



Empowering Futures: Bridging Communities and Engineering with Inclusive Innovation

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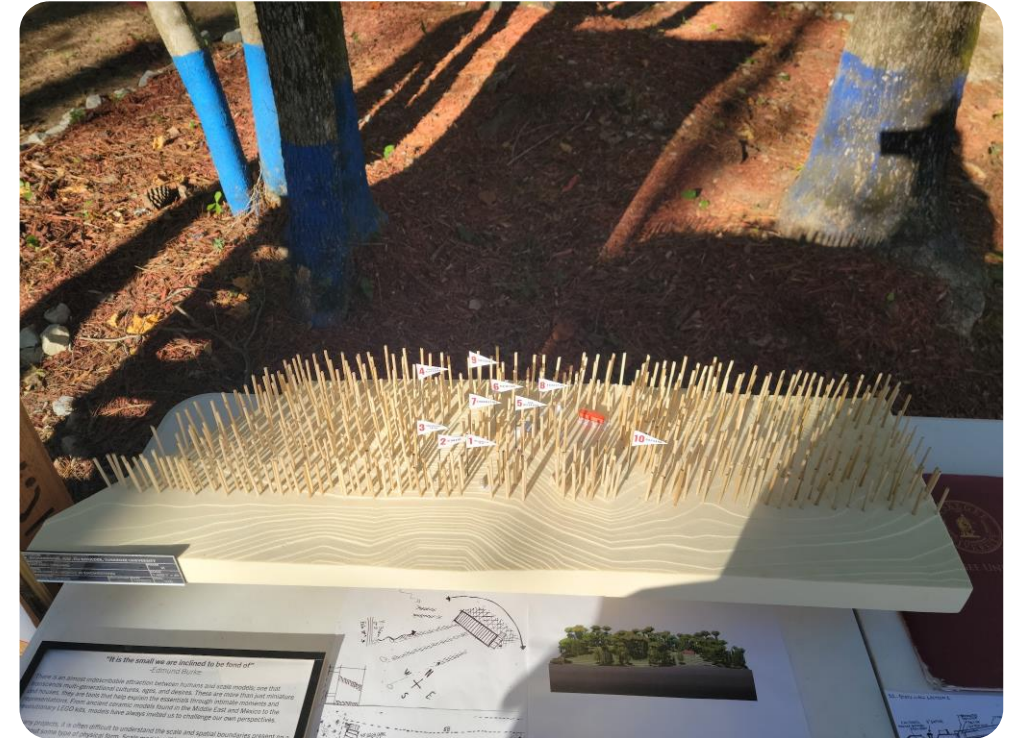


Hypothesis: Inter-institution approach to educational transformation, one centered on democratizing the practice of innovation across institutional boundaries, will effectively prepare next generation innovators and engineers to address systemic and institutional racism within STEM by challenging educational norms in higher education.

PALAR Framework

A combination of Action Research techniques:

- **PALAR** - combination of AL processes and AR principles
 - **Action Learning (AL)** - Problem solving via taking action and reflecting on results
 - **Action Research (AR)** - Seeks to solve social problems with a spiral of action research cycles (*plan-act-observe-reflect*)
- **Participatory Action Research (PAR)** - conducted by a group of people “aiming at inclusion, social justice, and equality of participants”
- **PALAR** - “an integrated concept of ALAR and PAR and lifelong learning, aiming at positive social change for a just and better world for all human beings.”



Theoretical framework for PALAR



Adapted from: (Zuber-Skerritt. 2002: 145). Zuber-Skerritt, O. (2002). A model for designing action learning and action research programs. The Learning Organization, 9(4), 143-149.

BLE Objectives & Questions through PALAR Stages

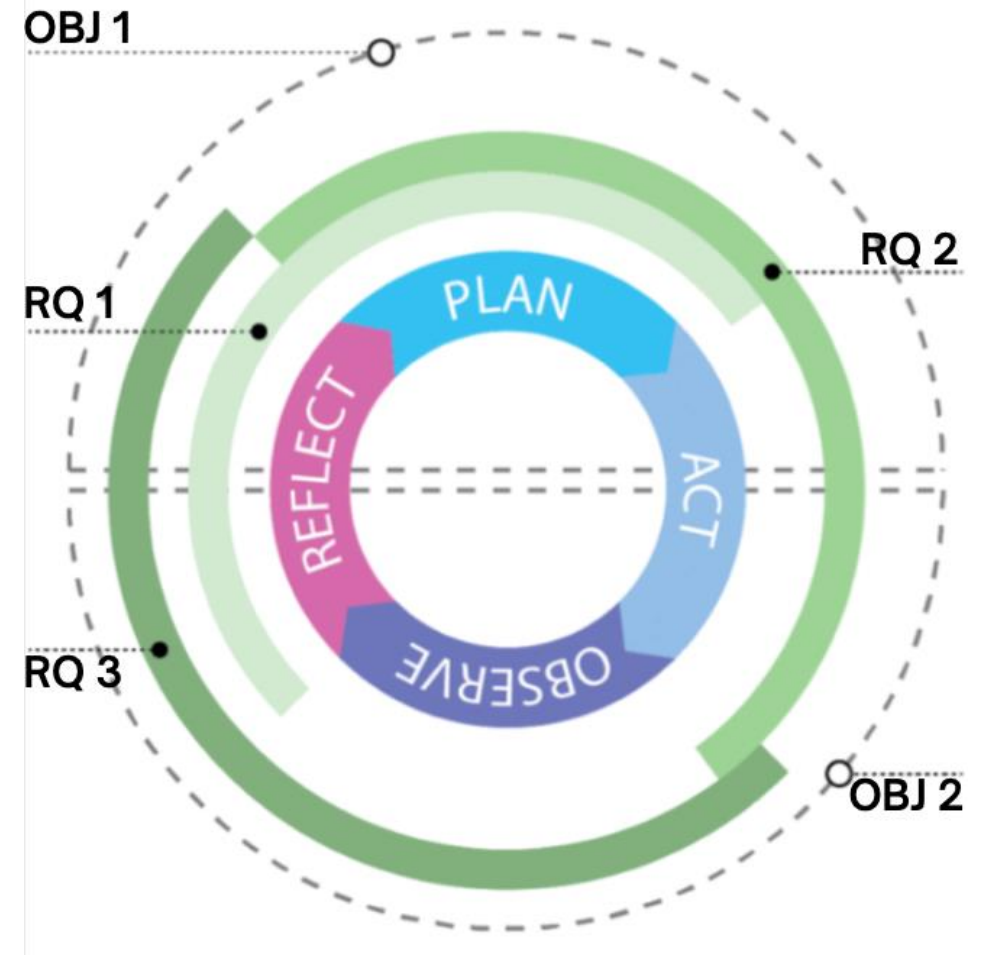
Obj 1: Understand the research, knowledge, and action necessary to achieve a practical transformation of social justice, community engagement, and to enact sustainable, positive change by tackling historical and institutional racism.

RQ1: What impact will tangibly building a legacy have on participating students' sense of belonging?

RQ2: What are tenets of anti-racist and decolonizing student and community projects?

Obj 2: Produce evidence and further understand organizational context factors that improve or constrain the inter-institutional sharing of knowledge

RQ3: How can Predominantly White Institutions (PWIs) and historically black colleges and universities (HBCUs) enable authentic and collaborative learning approaches through project innovation while centering around cultural empathy?



PALAR Framework



- **Project Overview:** An inter-institutional initiative focused on STEM community engagement and educational innovation, bridging faculty, staff, and students from both predominantly white institutions and minority-serving institutions.
- **Team Composition:** A dynamic collaboration of faculty, staff, graduate, and undergraduate students, fostering diversity and inclusivity across academic environments.
- **Objective:** To critically explore and assess the principles of anti-racism and decolonization within higher education contexts, while examining the evolution of participants' attitudes and relationships over time.
- **Analysis Methods:** Employing a comprehensive approach through quarterly interviews, observation of group meetings, detailed in-person field notes, and reflective weekly student journals to gather insights and measure impact.

Timeline

	Year 1: Creation	Year 2: Continuation	Year 3: Permaculture Design	Year 4: Stakeholder Engagement/Community Self-Sustaining
Plan	<ul style="list-style-type: none"> + Semi-structured interviews and focus group discussions + collective 	<ul style="list-style-type: none"> + Semi-structured interviews and focus group discussions + construction management planning 	<ul style="list-style-type: none"> + Semi-structured interviews with indigenous and local agricultural experts; local stakeholders who will work with permaculture systems in long term 	<ul style="list-style-type: none"> + Community interviews and focus groups regarding needs and wants for space long term + Stakeholder analysis and participatory mapping
Act	<ul style="list-style-type: none"> + design charette + producing site analyses deliverables 	<ul style="list-style-type: none"> + design iterations and refinement + engineering design + initial build and construction 	<ul style="list-style-type: none"> + Installation of permaculture demonstrations + Continued build and construction + Community training on indigenous permaculture approaches 	<ul style="list-style-type: none"> + Creating a process plan for the community, including how to obtain resources for support + Building a stakeholder engagement model
Observe	<ul style="list-style-type: none"> + social and historical context + site analysis 		<ul style="list-style-type: none"> + Observation and documentation of existing agricultural practices + field trips to existing permaculture sites 	<ul style="list-style-type: none"> + Observation and documentation of stakeholder engagement with the space + Monitoring effectiveness of plan during the initial phase of implementation
Reflect	<ul style="list-style-type: none"> + discussions on decolonization and antiracism in design planning to reflecting 	<ul style="list-style-type: none"> + juried critique of design concepts 	<ul style="list-style-type: none"> + Journaling regarding growth and progress and the potential of future seasons 	<ul style="list-style-type: none"> + Discussions on decolonization and antiracism and stakeholder engagement + Group reflection on strengths, weaknesses, and improvements to continue the plan

Results

Navigating Structural Challenges:

- **Balance:** Achieving the right mix of healthy challenge and clarity to avoid frustration in ambiguous situations.
- **Role Clarity:** The critical importance of defining roles clearly for effective team function.

Addressing Anti-Racism and Decolonization:

- **Student Engagement:** Overcoming student resistance to engaging in challenging conversations.
- **Strategy:** Early and frequent introduction of anti-racism topics to foster student-led discussions.

The Power of In-Person Engagement:

- **Collaboration Hurdles:** Challenges in fostering genuine connections through remote collaboration.
- **In-Person Advantages:** Direct interactions enhance motivation, understanding and deepen relationships.

Fostering Personal Development:

- **PALAR Impact:** Enhancing self-advocacy, initiative, effective communication, and leadership skills.

Next Steps

The PALAR approach is crucial in our complex, multi-layered, and community-driven project, fostering regular reflection and reassessment to navigate challenges. Regular reflective practices helped us mitigate confusion and bolster motivation with a well-defined initiation structure. We've also underscored the value of face-to-face interactions for enhancing participant engagement and facilitating sensitive historical dialogues.



Publications

2024 **Leeker, J.R.**, Palomar, M.P, Ruane, L., “Counter-Storytelling in Intergenerational STEM Experiences,” American Society of Engineering Education, Portland, Oregon, USA, June.

2024 **Leeker, J.R.**, Ruane, L., Sanders, H., MacDonald, L.,” Using PALAR to formalize informal education,” Research in Engineering Education Symposium, Hubli, India, January.

2023 **Leeker, J.R.**, Ruane, L., “The effect of student mentor relationships in afterschool elementary robotics programs,” Frontiers in Education, College Station, Texas, USA, October.

2023 **Leeker, J.R.**, Ruane, L., Richardson, R., “Lessons from Building a Legacy in Engineering: Developing Projects with Community Members,” STEMNoire, San Juan, Puerto Rico, June.

2023 **Leeker, J.R.**, Ruane, L., Sanders, H., Richardson, R., “Where do we start? Lessons learned from the PI, graduate research assistant, undergraduate researcher, and a community member starting their inter-institutional STEM-focused community-engaged project using PALAR,” American Society of Engineering Education, Golden, Colorado, USA, May.

Manuscripts in Submission

Ruane, L., Sanders, H., **Leeker, J.R.** “Building on PALAR- a Literature Review of PALAR-based projects, lessons learned and a collection of knowledge,” Research for Social Change.



Questions