WORKSHOP REPORT

Campus as Living Lab: combine research, education and campus operations

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The urgency of the UN global sustainability challenges to secure a clean, healthy, safe, and prosperous world for everyone and the necessity to improve material, water, land, and energy efficiency by several factors is widely acknowledged. The complexity of these challenges calls for integral, innovative, and systematic approaches to research, analysis, solution development and application on our campuses. University communities are excellent venues for testing, accelerating and scaling such solutions.

A Next Generation approach to engaging the campus as a 'Living Lab' is emerging to seek effective mechanisms that will enable facilities, students, and researchers working together to seek solutions to common challenges that lead to measureable impacts and effectiveness. However, being academic institutions, we now need to define the desired impacts on the whole, monitor the successes (and failures) of all approaches, and analyze, understand and falsify the factors behind these successes. Only in that way, recommendations for continuation have value beyond our own experiences.

In the workshop, we reported on the progress after the ISCN Vancouver conference 2017, by which several ISCN members have continued to develop the Campus as Living Lab Framework[1]. The system is intended to create value in four ways: improved understanding of mixed academic and non-academic programs; effective sharing and communication with peers; creation of a valuable database for analysis on topic, theme, size; and improved engagement with stakeholders.

In this workshop we explored how to use The Campus as Living Lab learning system *for analyzing, designing and running a living lab* and create the values as intended. In a dynamic dialogue emergent and active living lab models from around the globe were discussed. The 40 participants worked in four subgroups on Living Lab issues:

1. how to use the framework,
2. how to design the process and management,
3. how to generate learning and educational outcomes and
4. how to cultivate a culture, as a result of the framework for Campus as Living Labs.

The main messages from these four tables are:

1. **How to use the framework.** In this workshop, the framework was presented and how it can provide guidance through all the phases of a Living Lab on Campus. There

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[1] Verhoef, L.A., Bossert, M., Newman, J. Ferraz, F., Robinson, Z.P., Agarwala, Y. Wolff III, P., Jiranek, P., Hellinga, C., *Towards a learning system for University Campuses as Living Labs for sustainability*, In: Universities as Living Labs for Sustainable Development: Supporting the Implementation of the Sustainable Development Goals - Volume 2. Springer, 2018 (in press).

are a couple of critical issues already during the preparation and set-up phase of a Living Lab on a university campus and its unique surrounding and environment. Therefore, it seems to be helpful to have a kind of handbook or framework, which provides necessary checklists or process-outlines to be aware of certain risks. However, not only for the beginning, as well for the managing, monitoring and evaluation processes the framework provides some guidelines, assistant tools and hints e.g. how to build trust, keep persons connected to the Living Lab and how to prepare the ground for and assure a long term cooperation. Summarizing the discussions, the participants concluded that a Living Lab as a trans-disciplinary approach is very different from a classical research project and therefore it is very useful to get guidelines and tools how to proceed and to share stories about success and failure.

2. **How to design and manage.** In designing the process and managing Living Labs, a three to five step approach seemed workable, and especially formulating the right parameters, questions and decision points in those steps. These steps in designing the living lab were typically: i) Idea/filtering , ii) Definition, iii) Stakeholder group formation, iv) Living Lab setup, and v) Approval. It was more difficult to define and formulate management approaches to run and maintain momentum in a Living Lab.

3. **Educational outcomes.** This part of the workshop considered how we articulate and maximize the educational outcomes of the Living Lab approach. We considered different scales of educational outcome from a single student involved in a research project to the whole of the campus community who could be educated through a campus wide Living Lab intervention. Different levels of educational outcome were also considered, for example those that may be consistent with any Living Lab project which could be set by a Living Lab Manager for a Living Lab program/approach as a whole, to discipline/project specific educational outcomes set by researchers or program leaders. Discussion was also had on how certain desired outcomes – for example those relating to 'transformation' can be measured. There is significant scope for further work in this area, ensuring that pedagogical considerations are more firmly embedded in Living Lab approaches.

4. Cultivating a culture of living labs across our campuses is a complex endeavor. Participants sought and found common ground in framing and strategizing how they are developing living labs on their campuses. Participants found common ground by exploring and framing their process of cultivation into four categories:
   a) *Barriers* e.g. data risks, lack of integration in staff job description, leadership engagement
   b) *Cultivating strategies* e.g. funding to attract faculty, multi stakeholder engagement, access to data, alignment of stakeholder interests.
   c) *Attributes of successful 'living labs'* e.g. data sharing and analysis, solution development, defined learning outcomes, new policy.
   d) *Communication strategies* e.g. development of metrics for assessment, transferable and translatable results.

In conclusion, participants strive to determine how best to connect the output from living labs on their campuses to the desired transformation needed to leverage the campus as a true test bed for sustainability. Overall, it is clear that a strong co-creating force is emerging, where many are building up their skills and experiences, and a framework is embraced as a way to structure and communicate with each other. Next steps are to further work on the framework and gain experience with testing it in practice. Also expanding the approach to the urban connection and wider communities around universities is emerging as a field of interest.