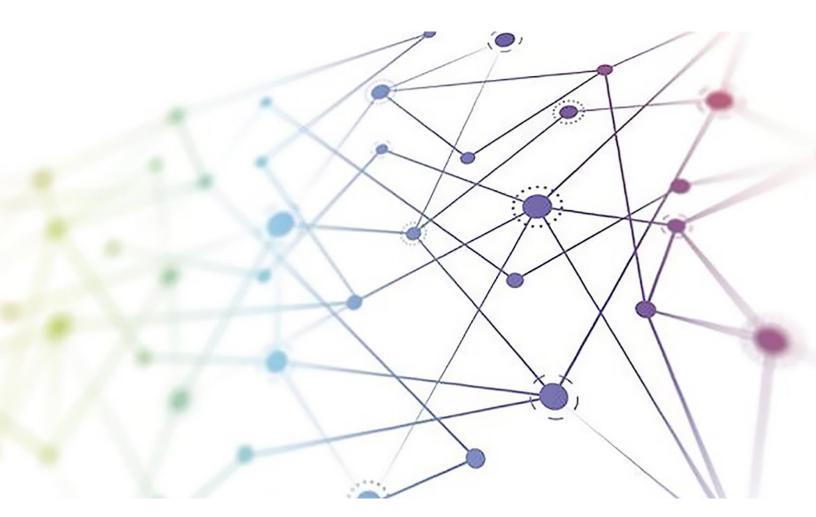National Institute for
Learning Outcomes Assessment
Making Learning Outcomes Usable & Transparent

Mapping Learning:

A Toolkit

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National Institute for Learning Outcomes Assessment

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Introduction

Institutions of postsecondary education are complex spaces, with students learning in all corners of them, building upon prior learning they bring with them. The complexity of our educational environments poses a challenge to understanding where students learn and how learning is reinforced and integrated across curricular, co-curricular, and work-based experiences. In its most recent survey of the field, the National Institute for Learning Outcomes Assessment (NILOA) has seen an increased awareness of the range of places that learning happens within institutions as well as the need to document and align learning throughout. While 77% of provosts surveyed report that their institutions are currently involved in curriculum mapping of some kind, only 50% indicate that all programs have learning outcomes *and* that those outcomes align throughout the institution (Jankowski, Timmer, Kinzie, & Kuh, 2018). Thus, while growing in attention and interest, the process of mapping learning is still very much under development.

Faculty are working to create a curriculum that intentionally builds in integrated learning opportunities over time for students to apply and practice as well as transfer their knowledge and skills through assignments, in and out of courses. Student affairs staff are also mapping learning that occurs in the co-curriculum and on-campus employment spaces, positioning the evidence needed on learning for a comprehensive learner record. And together, faculty and staff are mapping the frequency, location, and related learning of High-Impact Practices.

Overall, mapping is a key strategy for examining the role of different elements of learning environments as they build towards shared learning outcomes as well as to better understand where to assess and document learning. In addition, as assignments continue to take on prominence as an embedded authentic measure of learning (Jankowski, Timmer, Kinzie, & Kuh, 2018), the need to map relationships between institution, co-curricular, general education, and program learning outcomes with courses and specific assignments or assessments takes on increasing importance. Thus, we need to not only drill down to the tasks we ask students to undertake to demonstrate their learning, we also need to look across to see how the different elements are integrated and add up into a coherent whole.

In this toolkit, we present a variety of information on the mapping process – what are the purposes and uses of maps, what can be mapped, and various approaches to engage with mapping learning. We assume the focus of mapping is on documenting learning, but the approaches addressed here would be applicable with a different focus or lens as well.

We invite you to share with us additional examples, materials, resources, and modifications of the toolkit to add to this resource. If you have examples, please send them to niloa@education.illinois.edu.

What is Mapping?

Mapping is a tool for seeing relationships between different aspects of the institution based on learning outcomes as well as documenting where learning is demonstrated and how. The most common form, curriculum mapping at the program-level, makes visible how courses in a curriculum align to the learning outcomes to which that curriculum strives. In its simplest version, the curriculum map is built on a two-dimension matrix, with the courses arrayed across the top (the x-axis) and learning outcomes listed down the left side (the y-axis). As depicted in Table 1, a mark is made in the box where a course addresses an outcome.

Learning Outcomes	Course 1	Course 2	Course 3
Learning Outcome 1	X	X	
Learning Outcome 2		X	
Learning Outcome 3	X		X

Table 1: A basic curriculum map

Such a map documents where different learning outcomes are addressed within the program and can be utilized for a visual reference regarding if there are any gaps—such as learning outcomes not addressed in courses or courses that do not address learning outcomes. The same style of map could be utilized with co-curricular learning experiences by changing the title of course to learning experience/activity/program (Table 2).

Co-curricular Learning	Learning Experience/ Activity/ Program	Learning Experience/ Activity/ Program	Learning Experience/ Activity/ Program
Learning Outcome 1	X	X	
Learning Outcome 2		X	
Learning Outcome 3	X		X

Table 2: Co-curricular learning map

While these are the most commonly seen maps, there are many additional layers to which faculty, staff, and students can map learning that provide further points of discussion, potential integration, and clarity to the learner. An "X" does not tell us all that much regarding how a learning outcome is addressed in a course, learning experience, activity, or program. Table 3 and 4 provide additional layers that can be mapped to further our understanding of when, where, and how learning outcomes are addressed within our institutions.

In Table 3, faculty and staff come together to discuss the purpose of a particular learning event as it relates to developing learning outcomes over time. Does this experience expose or introduce learners to the learning outcome? Are they assessed on it? When is mastery of the learning outcome expected and how do prior learning experiences help ensure successful attainment of mastery? It can also be useful to explore if there are formative assessment opportunities prior to the culminating experience or demonstration of learning. Such a developmental lens is useful for mapping because the vast majority of the learning outcomes we aspire our students to attain cannot be acquired in one course, activity, or experience.

Learning Outcomes	Learning Experience/ Activity/ Program/Course	Learning Experience/ Activity/ Program/Course	Learning Experience/ Activity/ Program/Course
Learning Outcome 1	Introduced/ Exposed	Reinforced/ Formative Assessment	
Learning Outcome 2		Reinforced/ Formative Assessment	
Learning Outcome 3	Introduced/ Exposed		Mastered/ Assessed

Table 3. Map of learning progression and development

In Table 4, the assessment, or expected demonstration of learning is included in the map. Thus, it is not just that the learning outcome is addressed in a particular experience, but that it is also assessed, along with the means by which the learning is assessed. This layer of mapping allows for examination on issues of alignment as well as gaps. Do the learning outcomes match with the means in which we ask learners to demonstrate their learning or are they out of alignment? If we stated that a learning outcome is being addressed, is it assessed as well? If we are expecting higher levels of learning attainment, do the assessments we employ align with higher level tasks and demonstrations of learning? Do we provide a variety of mechanisms, approaches, or assessments for students to demonstrate their learning?

Learning Outcomes	Learning Experience/ Activity/ Program/Course	Learning Experience/ Activity/ Program/Course	Learning Experience/ Activity/ Program/Course
Learning Outcome 1	Reflective Essay	Exam Question	Case Study
Learning Outcome 2	Term Paper	Group Project	Oral Presentation
Learning Outcome 3	Meeting Minutes	Lab Report	Capstone Project

Table 4. Map of assessment approaches

The point here is that mapping provides a visualization for how various pieces fit together related to learning outcomes. It allows a conversational space and lens through which to examine our educational design. However, it is a lens, a way of seeing, and the layers provided in Tables 1-4 add different dimensions to what we might change if students are not

attaining expected learning outcomes, with whom we might partner, and our understanding of where and how students are learning.

> **Note:** An important part of any mapping exercise is to overlay the student experience onto the map. For instance, within curricular mapping, course taking patterns of students need to be examined. In student affairs, student participation in various learning events as well as access to activities needs to be examined. If the students are not moving through the curriculum as intended, or only some groups of students experience co-curricular learning, we would not expect to see the desired progression in student learning. Thus, while maps can offer insight to our intended learning design, the actual student movement through postsecondary education needs to be considered in terms of operationalizing the maps. In addition, issues of access, equity, and participation are key to implementing the maps to ensure we design and support realistic learning pathways for our students.

The Process of Mapping Learning

Since curriculum mapping is the most common approach, the vast majority of mapping activities have been led entirely by faculty, often without discussion with student affairs or students themselves. Thus, rarely do curriculum maps represent the entirety of a degree or the fulsomeness of the student learning experience. Yet, any of the approaches are applicable in an academic or student affairs setting. There are three commonly utilized approaches to mapping learning.

1. An excel spreadsheet, or a template, is electronically sent around to faculty or staff within a specific unit, and individual faculty/staff members complete the sheet based on the course(s) they teach or programming offered within the unit. Responses are then compiled into a single map and filed.
2. A program officer or department chair, in isolation, completes the entire map of the curriculum or unit and submits it to an assessment management system or assessment office. There may be minimal to no conversation with other faculty or staff before, during, and after the process.
3. Faculty and/or staff come together to identify which courses or programmatic learning experiences align with which outcomes or where various learning outcomes are addressed. It is a process of discussion, conversation, and building a single map collectively, based on shared understanding of the role of each learning experience within the larger picture. This also generally entails examination of alignment of assessments with learning outcomes and experiences.

While there is not a right or wrong way to undertake mapping, each of the approaches above have strengths and weaknesses. Mapping under the first two approaches generates reports which can be pulled for review and initial gap analysis, but the maps are rarely used after their creation nor impact practice. Further, if two faculty members or two student affairs staff mapped the curriculum or learning experiences individually, there is no guarantee that they would develop the same map. If students mapped where they thought learning outcomes were addressed, there would be another map entirely. Thus, the process undertaken needs to build off of the purposes for mapping as well as consideration of whom should be involved.

The third approach for mapping learning includes a shared understanding of integrated and intentional learning design. It brings educators together to collectively discuss where learning occurs, exploring alignment between educational experiences, activities, and assessments. When completed as a collective enterprise, mapping becomes a means of generating consensus around learning outcomes along with collaborative ways to move forward as an institution, not a discrete educational unit (Jankowski & Marshall, 2017). It also means that we can map activities and their related learning (such as occurrences of High-Impact Practices, or HIPs, and related learning), co-curricular learning, programmatic learning, and the like. The difficulty with this approach is the amount of time taken and space needed for collaborative discussions as well as willingness to engage across potential organizational silos.

Before beginning any mapping exercise, we recommend considering the following reflective questions:

- Are there existing learning outcomes or learning frameworks? If yes, is there agreement on what the learning outcomes are and what they mean?
- Is there agreement on the criteria to include a course or learning experience on a map in relation to a learning outcome (e.g., is it actually assessed, merely mentioned, loosely related to the course or learning experience itself)? In other words – what is necessary for a learning experience to be included in a map?
- Is the alignment explored between learning outcomes and syllabi, activities, assessments, experiences, and the like? How will alignment be ensured?
- What questions will the map be able to answer and what additional information may be needed to inform improvement of our learning experiences?

Mapping is inherently about alignment in educational environments around learning, and as Jankowski (2017) observes, alignment is "a mechanism by which to counteract incoherence and fragmentation of the college experience." Mapping, therefore, is a strategy for visualizing the areas of where we think learning is happening as it relates to specific learning outcomes. Before beginning any mapping experience, we need to be clear on what we are trying to map and why, who should be involved in the process, if we are mapping for purposes of reporting or improvement, and whether we are utilizing multiple lenses to capture learning. Purposes for mapping learning may include:

- Providing an overview of the structure of the curriculum or programming offered within a specific unit and the contribution of individual courses or learning experiences to shared learning outcomes;
- Exploring alignment within a degree between general education, program, co-curricular, and institutional learning outcomes;
- Identifying where and how particular outcomes are expected, explicitly taught or experienced, and assessed;
- Backward-designing the curriculum or programming;
- Understanding the nature and role of course pre-requisites;
- Identifying strengths or student learning outcomes that are thoroughly addressed
- Identifying gaps or learning outcomes that are addressed by only a few courses or

learning experiences;
- Suggesting whether students take courses or participate in activities in an optimal sequence; and/or
- Developing advising tools that provide students with an overview of the role of each course or learning experience in the institution and why some should be taken in a particular order.

How one maps is dependent on what questions are being asked. Beginning to map, therefore, requires an intentional stance. Six questions can help to promote an intentional mapping effort (Jankowski & Marshall, 2017):

1. Purpose: What are we mapping and why? What pieces of the educational environment need to be aligned? What will be done with the map after the mapping is completed?
2. Scope: What parts of the learning environment are included or left out by this approach?
3. Participation: Who should be involved in the conversations? When?
4. Form: How many layers do our maps need to address educational complexity?
5. Limitations: What ways of seeing are we excluding in our maps?
6. Communication: With whom and how will the maps be shared?

Remember that mapping is as much about the process of seeing relationships as it is about completing a spreadsheet or report. By mapping collectively and collaboratively, those involved, whether faculty or staff, are able to unpack assumptions about their own and others' roles and contributions to the learning of students.

Finally, maps or the lessons learned from them need to be shared, used, and updated. Regarding sharing the maps, curriculum maps can help orient faculty, especially those new to a program, to the ways in which a curriculum is built to facilitate student learning as well as explore the role of their course in the larger program. For students, as McMahon and O'Riordan (2006) observed, curriculum maps increased awareness of the alignment of the curriculum and facilitated better course-taking decisions. Within student affairs, sharing the maps allows for easier documentation of learning from various spaces. Where learning is demonstrated is then captured in the maps, allowing inclusion of learning on student records from academic and student affairs. Further, if the maps are not used in understanding our educational processes, then one could argue it is not worth the time taken to make them in the first place. In addition, our educational experiences are constantly in flux, thus there should be processes in place to regularly update the maps.

Now that we have explored what mapping entails as well as related processes, the remaining sections of the toolkit present different layers of the learning that can be mapped. Each section includes targeted information and questions to inform practice for:

- Program-level curriculum mapping
- Certificate mapping
- General Education mapping
- Co-Curricular mapping
- Mapping High-Impact Practices

Program-Level Curriculum Mapping

At a program-level view, curriculum mapping entails exploring the relationships between the courses in a program and the program learning outcomes. In addition to documenting that the learning outcomes are addressed by the courses, the use of (I) for introduced, (D) for developed, and (M) for mastered enables faculty to focus attention on how learning is scaffolded over the course of the curriculum. Program-level maps that bring faculty together to discuss learning help indicate how courses relate to each other, allow space for adjunct and part-time faculty to understand the role of different courses, and reveal if certain outcomes are addressed and reduce redundancy. Some questions to ask when undertaking curriculum mapping at a program-level include:

- In the key courses, are all outcomes addressed, in a logical order?
- Do all the key courses address at least one outcome?
- Do multiple offerings of the same course address the same outcomes, at the same levels?
- Do some outcomes get more coverage than others? Is that intentional?
- Are all outcomes first introduced and then reinforced?
- Are students expected to show high levels of learning too early?
- Do students get practice on all the outcomes before being assessed, e.g., in the capstone?
- Do all students, regardless of which electives they choose, experience a coherent progression and coverage of all outcomes?
- What do your electives, individually and collectively, contribute to the achievement of your student learning outcomes?

Another layer of mapping at a program-level is exploring where learning is assessed or where artifacts are collected. Several key questions can help to guide mapping endeavors that seek to examine the alignment of curricula within a specific course (Jankowski & Marshall, 2017):

1. How do courses increase expectations for learning in relation to particular outcomes?
2. How do assignments elicit demonstrations of particular learning outcomes? How are we assessing it and where?
3. How do our pedagogies prepare students to make such demonstrations?
4. How do individual faculty/courses each contribute to the collective enterprise of helping students to demonstrate outcomes?

Once maps are completed, they should be shared. For students, viewing a curriculum map at the start of a course and throughout the program help indicate how courses build on each other, showing how the various pieces fit together into a coherent whole. In addition, program-level maps should be shared with advisors to help reinforce the connection points and add in course recommendation decisions. Curriculum maps from a program can also be utilized to provide multiple on- and off-ramps for students as they move through and transfer.

> **Note:** It is important to keep in mind that the program curriculum is just one piece of the larger educational experience of our learners. Focusing on a degree program itself

for mapping may mean faculty address gaps in learning outcomes within the program at the expense of partnering with and drawing from general education or co-curricular learning experiences. To move from a program view to a wider lens of how various elements fit together, we recommend using the Questions of Learning developed by Norm Jones and Dan McInerney of Utah State University. For additional information on curriculum mapping along with examples, see Chapter 4, Applying the Paradigm to Curriculum Mapping in Jankowski and Marshall (2017).

Certificate Mapping

For learning experiences that do not equate to the traditional definitions of "programs" (such as certificates)—learning can still be mapped whether in relation to employer frameworks, learning outcomes, standards, licensure requirements, and/or the Beta Credential Framework. In addition, elements to consider including are accepted elements of prior-learning, work-based learning experiences, certifications and licensure exams, and possible related career paths.

General Education Mapping

An additional layer to add to a program-level curriculum map is considering the relationship between program-level learning outcomes and general education. This map includes exploration of the general education courses that support learning outcomes as well as how they intersect with the curriculum map (Table 5).

Learning Outcomes	General Education	Major Courses	Licensure or Certification Requirements
Learning Outcome 1	General education courses that support the learning outcomes	Courses that address specific learning outcomes	Requirements or licensures that align with the learning outcomes
Learning Outcome 2			
Learning Outcome 3			

Table 5. General Education and Major map

A map that indicates the relationship between general education and major experiences as well as those that align with any required certification, licensure, or specialized accreditor requirements helps to indicate how various elements of a degree fit together. Questions that a general education and major map can help address include the following:

- What are the points of connection between general education and the major? In what ways is learning intentionally integrated and built upon from one setting to another?
- Is there a coherent educational experience for learners between general education and major courses? How are assessments in one setting advanced in another?
- How is advising involved in conversations around general education as well as transfer student services and the registrar? Are we building multiple points of entry and exist for our students?
- Is there a preferred pathway for a major through general education? How is that communicated to students?

To connect the various elements of a degree, learning outcomes that are shared beyond the program serve a useful starting point. These learning frameworks may include the institutional learning outcomes and how they relate, general education learning outcomes, or even more national learning frameworks such as AAC&U's LEAP Essential Learning Outcomes, the Degree Qualifications Profile, NACE Competencies or CAS Standards. Using learning frameworks as a starting point allows for translation and cross-walking from the various places learning occurs. The case study of McKendree University provides an example of such an approach. McKendree University engaged with the DQP to refine their Diverse Perspectives outcome, as well as their innovative crosswalk of the DQP's five areas of learning with McKendree's seven student learning outcomes, the Association of American Colleges and Universities' Liberal Education and America's Promise (LEAP) Essential Learning Outcomes, and the National Collegiate Athletic Association's (NCAA) Division II Life in the Balance key attributes. (Read the full case study.) An additional resource on mapping general education outcomes is that of Norfolk State University as shared in AAC&U's Program Review publication (Cuevas, Matveev, & Miller, 2010).

Co-Curricular Mapping

Learning happens in all sorts of places to help reinforce and transfer knowledge for learners. Mapping co-curricular learning as it relates to other elements of the educational environment can help to foster the coherent, integrated learning experiences needed to foster student success. While within specific student affairs units, mapping can occur of the learning addressed as well as how elements connect with CAS Standards (Table 6), points of connection can also be explored. However, while Table 6 does not include how the learning outcome is addressed, Tables 3 and 4 presented earlier can be layered under the program column for a full picture of the theory of change behind learning support (Jankowski & Marshall, 2017).

Institution Mission	CAS Outcome Domain	CAS Dimension	Learning Outcome	Program
Mission statement element	Related outcome domain	Related dimension	Student affairs unit specific learning outcome	Program or programming that addresses the learning outcome

Table 6. CAS Standard mapping within student affairs units

Some questions to explore when co-curricular mapping include:

- How is learning, not just participation or program effectiveness assessed?
- What are the criteria to include on a map? Is it exposure through an activity? Or is it that learning is assessed?
- Is it useful to map program offerings in layers of development coupled with assessment?
- Who has access to different learning experiences and are there differences by student characteristics?

In addition to examining the learning within a specific student affairs unit or program, student affairs can and should be part of degree-level learning conversations. Building upon the map provided in the general education section, Table 7 presents a wider lens of integrating learning throughout a degree experience.

Learning Outcomes	General Education	Major Courses	Co-Curricular Learning Activities	Licensure or Certification Requirements
Learning Outcome 1	General education courses that support the learning outcomes	Courses that address specific learning outcomes	Co-curricular elements that support learning outcomes	Requirements or licensures that align with the learning outcomes
Learning Outcome 2				
Learning Outcome 3				

Table 7. Integration of degree elements

Mapping High-Impact Practices

One of the mechanisms used to foster student learning and success that can cross academic and student affairs domains are the eleven identified High-Impact Practices or HIPs:

- First Year Seminars and Experiences
- Common Intellectual Experiences
- Learning Communities
- Diversity/Global Learning
- ePortfolios
- Service Learning, Community-Based Learning
- Internships

- Capstone Courses and Projects
- Undergraduate Research
- Collaborative Assignments and Projects
- Writing-Intensive Courses

A growing area of focus within HIPs is that of on-campus employment for learners. To learn more about this see the WI Grow program and/or the book *A Good Job: Campus Employment as High-Impact Practice* (McClellan, Creager, & Savoca, 2018).

While mapping who is engaged in HIPs is a useful starting place as well as exploring how many students participate in HIPs, to ensure that student engagement with HIPs is of high-quality involves additional layers of examination. Questions to consider and a sample approach outlined in Table 8 include:

- For our institution, what shared definitions are there regarding the different HIP experiences? How many HIPs and at what times do we want our learners to experience them?
- What are the elements that encompass a high-quality HIP learning experience for students (See Kuh & O'Donnell, 2013 for possible ideas)?
- How are HIPs built into the educational experience and/or curriculum?
- Will implementation be undertaken in partnership between academic and student affairs, or will HIPs be divided between academic and student affairs responsibilities?
- For each HIP, are there related, expected, or associated learning outcomes?
- How is learning assessed to ensure a high-quality learning experience within each HIP?
- How are HIP opportunities and experiences communicated to learners? Why do or don't students engage with HIP opportunities?

High-Impact Practice	Course where HIP addressed	Activity or Program where HIP addressed	Learning Outcome	Assessment
List specific HIP of interest	List any associated courses that implement the HIP	List any associated co-curricular activities or programs where the HIP is implemented	List the learning outcome(s) addressed in relation to the HIP	List the assessment(s) utilized to examine student learning

Table 8. Mapping High-Impact Practices

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