LIVING ARCHITECTURE SYSTEMS GROUP

Toolbox Dialogue Initiative Workshop - 2019 LASG symposium

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"The LASG is about more than sculptures, and perhaps about more than the work. It's about the community."

~LASG member

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INTRODUCTION

The Living Architectural Systems Group (LASG) has undertaken the complex and ambitious challenge of intersecting the built environment with living systems. This endeavor requires cross-sectoral and interdisciplinary collaboration to facilitate knowledge integration across various disciplines including architecture, synthetic biology, human-machine interaction, and cognitive psychology. The LASG also focuses on advancing interdisciplinary methods situated at this art-science-engineering interface to build the capacity of interdisciplinary teams. Interdisciplinary team-members must consistently navigate diverse assumptions, jargon, value commitments, working methods, and priorities that come from different disciplines. The LASG has partnered with the Toolbox Dialogue Initiative (TDI) to support interdisciplinary capacity building. TDI focuses specifically on helping team-members recognize and articulate central concepts that relate to their disciplinary practice via a structured dialogue approach. This partnership has unfolded to help LASG members improve their working dynamic and thereby increase the likelihood of project success and facilitate identification of the desired collective trajectory of the LASG.

We have taken a 3-stage approach, (stage 1) distributing a communication survey in August 2018, using that information to develop four virtual Toolbox workshops (stage 2) in January and February 2019. We then used the responses from the virtual Toolbox workshops to develop the Toolbox workshop (stage 3) for the March symposium. The following report focuses on the results of the final Toolbox workshop event that took place at the LASG 2019 symposium.

THREE STAGE PROCESS

Stage 1

Communication Survey (*n=54*)

The survey was designed to collect data from members of the LASG on potential collaboration opportunities, as well as communication successes and challenges they experienced by August 2018 as part of the LASG. The results from this survey were disseminated in January and fed into the development of the virtual Toolbox workshops that took place in January and February.

Stage 2

Virtual Toolbox Workshops (*n=19*)

LASG members participated in one of four 90-minute virtual Toolbox workshops via Zoom. The Toolbox workshops focused on module themes relating to (1) living architecture systems, (2) working methods, and (3) motivations for collaborating. Each workshop concluded with a co-creation exercise aimed at identifying which themes and ideas would benefit from further discussion during the March symposium event.

Stage 3

LASG Symposium Toolbox Workshop (*n=47*)

On the final day of the 2019 LASG Symposium attendees participated in a 90-minute Toolbox workshop followed by a 60-minute co-creation exercise. Modules for this workshop were developed in response to the conversations and feedback from the virtual Toolbox workshops and focused on further articulating perspectives on (1) living architecture systems, and (2) methods, communication, and processes that can facilitate collaboration. The co-creation exercise focused on either planning a peer-reviewed handbook on living architecture systems or designing an introductory course for living architecture.

Satisfaction Survey (*n=14*)

A survey to assess participant experiences with the Toolbox workshop was sent out after the symposium event.

Satisfaction survey

Participants were highly satisfied with the workshop, giving it a mean rating of 4.03 out of 5. Participants commented that the workshop was engaging, challenged orthodox perspectives, and that the LASG would benefit from a longer workshop that split the dialogue and co-creation exercise into separate events.

"The community needs a much more technically, critically, and experientially informed approach."

~LASG member

"Give me a question that brings me somewhere I haven't been before."

~Paul Pangaro

LASG WORKSHOP OVERVIEW

Based on the findings of the virtual Toolbox workshops (see sidebar below), the March symposium Toolbox workshop was structured around a survey instrument that contained two modules, (1) *Living Architecture Systems* and (2) *Methods, Communication, and Process.* Each module was guided by a core question and a series of prompts that participants were asked to respond to on a scale from 1-5 (1=disagree, 2=somewhat disagree, 3=neutral, 4=somewhat agree, and 5=agree). Participants filled out a (pre)survey followed by a group discussion of the prompt statements and filled out a (post)survey identical in content to the (pre)survey once discussions concluded.

The discussion was followed by a co-creation exercise where groups of participants worked either on an outline for a living architecture handbook or a living architecture 101 course. This exercise helped participants leverage their diverse perspectives into actionable outcomes.

Virtual Toolbox Workshop Findings

The discussions from these stage 2 workshops were instrumental in identifying which prompts would benefit from more in-depth discussions. Some of the questions raised during these virtual workshops were:

- How do we characterize what is living and does it matter for living architecture? Is there a Turing test?
- What temporal and spatial scales should we be considering?
- Are there ethical boundaries that need discussion?
- Should parameters be placed on creations?
- Should we draw distinctions between individual and collective emergence, e.g. ecosystem approaches?

Module 1: Living Architecture Systems

Core question: *How is living architecture demarcated?*

Prompts:

The questions living architecture raises are more important than the knowledge it produces.

Within living architecture, aesthetics should not be prioritized over utility.

Living architecture needs to be approached at the ecosystem scale to be useful.

Sound is a fundamental component of living architecture.

The narratives we construct around living architectures are what makes them compelling.

Demarcating the living versus non-living characteristics of living architecture is a fruitless endeavor.

Module 2: Methods, Communication, and Process

Core question: *Can certain mechanisms provide the LASG membership with collaborative momentum?*

Prompts:

The LASG should produce a peer-reviewed handbook on the state of the field.

The LASG must function as a decentralized network to achieve its full potential.

Regular, in-person meetings are necessary for LASG projects to be successful.

There should be a process for assigning people to project teams.

All LASG projects should be interdisciplinary.

If pressed, I could conceptualize an LASG project today.

LIVING ARCHITECTURE SYSTEMS

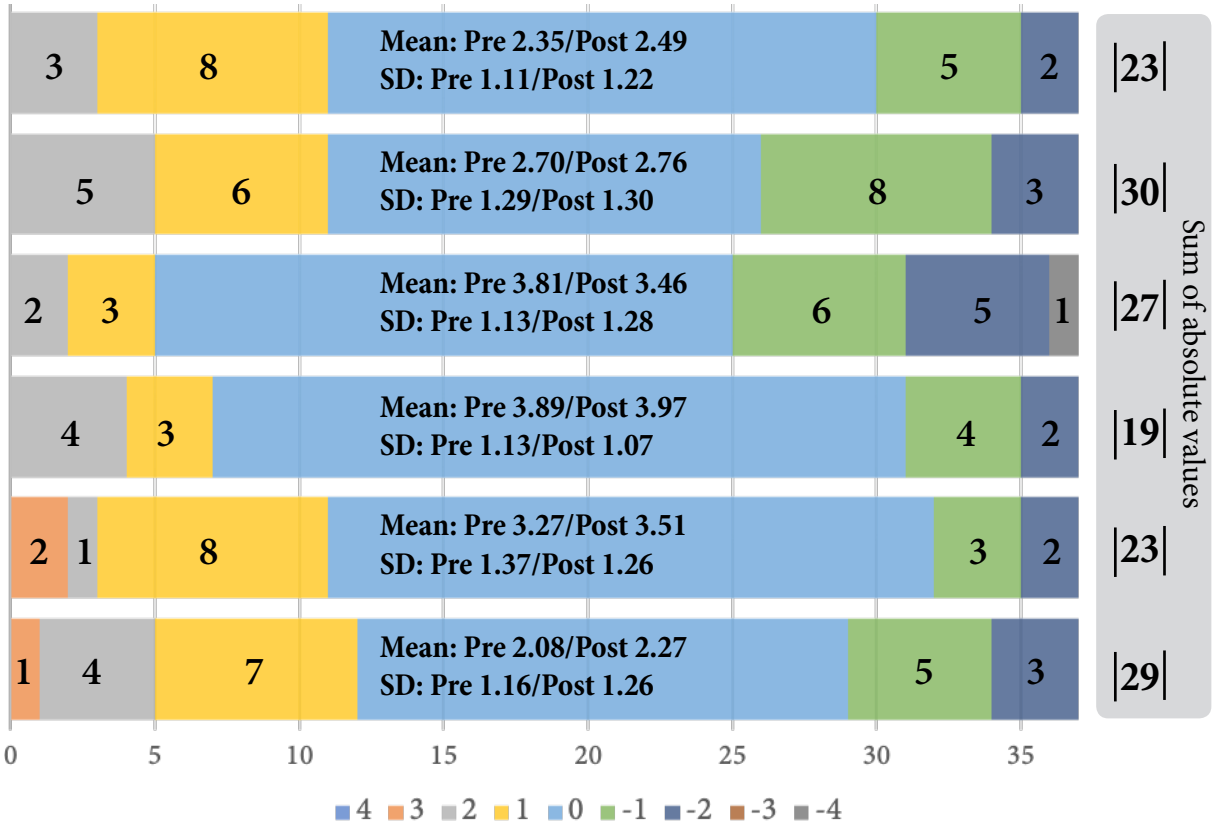
The graph below displays the changes in mean and standard deviation (SD) and the shift in prompt responses pre and post survey[1]. For example, prompt 1 indicates 3 participants increased their responses by 2 points (e.g. if they responded with a 2 in pre their post score would be 4), 8 by 1 point, 5 decreased their response by 1 point, and 2 by 2 points for a total change of 23 points (i.e. the totals of individual deltas for each prompt represented as the *sum of the absolute values*). The mean increased from 2.35 to 2.49 and the standard deviation increased from 1.11 to 1.22. All prompts had a mean increase aside from prompt 3. Prompt 4 in this module had the highest mean and lowest SD signifying an increase in score convergence. Prompt 1 and 5 had the largest changes in pre/post responses.

1 The number of survey respondents for this workshop totaled 47, however, we had respondents that were either missing the pre or post survey. We were only able to analyze respondents that completed both the pre and post survey, hence, *n* for the Living Architecture prompts is 37 and for Methods, Communication, and Process prompts it's 34.

Living Architecture Systems Prompts

1. The questions living architecture raises are more important than the knowledge it produces.
2. Within living architecture, aesthetics should not be prioritized over utility.
3. Living architecture needs to be approached at the ecosystem scale to be useful.
4. Sound is a fundamental component of living architecture.
5. The narratives we construct around living architectures are what makes them compelling.
6. Demarcating the living versus non-living characteristics of living architecture is a fruitless endeavor.

Changes in Likert Scores from Pre/Post (*n = 37*)



METHODS, COMMUNICATION, AND PROCESS

Prompt 3 had the highest mean recorded with a pre score of 4.09 and post score of 4.15, signaling a strong desire for regular in-person interactions. Prompts 1 and 5 experienced a decrease in mean scores and also the highest absolute value changes, indicating respondents changed their scores most often for these two prompts. Even though Prompt 2 had the smallest change in responses, the change was entirely positive with no respondents lowering their scores.

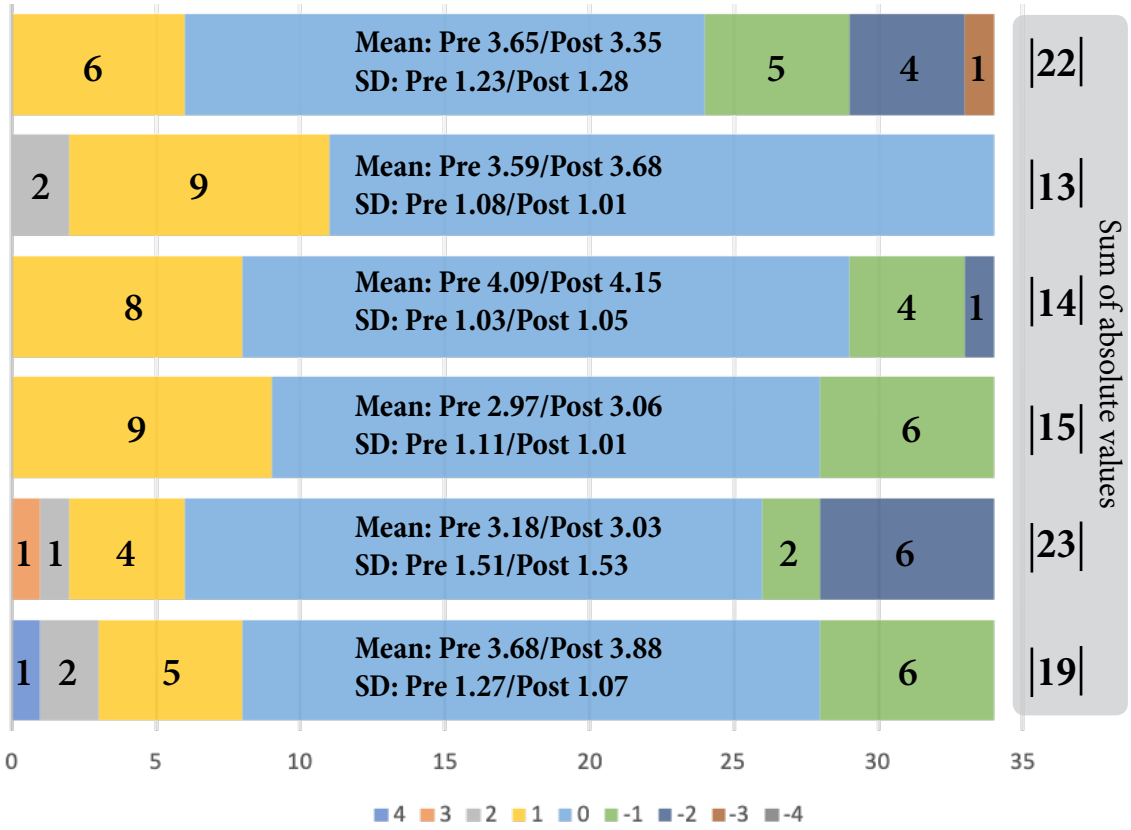
The Focus of this Analysis

It should be noted that the goal of a Toolbox workshop is not to intentionally shift responses. Rather the dialogue surfaces attitudes, views, values, and beliefs within the group. The shift in responses is an indicator that through careful and deep listening, collaborative interpretation, and collective meaning making participant interpretations of the prompts shift. The magnitude and directionality of those shifts can signal which prompts may benefit from further discussion and which share the most consensus.

Methods, Communication, and Process Prompts

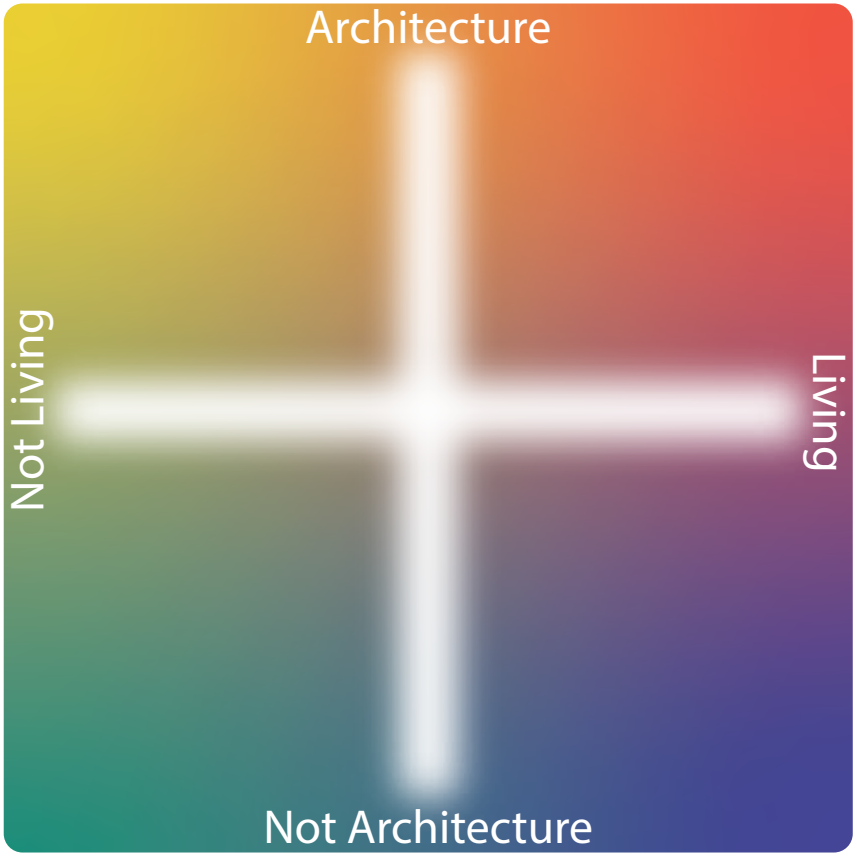
1. The LASG should produce a peer-reviewed handbook on the state of the field.
2. The LASG must function as a decentralized network to achieve its full potential.
3. Regular, in-person meetings are necessary for LASG projects to be successful.
4. There should be a process for assigning people to project teams.
5. All LASG projects should be interdisciplinary.
6. If pressed, I could conceptualize an LASG project today.

Changes in Likert Scores from Pre/Post (*n = 34*)



THE HANDBOOK OF LIVING ARCHITECTURE

The handbook group discussed the role of peer-review in the development of a handbook, who the audience might be, the essential elements of living architecture, and if the handbook might serve as a precursor to the development of a living architecture journal. The identified aim was to (1) broaden awareness of the field, (2) demarcate what qualifies as living architecture, and (3) understand how it is currently being practiced.



The handbook was organized into four themes:

1. Components (structure, actuation, perception, interaction, biology)
2. Scale (micro environments, rooms, buildings, temporal spaces)
3. Theory & Methodologies (history, algorithms, methods, experiments, narratives)
4. Practical Advice

The format for submissions would be broad, allowing contributors flexibility, whether they be from academia, the private sector, practitioners, or DIY communities.

Defining "living architecture"

One idea was to take contrasting researcher perspectives. The goal would be to establish terms of disagreement through opposing perspectives, ideally through a co-authored paper by authors who disagree on the term. We may not be able to say what living architecture is definitively but we may get closer to what it is not. The two authors thus help identify boundaries.

LIVING ARCHITECTURE 101

The 101 course groups (four total groups) developed a syllabus that focused on conceptualizing what should be included in an introductory university course. There was agreement that the course should extend long enough (5-12 months) that students have time together to develop strong collaborative skills, are able to conceive of a product, and produce a cohesive output. The course should be taught by multiple faculty from different schools, with topics drawn from art, architecture, science, and engineering. The course should also be structured to encourage modes of interdisciplinary inquiry and integrative thinking. The space the course is taught in should have the appropriate resources and design to encourage this kind of learning.

Course Structure:

1. *Theory and Ethics Foundation*: this supports the significant, project-based component of the course
2. *Collaboration Training*: an explicit effort placed on teaching students how to work together across disciplines
3. *Observational/Experiential Learning*: lessons should allow for exploration of topics that teach students multiple approaches to interrogation and experimentation
4. *Systems-Thinking*: a focus should be placed on systems dynamics and how they may intersect such as:
    a. Biology and computation, e.g., cellular automata
    b. Hardware, software, and wetware
    c. Intersections between the natural, social, and built environment and,
    d. Socially-situated technologies

One 101 course group selected children as their demographic, their goal being to "normalize the core ideas of LASG during youth." They framed living architecture as a means of stewardship, in effect embedding an ethic for intentional creation and care. The question guiding their general thinking on course development was, "How do we offer an environmental and immersive relationship with living architecture that is comforting, nourishing, awe-inspiring, perhaps even disturbing?"

Course Principles:

1. *Systems Learning*: there should be a low threshold for engaging in complex systems
2. *Provoking Positive Maker Society*: Scratch language, biohacker kits
3. *Immersive Environments*: learning should accelerate embodied cognition and,
4. *Play*: LASG principles would be engaged with through games and toys to teach complex systems concepts and methods

Interactive Learning Inspirations:

The group provided three examples of interactive/playful learning environments they envision as a model for this course. Explorable Explanations and Evolution of Trust by Nicky Case and Dynamic Land by Alan Kay.

"The workshop was a reflective opportunity and a very helpful aspect of how we might engage in meaningful discussion"

~LASG member

RECOMMENDATIONS

Based on data gathered from the workshop participants, we offer the following recommendations for your consideration:

Disseminate knowledge more broadly

There is a strong desire for knowledge sharing in the community. In particular there was a call out for a broader dissemination of technical advancements within the LASG and for the opportunity to collectively interrogate those advances in an effort to think reflexively and critically about next directions.

Restructure graduate training

Graduate training should be structured to advance students' interest in living architecture as a field. This may require the community to find opportunities for structured interdisciplinary learning for students. Additionally, a minimum of one living architecture course should be developed that orients students around a common foundation.

Produce a peer-reviewed handbook

In alignment with the development of a living architecture course to train future scholars, a peer-reviewed handbook will identify the current state of the field and potential trajectories. Graduate students in particular noted the need for this as it will establish a platform for their professional development. By leading this initiative the LASG community has an opportunity to contribute significantly in the establishment of the living architecture canon.

More in-person meetings

Several members noted the importance of in-person interactions with other members. Finding opportunities for more frequent interactions will help with membership cohesiveness and engagement within the LASG.

Conclusion

The workshop sought to improve LASG working dynamics and facilitate identification of a desired collective trajectory. We believe that extending efforts to further disseminate research, developing a foundational course for students, advancing and organizing knowledge about the field, and finding opportunities to engage the community to be top priorities for LASG. These are actionable ideas members can coalesce around to further establish living architecture as a field and community.

Suggested 101 Readings

Capra, F., & Luisi, P. L. (2014). The Systems View of Life. The Systems View of Life. https://doi.org/10.1017/cbo9780511895555

Carse, J. P. (1986). Finite and Infinite games: A Vision of Life as Play and Possibility. The Free Press1. https://doi.org/10.1002/14356007.a01_045.pub3

Dennett, D. C., & Braitenberg, V. (2006). Vehicles: Experiments in Synthetic Psychology. The Philosophical Review. https://doi.org/10.2307/2185146

Kinnane, C. (2008). The Human Experience. Grassroots Films.

Schrödinger, E. (1944). What is Life? Cambridge: Cambridge University Press.