



The state of the art of Living Labs in Higher Education

Author

Eveline F. Kapteijn, The Hague University of Applied Sciences, Faculty of Business, Finance & Marketing, Research Group Innovation Networks, Johanna Westerdijkplein 75, PO Box 1336, 2501 EH, The Hague, the Netherlands. Email address: e.f.kapteijn-kruijswijk@hhs.nl

Abstract

Living Lab Environments (LLE) are a relative new phenomenon, especially in higher education. There is no unambiguous definition of LLE in the literature and several LLE are discussed. Where traditional education takes place in a classroom (a controlled internal environment), LLE experiments in a real-life environment with all kinds of stakeholder groups needed. For higher education, this research explores whether this form of education in practice is appropriate by mapping the success and failure factors. Interviews with coordinators of labs and their experience with these labs will provide clues for future research.

Keywords

Smart cities, Stakeholders, Social change, Open innovation, literature review

Introduction

This progress paper details the progress on the success and fail factors of Living Lab Environments (LLE) in higher education. At present, three main messages can be communicated.

The Research

In the context of smart cities and high tech innovations LLL have emerged as a relatively new phenomenon, especially in higher education. The first stage of this research was an exploratory study on the phenomenon and an overview definitions and contexts. Initially desk research was conducted, in order to collect case studies and reports, complemented with a literature search in the Business Source Ultimate (BSU) database. Follow up interviews with lab coordinators yielded insights into definitions and success and fail factors.



Message 1: Definitions in the Literature

Generally, LLE can be generally be described as experimental settings for public innovation different from the traditional, more controlled, internally settings for public innovation¹. The labs are construed as a collaborative platform for research, experimentation, and collaboration in real-life context with stakeholders groups. Based on the analysis of several case studies, two distinctive features of LLE keep coming back: co-creation and a lifelike space for experimentation in a quadruple helix collaboration in the context of (technological) innovation; e.g. big data, digital sensors and robotization ^{2,3}. There is no unambiguous definition of LLE in the literature ³. In fact, there are many types of LLE⁴ like Semi-Realistic Environments, Real Life Environments and Network and Platforms^{2,4}.

The second part of the research was to examine how LLE are used in the context of higher education and the distinctive features that separate them from classroom education. With the help of subject librarians, a search strategy was developed. Special attention is given to the following topics: The problems LLE solves as opposed to classroom education and the consequences for the stakeholders involved. The literature on LLE in higher education turns out to be scarce.

Message 2: LLE in higher education

LLE are recognized as educational environments to prepare students in higher education for future roles and responsibilities in their future work environments; thus knowledge regarding the optimal embeddedness of higher education in living labs is of importance¹. Living lab environments are a real life environment and students learn to work on innovative projects, tackling 'wicked problems' ⁵ in a multidisciplinary team. This sounds great, but there are many challenges ahead, especially regarding the vision on learning on higher education and assessing knowledge, skills and wider competences outside a stable laboratory environment, called a classroom. The current literature indicates that LLE are predominantly found in technical studies (e.g. build environments, computer sciences, engineering and health). Table 1 shows the differences between the traditional classroom and the LLE.



Traditional classroom	Living Lab Environment
Controlled environment	Real life environment
Monodisciplinary	Multidisciplinary
Homogenous groups	Heterogenous groups
Standardised tests	Assessments
Grading scales	Professional judgement
Outcome is predetermined	Outcome(s) is/are not known in advance
Achievement of a learning outcome	Different stakes with different outcomes

Table 1. Classroom versus Living Lab Environment

The fact that we always learn in controlled classrooms is because of the massification of higher education which promotes standardization of education. Education in the classroom is often still characterized by lectures and tutorials. In the tutorials, students are trained to master the knowledge. Project education is a form in which the traditional classroom is superseded by having student work on a research question from the workfield or they get a case based on the real world. But still this happens within a controlled environment.

LLE arise within research centers because innovation need to be tested, but researchers also want to gauge the social relevance of their innovations by involving several stakeholders groups. Because everybody within the LLE has a new experience, everybody is learning in the real life environment each with there own goal. Alignment of curricula and fitting in a LLE is therefore a challenge. In the educational profiles Learning Outcomes are defined. These are related to the Calohee framework where Learning Outcomes for knowledge, skills, autonomy and responsibility (wider competences) are defined.⁶ Calohee is an international framework to compare degreeprogrammes. Calohee is the followuop to the Tunig method and integrates the two meta-frameworks for education classification within the European Union. The European Qualification Framework for life long learning (EQF) and the Qualification Framework for the European Higher Education Area (QF EHEA). Further research should show whether the LO offers the possibility to be full-fledged environments for LLE.

The course programs are based on stable laboratory environments. New forms of education are not or hardly known among teachers and students in higher education. This new form is being explored and experimented with, especially in the context of research centers. The research centers have the task to actively engage educational programs in their research, as well as the creation of new learning environments.



Message 3: Success and fail factors of LLE in higher education

The third part of this research concerns a field study based on surveys and follow-up interviews, exploring preliminary success and fail factors of LLE in higher education in 8 case studies. Special attention is given to: The roles and tasks of the stakeholders in the LLE; Collaborative arrangement between the stakeholders and the expectations of the interviewees regarding the future of LLE in higher education.

The first tentative observation is that LLE often take in the form of a minor (elective). Some courses allow students to do their thesis within such a minor or their internship. Tabel 2 shows the first observations of the success and failfactors of LLE in higher education.

Succes factors	Fail factors
Intrinsic motivation of students	Ignorance among students and teachers
Real life environment	Training profiles do not match
Everybody learns (collaboration high)	Too few skilled educators available
New form of learning in practice	Attribution of indivial achievement(s)
Broad spectrum learning	Educators are ill prepared for their role
Wider competences can be trained	Recruiting eligible students
Adaptive learning in practice	Embedding in education still difficult

Table 2. Preliminary success and fail factors of Living Lab Environment

Summary of findings

The literature review shows that little or no research is known about the role of higher education in LLE. What does emerge is that all stakeholders learn in LLE, which makes it a rich learning environment for higher education. It concerns new (technological) innovations so that experience can be gained during the study. However, within higher education, practical learning is still carried out in a controlled internal environment which takes place within the university of applied sciences or at an organization. The challenge for learning in LLE in higher education lies in sharpening the vision of learning and assess in practice. For the research centers, mapping out the different forms of LLE is supportive in this regard. Research centers and curriculum committees can thus explore possibilities. The aim is to develop an additional form of practical learning in an international context.



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