

**A Formative Rubric for Advancing Sustainability through Cross-Functional Collaboration in a
Living Learning Laboratory Approach**

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The Living Learning Laboratory concept promotes the utilization of living systems as settings for learning research and is of increasing interest as a strategic approach to advancing sustainability in Higher Education. A shared belief is that the LLL approach can be effective in the pursuit of both sustainability outcomes in campuses and communities, as well as providing a platform to cultivate of key competencies and skills that will help participants succeed in their future sustainability-focused endeavors. While applications of the LLL approach are prevalent throughout history, there are a detectable increasing number of efforts seeking to understand how the LLL approach can be specifically valuable in education for sustainability. LLL applications can be both liberating and energizing for participants, but also subject to challenges due their nature of cross functional collaboration and their similarities to prototyping processes. Studies of LLL in sustainability are emerging and reveal valuable patterns that are instructive to future efforts. This research seeks to organize observations and lessons in the pursuit of LLL projects in an effort to highlight value-adding processes and attributes found to contribute to success. Established frameworks of integrative design are utilized to provide a sound theoretical foundation for the organization of these observations. Successful attributes of LLL project and respective indicators are presented in the form of a rubric designed to serve as a formative guide for conceiving, planning, and implementing LLL project. A guiding example is also provided to support the understanding of the rubric categories.

DESIRABLE CHARACTERISTICS OF LIVING LEARNING LABORATORY PROJECTS

The following set of desirable characteristics and favorable conditions for Living Learning Laboratory projects is emerging through lessons learned in multiple pilot projects and programs. A version of these characteristics is presented below as a formative guide to support the conception and design of Living Learning Laboratory team formation and project design. It is worth noting that these characteristics need not be confined to sustainability focused collaborative efforts, and may be applicable to any form of collaboration undertaken by organizations or cross-functional teams. They are presented here however with an intention to reflect lessons learned on sustainability-focused LLL projects. A guiding central example of a collaborative effort to create a pollinator garden as a LLL project is also provided.

Brief definitions of desirable LLL project characteristics are provided below:

- **Shared benefits across collaborators:** refers to the receipt of well-defined value-adding benefits for the primary collaborators on Living Laboratory projects to ensure the will to succeed is shared by teams.
- **Clear statement of purpose:** a well-defined statement of purpose describes the function, approach, and the motivating outcomes of a Living Lab project and can be a powerful instrument to align project team members and also for communicating the project details to others.
- **Timing alignment:** refers to measures taken to ensure collaborating partners are able to contribute at a pace that is aligned with their culture and capabilities as well as the needs of a project.
- **Process champion:** a designated individual to support teams and drive high quality collaborative exchanges between team members and across stakeholders.
- **Structured interaction:** refers to deliberate and planned efforts to design collaborative exchanges between key project stakeholders and subject matter experts during the project.
- **Team experience:** collaborating team participants benefit when they are able to draw from experiences together to build mutual trust and understanding of their respective team member strengths and values.
- **Understanding of cultural essence** refers to the maturity of cross-organizational familiarity developed over time and through experience on collaborative Living Learning Lab projects.
- **Integrative design competencies** refer to the ability of teams to build alignment around purpose, the ability to seek reconciling solutions rather than compromise, the ability to be purposeful and disciplined in the establishment of guiding principles, and the ability to define value adding processes for users, co-creators, the earth, community, and investor stakeholders.
- **Process assessment:** refers to efforts to regularly revisit the project purpose and assess progress towards objectives throughout the project as well as the achievement of key milestones.
- **Defined project outcomes:** refers to deliberate efforts to develop a shared understanding of desirable project outcomes including value, creation of new value adding processes, and learning.

Descriptive Definitions with Guiding Example: Pollinator Garden

Shared benefits across collaborators: refers to the receipt of well-defined value-adding benefits for the primary collaborators on Living Laboratory projects to ensure the will to succeed is shared by teams. LLL projects are strengthened by shared benefits and returns between collaborators rather than a one-way flow. In other words, Living Lab projects are best built on a two-way street. While some may be launched based on good will and a sincere interest in collaboration, they may be challenging to sustain without clear mutual benefits for collaborators. **Example:** A student team works with a local municipality to design and build a pollinator garden at a local park. Students gain hands on experience in planning and organization, and a sense of accomplishment through producing tangible results. The municipal partner gains a valuable improvement for their community and demonstrates progress in its pursuit of sustainability goals.

Clear statement of purpose: a well-defined statement of purpose describes the function, approach, and the motivating outcomes of a Living Lab project and can be a powerful instrument to align project team members and also for communicating the project details to others. Because Living Learning Laboratory projects often bring organizations together with variable core goals and objectives, it is useful to align teams around a clear statement of purpose that articulates the functional aspects of the project, the rationale for the approach used to complete the project, and the outcomes that will build the collective “will” of the team. **Example:** *To* co-create a beautiful, sustainable, and educational pollinator garden *in a way that* provides valuable experience to project participants and is inclusive of community stakeholders *so that* our pollinators, citizens, schools, and community can experience the benefits of a pollinator garden indefinitely.

Timing alignment: refers to measures taken to ensure collaborating partners are able to contribute at a pace that is aligned with their culture and capabilities as well as the needs of a project. Different organizations and functional units operate with variable schedules, speeds, and agility. Project plans benefit from an alignment of timing and expectations, and in most cases, slowed down to accommodate process learning and high quality exchanges of input and feedback between collaborators. **Example:** A project plan is created in which students are allowed to conduct research and visit pollinator gardens in the fall semester to inform concepts that are developed and presented to project stakeholders for feedback during early winter planning meetings. During the winter, while students raise funds for the project, their plans are used to guide the work of a licensed landscape architect hired to complete drawings and permit applications. The project is then scheduled for construction on a long established spring day of service in the community to reduce costs of construction and engage students in a hands-on leadership experience at the end of the semester.

Process champion: refers to a designated individual to support teams and drive high quality collaborative exchanges between team members and across stakeholders. Traditional university roles and resource systems have not recognized the time needed for collaborative efforts or cultivated collaboration skills in their organizations. As a result, collaborative living laboratory activities that engage teams across academic and operational functional units in university settings are usually exceptions rather than the norm. Cross functional collaboration often requires facilitative, interpretative, and translation skills. **Example:** A Transacademic Interface manager” (see Brundiers) supports pollinator garden by planning and facilitating a series of meetings in which a statement of

purpose and project plan for a pollinator garden are co-created by students, faculty, municipal leaders, and community members.

Structured interaction: refers to deliberate and planned efforts to design collaborative exchanges between key project stakeholders and subject matter experts during the project. Integrative Living Learning Laboratory projects benefit from high quality exchanges of information and are likely to require interactions and processes that are new to some collaborators. Time taken to design “task cycles” for the project that guide teams through phases of functional design, evaluation, and feedback is valuable.

Example: A sequence of pollinator garden planning meetings is scheduled in succession, each with a defined purpose, and with care to ensure broad and diverse input of stakeholders and experts, and with defined outcomes that will enable an integrative design process and at the same time, keep the project on track.

Team experience: collaborating team participants benefit when they are able to draw from experiences together to build mutual trust and understanding of their respective team member strengths and values. Living Learning Laboratory projects can benefit greatly from complimentary team members that are able build mutual understanding and hit their stride as collaborators. As these successful teams emerge, a useful practices can be to keep them engaged through the advancement of projects to maturity and to capitalize on established teams on future projects as opposed launching new LLL projects that engage new teams and partners. **Example:** A faculty member that who has in the past, worked with their local municipality to organize a volunteer spring cleanup day at a local park could build upon their relationship to organize the planning and management of volunteers, tools, and leadership needed to engage students in the construction of a pollinator garden at the park.

Understanding of cultural essence refers to the maturity of cross-organizational familiarity developed over time and through experience on collaborative Living Learning Lab projects. Over time, teams that include cross-functional units and organizations have opportunities to learn about the respective cultures, business practices, and core functions. As these relationships mature, they can help to improve goal setting and alignment, communications, and planning. **Example:** Following their collective experience on pollinator garden project, a college team and their local municipality agree on roles and responsibilities to organize a workshop that will engage students in sharing lessons learned at a regional conference of municipal leaders.

Integrative design competencies refer to the ability of teams to build alignment around purpose, the ability to seek reconciling solutions rather than compromise, the ability to be purposeful and disciplined in the establishment of guiding principles, and the ability to define value-adding processes for users, co-creators, the earth, community, and investor stakeholders (Riley and Boecker, 2013). Integrative design processes are increasingly recognized as vital elements of sustainability-focused efforts, as they support a balanced approach to achieving social, economic, and environmental objectives. Team members who are literate and competent with the application of integrative processes are valuable to include on LLL projects. **Example:** A multiple individuals share refined design ideas for the pollinator garden early in the project. Rather than debating the merits of each, the team works together to establish a clear statement of purpose and a set of principles that will guide their future decisions, and then apply these principles to identify the elements of multiple design concepts that are aligned with this principles and that could be complimentary in a integrative design solution.

Process assessment: refers to efforts to regularly revisit the project purpose and assess progress towards objectives throughout the project as well as the achievement of key milestones. Living Learning Laboratory projects are similar to prototypes, and may not benefit from highly defined and familiar processes. Deliberate efforts to review process plans and purpose can be helpful to keep teams on track and to engage new team members. Milestones for progress of task cycles are also helpful to keep LLL projects on track, as they can create connections between a project plan and important interaction opportunities. **Example:** A goal to develop three pollinator design concepts is established in a manner that allows the concepts to be presented at a regular municipal board meeting of stakeholders.

Defined project outcomes: refers to deliberate efforts to develop a shared understanding of desirable project outcomes including value, creation of new value adding processes, and learning. Deliberate efforts to design metrics and outcomes that connect to core organizational values are helpful to demonstrate returns. Outcomes that engage teams in imagining “what would success look like?” and can also help to expand thinking about the potential effects of projects and in turn, guide project processes and collaborations. **Example:** The desired outcomes for a pollinator garden project may include (1) At the conclusion of the project, the team expresses an interest in working together again, (2) A measurable sense of confidence exists among team members that they could repeat or adapt the project at another location, (3) An article featuring the project in a local town/gown publication is published, (4) A measurable increase is found in the number of requests for guided tours or use of the park, (5) A horticulture specialist agrees to utilize their course on an annual basis to conduct a longitudinal study of the impact of the pollinator garden over time, and (6) An agreement is put in place with a local gardening group to “adopt” the garden to ensure it is maintained into the future.

Table 1 Summary of Living Laboratory Application Characteristics, Description, and Indicators

Application Characteristics	Description and Rationale	Key indicators
Shared benefits across collaborators	LLL projects are strengthened by shared benefits and returns between collaborators rather than a one-way flow of benefit. Projects are best built on a two-way street. While some LLL projects can be launched based on good will and a sincere interest in collaboration, they may be challenging to sustain without clear mutual benefits for collaborators.	Mutually interdependent project goals, clearly defined benefits for collaborators, clear articulation of benefits
Clear Statement of Purpose	Because LLL projects often bring organizations together with variable core goals and objectives, it is useful to align teams around a clear statement of purpose that articulates the <i>function</i> of the project, the rationale for the being state of the approach, and the outcomes that build the collective “will” of the team.	Purpose statement includes “To:” (function), “in a way that” (being), and “so that” (will) components
Timing Alignment	Different organizations and functional units operate with variable schedules, speeds, and agility. Project plans benefit from an alignment of timing and expectations, and in most cases, slowed down to accommodate process learning and high quality exchanges of input and feedback between collaborators.	Project timing driven by learning process requirements, process feels formative to team members
Process Champion	Cross functional collaboration often requires facilitative, interpretative, and translation skills. The specific roles and competencies of “Transacademic Interface Managers” as facilitators of LLL projects emerge through experience.	Clear leadership in process design and facilitation, reflection
Structured Interaction	Integrative LLL projects benefit from high quality exchanges of information and are likely to require interactions and processes that are new to some collaborators. Time taken to design task cycles for the project that guide teams through phases of functional design, evaluation, and feedback.	Clear roles and task cycles and IT infrastructure for interaction and exchange of quality information
Team Experience	LLL projects can benefit from complimentary team members that are able to hit their stride as collaborators. As these successful teams emerge, it is useful to keep them engaged and capitalize on established teams and through the advancement of projects to maturity as opposed a singular focus of starting new LLL projects that engage new teams and partners.	Core team of past project intact and selected for project
Understanding of Cultural Essence	Over time, teams that include cross-functional units and organizations have time to learn about the respective cultures, business practices that are enduring over time. As relationships mature, an understanding of essence can help to improve goal setting and alignment, communications, and planning.	Functional and learning teams possess past working relationships and understanding of essence
Integrative Design Competencies	Integrative design processes are increasingly recognized as vital elements of sustainability-focused efforts, as they support a balanced approach to achieving social, economic, and environmental objectives. Team members who are literate and competent with the application of integrative processes are valuable to include on LLL projects.	Core team leaders are practiced in implementation of integrative design frameworks
Process Assessment	LLL projects are similar to prototypes, and may not benefit from highly defined and familiar processes. Deliberate efforts to review and revisit process plans and purpose can be helpful. Milestones for progress of task cycles are helpful to keep LLL projects on track.	Defined milestones for project assessment and multiple revisits of project purpose exist
Defined Project Outcomes	LLL projects may include the pursuit of benefits and outcomes that are new to some of the participating organizations. Deliberate efforts to design metrics and outcomes that connect to core organizational values are helpful to demonstrate their returns	Mutual agreed upon success and renewed interest in partnership exists

Table 2: Living Learning Lab Application Rubric Assessment Data

Rubric Application Criteria	Strong <i>Exemplar and impactful</i>	Partial <i>Visible and intentional effort</i>	Weak <i>Detectable presence but unclear result</i>	Absent <i>No detectable effort or impact</i>
Shared benefits across collaborators	Mutually interdependent project goals	One-way dependency of project goals	Relationship of project goals visible but informal	Goals unclear, no relationships stated or detected
Clear Statement of Purpose	Purpose statement includes “function”, “being”, and “will” components	Purpose statement includes “function” + “being” or “will” components	Purpose statement describes project goal and/or objectives	No formal statement of purpose exists
Timing Alignment	Project timing driven by learning process requirements	Learning process modified to meet functional needs	Functional needs drive timing, learning is through observation	Project suffers from to lack of alignment of timing
Process Champion	Clear leadership in process design and facilitation, reflection	Leadership in some process design, facilitation and reflection	Process design, facilitation or reflection clearly missing	Absence of leadership in process design, facilitation, and reflection
Structured Interaction	Clear roles and task cycles and IT infrastructure for interaction and exchange of quality information	Some role definition, + Event series & IT focused on information exchange	Lack of interaction structure and roles, IT infrastructure for archives and records	Lack of clearly defined roles and no visible plan for structured interaction
Team Experience	Core team of past project intact and selected for project	Some team members with useful prior working experience	Team assembled of mostly new team members	All team members new and brought aboard
Understanding of Cultural Essence	Functional and learning teams possess 2+ yrs working relationship	Functional and learning teams possess 1-2 yrs working relationship	Functional and learning teams have organizational connections	Functional and learning teams have no prior experience and relationship is new
Integrative Design Competencies	Core team leaders are practiced in implementation of integrative frameworks	At least two team members are experienced with integrative process frameworks	Team acknowledges goal of integrated approach and new communication patterns	Team displays preference for sequential traditional contribution and communication
Process Assessment	Defined milestone for project assessment and multiple revisits of project purpose exist	Ad-hoc process adjustments used to maintain alignment with project goals	Processed assessed at conclusion of project, no mid-stream process assessments exist	No detectable assessment or adjustments of process
Defined Project Outcomes	Mutual agreed upon success and renewed interest in partnership exists	Project objectives partially achieved, continued interest in partnership exists	Project objectives not achieved; lack of interest in further partnership	No formal project evaluation exists, desire exists to terminate partnership

Definition of Terms

Partnership: refers to collaborative relationships cross functional units with at least one unit focused on learning objectives of living laboratory application.

Project: Refers to a focused activity with defined objectives pursued by a project team seeking to apply living laboratory principles.