Dynamic Boundaries of Action Based Learning: the Longitudinal Impact

D. Song [1]
[1] PhD Candidate, Tongji University, China,
song.dongjin@tongji.edu.cn
S. Nousala [2]
[2] Research Fellow, Aalto University, Helsinki,
Research Fellow, University of Melbourne,
Professor, Wuhan University of Technology
***Susu.nousala@aalto.fi (corresponding author)**
P. Aibeo [3]
[3] Design Architect, PhD.c. Architectural
Democracy, School of Civil Engineering, Aalto
University, Helsinki, Visiting Associate
Professor, UNAM

Abstract

How do communities and group-based efforts create, learn and evolve? This paper argues that communities are dynamic, continuously creating connections through cyclical learning processes, regardless of how tight or loosely formulated group based efforts are (Hall et al. 2012).

Learning cycles or epicycles processes are relevant for action-based investigation within organizational and social structures. The question of behaviors across boundaries or groups maybe influenced by their positioning within a larger adaptive system, including the type of focus, determined goals and the type of connections that have been developed over time (longitudinally).

These types of community or group efforts can be described as autopoietic systems, which operate within larger adaptive societal webs (Nousala 2014). The learning methodologies involved in investigating these types of dynamic phenomena need themselves to be dynamic. These methods can be viewed through longitudinal cycles, (which are essentially feedback loops that include extensive reflective time lines, integration before repetition) exposing these epicycles at work. The continuous recording of various processes through epicycles (which are the basis for learning cycles) provide a means to "qualitatively measuring" change, which would normally go unseen (Hall et. al 2012; Hall et al. 2005; Nousala and Hall 2008; Wenger and Synder 2000; Garduno et al. 2015).

1 Introduction

The purpose for the investigations into various dynamic evolutionary processes has been to understand common points between methodological approaches, and their possible impact at the intersection of various bounded rationality (where knowledge and cultural including community and organization induces a sense of boundary and frontiers) (Simon 1956). For the purpose of this paper, boundaries included community and its various relationships to its environments, be they physical or virtual (inclusive of environmental, social, political, and economic).

Knowledge generation mechanisms vary according to the type of problem, number of stakeholders, the goals for change in the context of communities. Based on Susan Gasson's explanation of relationship between problem definition and knowledge generation (Gasson and Elrod 2006), action based knowledge in this instance has been defined as knowledge about problem solving tasks and goals that emerge through a process of exploring and re-solving ill-defined problems (wicked problems) in a real world context.

The Action Research model has been widely utilized by practitioners in many social science fields as a practical problem-solving method (Akdere 2003). Action Research, Action Based Learning and Living Lab methodologies can be considered as similar dynamic theory-praxis dialectic based on learning approaches that aim to generate action based knowledge, which is a legitimate alternative to positivistic hypothesis (interaction free) testing, also useful to investigate changes in communities and their environments. In this paper, finding points of commonality rather than making distinctions between these three approaches was more helpful during the investigation of a key finding, the longitudinal impact on communities.

The relevance for recording continuous shifts during the longitudinal process, provided a means by which to apply action-based knowledge for problem based solving. Such approaches have an ability to solve complex problems and to increase the speed and quality of individual, team and organizational learning. The success of the application of this type of action-based knowledge relies on the quality and consistency of longitudinal approaches for mapping and recording any current discussion, discourse, literature or practice. The application of the action-based knowledge also exposed various properties and behaviors operating in close proximity to or attached to boundaries (physical or otherwise). In particular, properties or behaviors were exposed and emerged through a longitudinal approach. With regards to the dynamics involved within a longitudinal approach, it raised the question: "What length of time was required or considered sufficient for supporting the development of robust groups or community based actions,

(as in knowledge attained while participating or interacting with community activities?"

This paper discusses group or community based actions as a point of investigation, exploring different types of inquiry, ranging from the qualitative (Action Research, Action Based Learning and Living Labs) approach, through to community engagement via quantitative investigation (using open source "interactive" about the physical environment "buildings"). These action-based inquiries also extended investigation and discussion into their immediate environment, and/or eco-systems through dynamic learning approaches.

2 Defining dynamic learning approaches

Action based knowledge generation and reflection (learning gained through participation) started their life in the 1940s as we normally credit Kurt Lewin as the scholar who introduced these approaches of Action Research in 1944. Action Research can be described as a set of theoretical approaches informing practice. In turn the practice refines the theory, in a continuous transformation. In any setting, people's actions are based on implicitly held assumptions, theories and hypotheses, and with every observed result, theoretical knowledge is enhanced. The two are intertwined aspects of a single change process. It is up to researchers to make explicit the theoretical justifications for the actions, and to question the bases of those justifications. The ensuing practical applications that follow are subjected to further analysis, in a transformative cycle that continuously alternates emphasis between theory and practice.

Elden and Chisholm (Elden and Chisholm, 1993:124) summarized the minimum characteristics of Action Research which include purpose and value choice, contextual focus, change based data and sense making, participation in the research process and knowledge diffusion (quoted from study notes of Hongkong Polytechnic University).

"a) purpose and value choice: an Action Researcher has some vision of how society or organization could be improved and uses the research process to help bring this desired future state into existence. Action Research is change oriented and seeks to bring about change that has positive social value.

b) contextual focus: contextual focus would allow us to appreciate how the local people define "the" problem and need an interdisciplinary way to solve local problems. Moreover, the active researchers are interested in formulating cause-and-effect explanations of participants in a given context with the view to digging out "tacit knowledge" and "local theory" of a particular context rather than the general knowledge.

c) change based data and sense making: Action Researchers collect data systematically over time for the purpose of tracking the consequences of their invention. They assumes that "ordinary members can generate valid knowledge as partners in a systematic empirical inquiry based on their own categories and frameworks for understanding and explaining their world's and people's cognitive map or local theory are also legitimate and useful for enhancing scientific validity.

d) participation in the research process: all efforts should support and encourage the ongoing cyclical and emergent nature of the Action Research process which researcher should feedback to and active interaction with the people.

e) knowledge diffusion: spreading knowledge to the public which is not through a good idea alone but finding the possibility of doing research that could have a great impact on the public."

It is useful to note that Elden and Chisholm's observation of the participatory research process as transformative cycles do "continuously alternate" between theory and practice, one informing the other. However, this paper extends this concept further to provide more than a mere binary exchange between theory and practice. The discussion in 2.1 and 2.2 extends the notion that Action Research, Action Based Learning and Living Lab approach have the ability to provide a means to multiple emergent and dynamic states to be observed and gained, provided via longitudinal process.

2.1 Action Based Learning, Action Research and the Living Lab approach

To build dynamic learning systems, it is necessary to understand the various approaches towards different operating environments. For longitudinal development of robust groups or action based community activity, several approaches can be applied to build dynamic learning systems both in academic and in the practice based fields. For example, there is Action Based Learning, Action Research, (Kurt Lewin 1940s, also termed as participatory Action Research, collaborative inquiry and emancipatory research) and the Living Lab approach. These three different approaches were considered. As such, these approaches also needed to be defined for the purpose of discussion and comparative analysis.

Action Based Learning emerged in the 1940s, introduced by Reg Revans (1988) and Kemmis (1987), advocated group participation, programmed instructions, spontaneous questioning, real actions, and experiential learning in a constant and dynamic way in different social and organizational contexts. Since its inception, it has been applied by individuals, teams, and organizations to define and solve complex problems as a self-developed learning agenda in businesses, governments and educational institutions. Action Based Learning considered as a stream of Action Research that referred to "Contextual Action Research", can be defined as an iterative process in which a group of real people help each other to resolve and take action on real problems, then learn and reflect through their

experience. It is not usually necessary to have a facilitator during the process.

European Network of Living Labs (ENOLL), which is the largest community with over 370 Living Labs, defined "Living Labs" as a real-life test and experimentation environment where users and producers co-create innovations in real world context. The European Commission as Public-Private-People Partnerships (PPPP) has characterized Living Labs for user-driven open innovation (Open Living Labs, n.d.). Veekman's argument (Veekman et al. 2013) is based on the characterizing purposes and key principles of Følstad (2008) and Eriksson et al. (2005), which took "the ecosystem approach", "level of openness", "community aspect", "user role", and "innovation outcome" as key characteristics of Living Lab triangle framework.

These approaches gained importance in times of crisis and world-shaking change, for example, during and after the World Wars, global economic crisis, environmental deterioration, and socio-economic change. Each approach has its own particular characteristics while sharing some common distinguishing features. In particular, "experiential learning cycles" can be considered as one of the key factors for self-determining, independent, self-governing of groups, or communities building. A comparative analysis of the typical process of the Action Based Learning, Action Research, and the Living Lab approach, meant exposing the connection while also learning about interactions between approaches to refine the sustainable innovation process.

2.2 Comparison of Action Research, Action Based Learning and Living Lab approach（Figure 1）

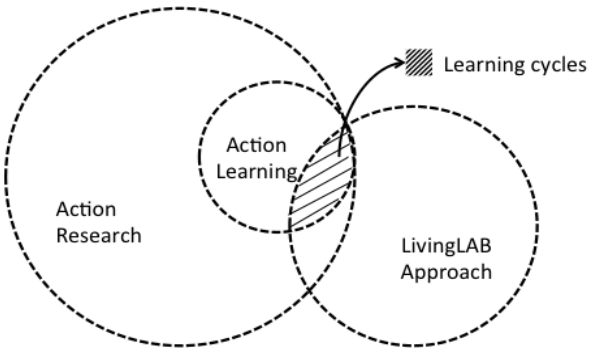

Fig 1: The comparison of Action Based Learning, Action Research and Living Lab approach.

2.2.1 Action Research vs. Action Based Learning

Action Research can be generally understood as a interpretive and critical approach: "the way in which groups of people can organize the conditions under which they can learn from their own experience and make this experience accessible to others" (McTaggart 1997). A step later, the same group(s), undertake actions to resolve the problem(s) using their own experience to reflect the next iterative research cycle. "Action Research... aims to contribute both to the practical concerns of people in an immediate problematic situation and to further the goals of social science simultaneously" (Gilmore, Krantz and Ramirez, n.d.). Action Research also could help "systems to develop a higher degree of self-determination and self-development capability so that learning continues after the researcher leaves the system" (Elden 1993a).

Action Research is used in real situations, rather than in contrived, experimental studies, since its primary focus is on solving real problems. According to (Brown 1993), the "northern" industrialized country tradition has been more concerned with work groups and organization. The research deals more with organizational decision-making to support organizational reform. The "southern" version has been working with grassroots group(s) to promote fundamental transformation, and the major work is to understand and change communities and societies.

Action Based Learning and Action Research are closely related processes for collaborative learning. Comparing and analyzing Action Based Learning and Action Research, the differences between these similar terms are considered here.

Application field: Action Based Learning is more often used in organization settings; Action Research is more common in community and educational settings.

Facilitator: in the Action Based Learning process, there may or may not be a facilitator for the learning groups which are formed; in the Action Research process, the researchers serve as consultants, partners, academic supervisors or even managers.

Learning group: in Action Based Learning, each participant draws different learning from different experience; in Action Research, a team of people draw collective learning from a collective experience ("Action Based Learning : ALARA : GroupSpaces" n.d.).

In recent years, with the increasing use of project teams in Action Based Learning programs, the difference between Action Based Learning and Action Research has become blurred. Most Action Based Learning needs to be facilitated and also applied for community, education and organization setting ("Action Based Learning : ALARA : GroupSpaces" n.d.). In this paper, we treat the learning process of both Action Based Learning and Action Research as the same: diagnosing, action planning, taking action, evaluating and specifying learning.

2.2.2 Living Lab approach

European Network of Living Labs (ENOLL), which is the largest community of over 370 Living Labs, defined "livinglabs" as a real-life test and experimentation environment where users and producers co-create innovations in real world context. Living Labs have been characterized by the European Commission as Public-Private-People Partnerships (PPPP) for user-driven open innovation .

Several scholars mentioned that the process of Living Labs created rapid learning cycles to accelerate the innovation process as well as reducing risks (Schaffers, Guzman, and Merz 2008).

Living Labs are concerned as an umbrella with a wide variety of subjects and different contexts, thus each Living Lab adopted distinct methods and process. Therefore, they are still a new research area due to lack of common understanding. In this paper, we rely on the data from secondary material and documented cases to clearly identify their research methodology and process in publications. The main Action Based Learning models and Action Research frameworks are the following:

iLabo Methodology(Ballon, Pierson, and Delaere 2007),

Catalan LL Methodology (Almirall and Wareham 2008),

FormIT Methodology (Bergvall-kåreborn, Holst, and Ståhlbröst 2009),

CKIR LL Methodology (Scholar and Consortium 2011),

LbD (Learning by doing) Model ("Laurea Living Labs " n.d.)

It is interesting to note these subtle differences of LL methodologies:

These different stages of different LL models are not always strictly separated from each other in real cases. (including within various contexts).

The dynamics of different stages of perspectives between theory and practices are part of the iterative process of the research cycle but also are influenced by shifts in context in action, cycle after cycle through the practical persective. The theoretical perspective can then track these iterative processes through longitudinal methods of analysis.

Comparing these models not only help in mapping out the research activities process but also validating the research framework.

2.3 Comparison learning process of Action Research, Action Based Learning and Living Labs approach（Figure 2）

Action Based Learning, Action Research and Living Lab approach were mostly separate, with each having its own provenance, tradition, originators and literature. Comparative analysis of the methodologies in figure 2 shows the major stages of Action Research, Action Based Learning and the Living Labs approach. These three approaches shared similar iterative learning process when they generated action-based knowledge and aim at achieving longitude impact in communities such kind real context. A distinctive pattern begins to emerge in Action Research, Action Based Learning and Living Labs approach, which evolve in a spiral through a number of stages—typically three or four.

2.4 Comparison of Action Research and quantitative/qualitative data analysis (the case of architectural democracy)

In the current techno-economic landscape, varying testing and experimentation platforms can potentially overcome a number of systemic failures during the innovation process (Edquist 2001). Such experimental approaches cannot be supported only offering specific methods and tools to the designers or to users, or even by implementing a participative design approach (Schaffers, Guzman, and Merz 2008). In addition, there needs to be a qualitative and quantitative approach to capture emergent properties when investigating relationships between technical evidence and its non-data counterparts.

This hybrid socio-technical research methodological approach provides a means for integration of data by tracking of technical-evidence-based outcomes and its qualitative counterpart. An example of this type of approach is provided through research, based in a topic, "Architectural Democracy". This ongoing research / practice deals with the relationships between architecture, technology, politics, its repercussions for citizenship, architectural practice and policy-making. It is concerned with ways of using technology for rendering buildings into open source interfaces, improving public understanding of the built environment for the everyday life of citizens, including the quality of political participation. Due to its human scale and cross-generational properties the work focuses on buildings in cities. The approach is done at both research and industrial levels.

Essentially, the democratic decision process involves the end-user, the architect and the developers. The important point to be unfolded in this research is to investigate on a tool that will allow a more horizontal decision process (democracy) among developers, architects and end-users, thus answering the main question: How can open source buildings facilitate the democratic process?

To date, practical tools have been developed for citizens, for real-time public access and evolving editions of building's metadata, including combinations of smartphones, open source BIM (Building Information Modeling), and photogrammetry. These tools were a fundamental aspect of the data analysis (quantitative approach) but fell short in providing a comprehensive understanding of the complexity of human and city interaction.

			DIAGNOSING	ACTION PLANNING	TAKING ACTION	EVALUATING	SPECIFYING LEARNING
action research &action (based) learning			Identifying or defining a problem	Considering alternative courses of action	Selecting a course of action	Studying the consequence of an action	Identifying gemeral findings
livinglabs	Schaffers et al (2008)		Diagnosing capturing the issues and challenges, interpretation, data collection	Action planning specifying improvements and interventions, action plans	Action Taking implementing the changes, continuous monitoring, providing feedback to participants	Evaluation joint evaluation of outcomes, problem redefinition	Specifying learning
	Pierson & Lievens (2005)		Contextualization *telenological scan *a (state-of-the-art) study *Selection of respondents	Concretization *initial measurement of the sample *socio-demographic and economic *relation towards (the introduced) technology or service	Implementation *running test *direct and indirect analyses	Feedback *an ex post measurement *infer technological recommendations	A new research cycle
	Ballon, Jo, Pierson, & Simon, Delaere, (2005)	The IBBT Research Cycle	Contextualisation appreciating the technological and socioeconomic context evolves to user selection	Concretisation where departing from an initial measurement, the concept is developed	Implementation implementation and testing in real life environments	Feedback ex-post measurement	
	Bergvall-Kåreborn et al (2009)	FormIT methodology	Planning *decidingon the overall project team *discussing issues: context, important constraints and relevant methodologies, and methods for the project as a whole	Concept design *generate needs of the service *design concepts *evaluate concepts	Prototype design *generate needs in the service *design prototypes *evaluate usability	Evaluation *generate changed needs of and in the service *design final system *evaluate user experience	
	Scholar & Consortium, (2011)	CKIR LL methodology	Grounding identifying stakeholders and selecting the group of users	Interactive and iterative co-design definition of concepts and the design of prototypes	Appropriation and implementation public trials and gathering feedback		
	Tang & Hämäläinen (2012)		Vision users (groups) and issues to be solved are preliminarily identified in real world context.	Prototype co-designed and co-developed with users		Evaluation testing prototype with users and in real life environments.	Diffusion&Adoption *diffused and adopted by other *collaborating LL contexts for the scalability and sustainability of LL
	Alaoui, Ting, & Lewkowicz, 2014	FoSIBLE Living Lab methodology	Research issues Analysis state of the art solutions study field	Design&implementation service and features		Evaluation evaluation of usages of the device in home and laboratory	

Figure 2. Comparing the methodologies of

Action Research, Action Based Learning and Living Lab approach

In light of this short fall, direct observation (interviews, field tests…) is thus required to support the necessary range of social/economic relationships and processes. Alongside the quantitative data of software development, (according to the project developments), a systematic re-evaluation, planning, acting and reflection of the research is necessary. It is clear that there is a need for a deeper understanding of the actual process, involving participants as both informants and researchers (Tacchi, Slater, & Hearn, 2003). The qualitative observations allow the research to be adaptive, exposing a deeper understanding of the whole and to improve the software drafting in a retroactive way.

This case study utilized socio-technical methodological approach, covering several aspects from across the Action Research spectrum, in combination with qualitative data collection with multidisciplinary elements, holistic viewpoints, emergent phenomena and practice-based fieldwork, as well as prototyping and testing.

Work carried out through both qualitative and quantitative investigations captured the emergent properties inherent within a complex environment/ecosystem. Due to the multidisciplinary nature of this work, a holistic approach was required to cover firstly, the quantitative data, collection and analysis aspect, highlighting the scope and direction of the work over time (the longitudinal element, which was clearly an important aspect). Secondly, the qualitative approach was used to uncover the non-data related aspects of the investigations, partly through Action Research in the field (in this instance, the photogrammetry case work).

It is interesting to note at this point how longitudinal aspects of this socio-technical case work is impacted by Action Based Learning and research.

The following are suggestions of current examples that are applicable to the framework(s) in figure 2, where the key observation included the evolution of Action Based Learning and research through several stages via spirals, cycles or epicycles:

. Social barriers and constraints and how different communities might deal with this to solve social problems or create new innovation.

. Over time, how added knowledge about the construction of the buildings (vertical especially, as in Hong Kong and Shanghai) impact the people and their way of living.

. Positive deviance (PD) maybe useful (a broad set of participatory methods--see Pascale and Sternin 2004) to highlight the different approaches towards Action Research engagement that has the ability to expose hidden value, knowledge and tacit connections that would be useful if made explicit and known.

2.5 The socio-technical system and Action Based Learning: Are they both part of action systems?

Lugovic (et al. 2015) discusses that the recently proposed emergent development of science (Science 2.0) based on socio-technical progress as a new phenomenon, a phenomenon that utilizes interrelated socio-technical interactions, focusing on studies carried out at scale, by rigorous observations in real time. Lugovic (et al. 2015) goes on to say that communication is at very the heart of science, one of the most powerful ways for building on the shoulder of others, creating new emergent work.

If this is so, the understanding of technology within society and various communities, and within various environmental contexts, require us to comprehend technology as an action system (Lugovic et al.2015). This blending of Action Based Learning, research and a socio-technical system provides the way for the translation of human abstraction to human action. This blending also has the capability to technically make clear patterns via software and non-data-based aspects of behavior, a most useful approach. As discussed in figure 2, it is interesting to note that the pattern emergence over various stages within Living Lab conditions through cyclical iterations are mirrored in patterning of this action system discussion. Notably, internal system properties have the capability of reflecting emergent patterns of system behavior, according to their environment.

3 Living Labs as innovative eco-systems: a learning approach

Various ways of describing dynamic and expansive eco-systems are interesting as they offer possibilities of comprehending interaction between our human spheres of activities and the environmental landscapes in which we find ourselves existing and working, and beyond... These boundaries of dynamic crossovers, interchanges and merging are both challenging and promising. The need to navigate simultaneous actions successfully is fundamental to translating data and information into applicable practical knowledge, whilst retaining a dynamic, holistic view. (Garduno et al 2015, Nousala and Garduno 2013).
Emergent approaches such as Action Based Learning and research are critical, since they give rise to the opportunity for long range analysis, providing a means for dynamic environments to “expose” or uncover non-data-related aspects of investigation (as previously discussed in section 2.4). The focus on the symptom rather than the cause can be emotive and misleading as Asghar (2001) notes, linking poverty and pollution, social justice with unsustainability.
Viewing these crossovers at various boundaries of community and environments provides a vantage point for these issues to be discussed as whole living eco-systems, be it as social, economic or biological, expanding the concept, inclusive of various combinations of a holistic living system, socially complex and adaptive with very specific components and properties according to context (Nousala et al 2012: Nousala and Hall 2008: Hall et al 2010: Nousala

and Garduno 2013). Highlighting the commonalities of components and properties (within context) between theory and application through a holistic approach was something that the Living Lab, action based concept could offer, doing so to great effect (Garduno et al. 2015).

3.1 Educational field based experiences

As discussed previous in sections 2.3, 2.4 and 2.5, new approaches to educational fieldwork must have ability to physically engage many corresponding eco-systems simultaneously. This approach also includes a reflective "mirror image" which responds within various contexts of environment or boundary scale. With regards to fieldwork, expansion of educational experiences observed in the field develop and evolve into platforms of exchange. Reflection and learning outcomes via differing levels of fieldwork activity produced learning outcomes and activities mirroring behavior that was influenced by the systems environments. In a practical sense this provided a societal impact, viewed as a complex system of eco-systems. In other words, creating continuous cycles that included multiple levels simultaneously. This discussion has been based on experimental field studies of previous research, current literature and ongoing fieldwork engagement with a range of differing communities (Nousala et al. 2012: Nousala and Garduno 2013: Nousala 2013; Garduno et al. 2015).

4 Boundaries and their impacts, a discussion

Boundaries as described by Linklater (1990, p. 149), have bottom up influence locally, via global concerns, "The State, as it has developed from the European experience through the treaty of Westphalia in 1648 and onwards … sought to limit the scope of both sub-national and transnational solidarities and identities … because of the fear of its internationalization, the idea of community has thus remained limited to the boundary of the nation-state".

Many current educational pilot projects are not typically designed to include holistic action-based approaches of inclusiveness and longitudinal development. Action Based Learning, research and action systems (as discussed in 2.5) have the capacity to impact educational projects and cases in the field through engagement and comparative analysis, at local levels while simultaneously looking at global concerns. Tension between boundary levels of society, creates the need to address such layers in a way that engage "like for like" across living eco-systems that are not necessarily compatible with economic structures (including social, economic and biological elements). This horizontal approach has the ability to extend beyond the individual and group to merge with the emergent social innovations of eco-systems in general (Garduno et al. 2015; Salthe 1985; Nousala and Garduno 2013; Hall and Nousala 2010; Nousala et al. 2009; Nousala and Hall 2008;).

5 Contextual shifts, time and dynamics, a conclusion

The development of new skill sets that have the ability to embrace, deliver, actively expose, highlight and maintain the critical web of interactive processes for both human and environment has never been more pressing.

Eco-systems in the broadest sense, service multiple levels of community and environment and are certainly vulnerable to shifts and changes of current conditions, be it climatic, political or economic. Models that embrace the various elements of Living Lab methodologies expressed and explored in this paper are necessary, to create encouraging project-based learning solutions (these experiences need to be positive so as to be absorbed and survive multiple epicycles of growth and acceptance) that provide a baseline for fundamental support towards empowerment and resilience.

Understanding the core of these methodological approaches requires the ability to map and track contextual shifts, through emergent epicycles within epicycles. The understanding of their full impact can only be appreciated or "measured" through longitudinal snap shots, so as to provide the possibilities of mapping entire sequences of processes and shifts for future analysis and learning.

This process surely lends itself to the worthwhile pursuit of transferring theoretical based knowledge to practical based learning, while ensuring that theories coincide with knowledge acquired from practice. More importantly, it is a critical means for understanding action-based learning at the intersection of community and environmental dynamic boundaries.

6 References

(*Note: all URLs valid as at 18 Sep 2015)*

Aibeo, P., Botelho, J., and Lopes, J. 2013. NU porto, "A digital tool to visualize what is beyond the building's façade." Digital Heritage, 435. Doi:10.1109/Digital Heritage. 2013.6744799

"Action Based Learning : ALARA : GroupSpaces." http://www.alarassociation.org/pages/al-and-ar/action-learning (July 7, 2015).

Akdere, Mesut. 2003. "The Action Research Paradigm: An Alternative Approach in Negotiation." 16(5): 339–54.

Almirall, Esteve, and Jonathan Wareham. 2008. "Living Labs and Open Innovation: Roles and Applicability." The Electronic Journal for Virtual … 10 (August). http://www.ictusagelab.fr/FLL/sites/default/files/documents/files/eJOV10_SPILL3_Almirall_Living Labs and open Innovation.pdf (September 20, 2014).

Ballon, Pieter, Jo Pierson, and Simon Delaere. 2007. "Fostering Innovation in Networked Communications: Test and Experimentation Platforms for Broadband Systems." In , 137–66. http://www.irma-international.org/chapter/fostering-innovation-networked-communications/8196/ (February 1, 2015).

Bergvall-kåreborn, Birgitta, Marita Holst, and Anna Ståhlbröst. 2009. "Concept Design with a Living Lab Approach." : 1–10.

Edquist, Charles. 2001. "Innovation Policy–a Systemic Approach." The Globalizing Learning Economy. Oxford

University …: 1–18. http://www.druid.dk/conferences/summer1999/conf-papers/edquist.pdf\nhttp://www.business.aau.dk/druid/conferences/summer1999/conf-papers/edquist.pdf.

Elden, M. 1993. "Emerging Varieties of Action Research: Introduction to the Special Issue." Human Relations 46(2): 121–42. http://hum.sagepub.com/content/46/2/121.short (January 14, 2015).

Gasson, Susan, and Edwin Elrod. 2006. "Distributed Knowledge Coordination across Virtual Organizational Boundaries." In International Conference on Information Systems ICIS, , 20 pages. http://aisel.aisnet.org/icis2006/6.

Gilmore, Thomas, Jim Krantz, and Rafael Ramirez. "Action Based Modes of Inquiry and the Host-Researcher Relationship."

"Laurea Living Labs ." https://www.laurea.fi/en/research-development-and-innovations/laurea-living-labs (July 7, 2015).

McTaggart, Robin. 1997. 3 Participatory Action Research: International Contexts and Consequences. SUNY Press. https://books.google.com/books?id=s6HvZ3gqOK0C&pgis=1 (July 7, 2015).

Schaffers, Hans, Javier Garcia Guzman, and Christian Merz. 2008. "An Action Research Approach to Rural Living Labs Innovation." Proceedings of the Cunningham …. http://www.c-rural.eu/southafrica-livinglab/images/stories/files/wts@sap.pdf (September 20, 2014).

Scholar, Economics Visiting, and Scandinavian Consortium. 2011. Living Labs Methodology.

Veekman, Carina et al. 2013. "Characteristics and Their Outcomes in Living Labs : A Flemish-Finnish Case Study Dimitri Schuurman Seppo Leminen Bram Lievens Mika Westerlund." The XXIV ISPIM Conference - Innovating in Global Markets: Challenges for Sustainable Growth (June): 1–24.