A TRANSDISCIPLINARY RESEARCH APPROACH: CHALLENGES AND BENEFITS OF CO-PRODUCTION

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Abstract

Problems concerning Sustainable Urban Development are complex and can no longer be dealt only within pre-existing disciplines and structures for planning and decision-making. (Mistra Urban Futures (MUF) Handbook 2013) "A key characteristic of scientific approaches that focus on contributing to sustainability is participation. In the scientific sphere, this includes the integration of different types of scientific and non-scientific knowledge. One of the most popular concepts used to refer to this type of participatory work is transdisciplinary research". (Polk 2014). Research projects based on joint-knowledge production are unusual, and there are few real templates to follow. (MUF Handbook 2013) This paper describes a case study, connected to the MUF interactive platform in Kisumu[1]*. The research students describe and reflect on the situation to understand what challenges and opportunities a transdisciplinary approach gives to the over-all process. It aims to produce outcomes that can be further implemented and support researchers working in practice based transdisciplinary projects.*

Initial Findings:
-Complexity takes time and requires an open mind-set and ability to work with multiple framings.
-Trust-building ability is a key - to be present, transparent and build dialogues
-A Shared ownership of the process is necessary
-Prototyping and establishing a Shared Digital Working Space with Easy Access are a useful co-creative method to implement knowledge
-Reflection and Facilitation is needed to support and deepen the collaborative working process.

Keywords: *Transdisciplinary research approaches, co-creation, marketplaces, prototyping, systems design, challenges.*

Introduction

Transdisciplinary research aims to produce socially robust results that "*contribute to sustainability*

through in-depth participation of stakeholders and the integration of relevant knowledge from both practice and research in real-world problem contexts. The actions should lead to increased participation, knowledge integration, social robustness and contributions to sustainability." (Polk 2014) There have been similar approaches under different names such as post-normal science (Funtowitz and Ravetz 1993), Mode 2 (Gibbons et al 1993, Nyström 2002, Nowotny et al 2001), issue-driven interdisciplinarity (Robinson 2008), interactive social research (Talwar et al 2011), and transformative or participatory sustainability science (Blackstock and Carter 2007, Lang et al 2012, Spangenberg 2011, Wiek et al 2011). All share a focus on "*bridging the gap between science and practice to more effectively use science to capture and solve current social and environmental problems" (*Robinson 2008, Polk 2014).

Challenges of Transdisciplinary Research

Research projects based on joint-knowledge production are unusual, and there are no real templates to follow. One "user manual" is MUF's *"Manual of Joint Knowledge Production for Urban Change" (2013)* based on five research cases from Sweden. Referring to the manual the challenges are related to the knowledge production process, with multiple actor involvement including both academic disciplines and practitioners. The issues are related to multiple framings, knowledge diversity and challenges of how to create co-owned arenas for transformation processes (MUF Handbook 2013). Working in a global transdisciplinary research project between Kenya and Sweden, with more than 150 participants, adds further complexities: distance and different societal and academic cultures.

Methodology

Introduction

This paper focuses on a case where three research students, from different academic backgrounds connected to MUF interactive platform in Kisumu, work with the common objective to: *"empower local livelihoods through sustainable marketplaces and ecotourism development using a transparent, transdisciplinary, and system-based approach by stakeholder participation"* (KLIP Core group Objectives). Dunga Beach, a fishing community outside Kisumu act as the common case (see illustration1). The researchers share the same space but are looking at different problems. The aim is to integrate and extend beyond discipline-specific concepts, approaches, and methods to accelerate innovations and progress toward solving complex problems affecting Marketplaces in Kisumu. The study enables collaboration in information gathering and dynamic analysis to integrate crafts, livelihoods, energy and design in a market system. The knowledge is prototyped and implemented for direct feedback from the local community. The common approach used by the researchers, is aimed to connect academia, business sector and the end user. *Dynamic Systems Design* is one of the common languages for design utilizing analytical and intuitive approaches to formulate questions, gathering information and analysing. Incorporating the language and approach of system analysis can help create a holistic view of otherwise complex situations. It becomes a tool for communication between disciplines. Another method used is *transformation and innovation through interventions*. The interventions are made up of physical and social systems involving people in the city, buildings, objects, concepts and so-called "rules of the game" (Nyström 2002, 2005, 2010).

Researchers Framings

One of the Kenyan researchers has a background in Geographic Information Systems (GIS) and her research is on *'Market Metabolism Focusing on Omena Traders'.* She uses the concept of metabolism to analyse the flow of *Omena* through Dunga market system. Omena is a local fish traded by women

that is gaining recognition because of its market availability, high nutritional value, and low cost. The main objective of the research is to understand the flow of resources in a market system. The results will give inputs in developing sustainable resource use within the system. The researcher is working with individual women and women groups, other researchers on alternative livelihoods, and a local non-governmental organization working with the women to form groups of Omena traders .

The other Kenyan researcher has a background in architecture and urban design. He looks at the design process as a participatory mechanism in connecting market communities' renewable energy systems. Connectedness theory is used to study the individual's sense of connection to nature and the degree in which s/he participates in the planning and designing of renewable energy systems at the marketplace. This study aims to investigate an integrated version of sustainable building and site layout practice to develop an approach that enables the exploration of a trans-disciplinary collaboration in the provision of renewable energy technologies for large public markets.

The Swedish researcher has a background in industrial design. The study explores the "new" role of the designer operating on a global arena by using Actor-Network Theory (Latour, 2005) In the process, she act as a designer herself with the aim to support the local craft community to build capacity and thereby create livelihood opportunities. She designs "strategic objects", with a function beyond the obvious, and study how these *"supports the creation of syntagms (linkages) to build and stabilize a network of actants"* (Latour 2005) The practical result of the research, are projects where the invasive plant water hyacinth is used as a resource in handicraft production, for example in basket production and eco-tourism development.

Data Collection

The research process has been divided into five phases. The Swedish researcher mostly works from Sweden but has been in East-Africa several times during 2011-2013. The two Kenyan researchers are based in Kisumu and Nairobi, and have been visiting and studying in Sweden several times. The researchers regularly have contact via e-mail and Skype, but the most frequent interaction is made via Facebook. The researchers have set up several shared groups together with practitioners.

Results

1. Set up the Core-group - Identify the Case (Sept 2012)

The process started with the Swedish team going to Kenya to meet the research colleagues. A Core group was established with three PhDs from Sweden and four from Kenya. The Core group has a common research framework and objectives. The phase also included identifying a research case, which could link all the researchers work together. The identified societal needs were primarily alternative sources of livelihood and market access.

Reflections and Learning Outcomes

It was a challenge to set up the joint work because of multiple framing within the group. Areas of interest are different, and the different academic traditions. Team building activities is core to identify roles and abilities and, external facilitation would have supported this process.

2. Data Collection through Participatory Activities (Nov 2012)

The Swedish team arrived to Kisumu to start the research work with the community through field studies and data collection using participatory interventions and observations. The participatory activities involved about 100 community participants. These activities were complemented with

individual observations, interventions and semi-formal interviews to establish relations and get an understanding of the place.

Reflection and Learning Outcome
Some Kenyan students were occupied in full-time teaching, and it was difficult to gather the full group to enable cooperation. The researchers were in different stages of their process and with different academic traditions in the group, and it was a challenge to find common methods of data collection relevant for everybody. The design interventions that included several workshops, was a challenge to organize. More community members than expected were participating, and they arrived at different times. Language was a challenge since not all of the participants could speak English, and had difficulties in reading and writing.

Instead of big community gatherings, an alternative way to collect data could be to spend time on site observing or shadowing the stakeholders. Research students could have worked in pairs using systems mapping as a co-creative tool to make the system dynamics visible. A small co-creative intervention like the playground workshop described below, can be a way to "get everyone on-board". Reflexive discussions in smaller groups on why and how to do participatory work could be a start to build common understanding.

The identification of demand driven needs within the community plays a crucial role as a starting point for researchers. To avoid repetition, the researchers must reinforce and develop existing initiatives and potentials.

3. Formulation of a Common Proposal (Jan 2013)
The group formulated a common project proposal aiming to connect the three individual projects. The concept of using water hyacinths as a resource for the community, acted as a link between the different projects. The proposal was sent to the community by e-mail, but little feedback was received.

Reflection and Learning Outcomes
There was a challenge in framing because of the three levels to handle: The individual research level, the Marketplace research level and the Core group research level (see figure 2).

Co-production of a common project proposal together with community on site would probably be a better way to create an inclusive process with shared ownership. Here systems dynamics mapping could have been an efficient tool, because it makes visible all components and linkages and give an overview of the interconnections.

4. Implementation through Prototyping – Participatory Activities (April-October 2013)
A playground concept was developed as a way to initiate participatory work with the community. It explored the intersection between crafts, design, play, and space through hands-on making in full scale. The first prototype was tested in Sweden and the concept was then "translated" by a Kenyan researcher to be adapted to the Kenyan context. A joint intervention was later held in Kenya where all researchers worked together with the community on site (see figure 3). A simple rope-making machine was also introduced, which showed to be a successful tool to engage the community and show potentials of how to use waste as a resource (see figure 4.) A Facebook group was also created where the researchers and community could communicate more easily.

Reflection and Learning Outcome

A transdisciplinary research process is open, hard to predict, and includes improvisations. The researcher must be open-minded but at the same time clear on the individual aims and objectives, to be able to interact with other stakeholders. A co-creative intervention like the playground including the rope making, showed to be an efficient method to gather different actors and make visible and create awareness on the potentials, in this case alternative use of resources. The individual researcher's input was highly noticeable and the intervention naturally invited the community members as co-creators. By collaborating together through hands-on activities, the relations between the actors were strengthened. The Facebook group made it easy to share photos and chat to keep the contact alive.

5. *Reflexive Analysis and Co-production of Knowledge through Writing*

During a period in Sweden, the students had the opportunity to reflect on the research process so far, with supervision from several professors. They brought up issues that were hard to discuss on e-mail or Facebook. The group analysed the process to find out the next steps to take. This was done through several systems mapping sessions.

Reflections and Learning Outcomes

During this period, the students spent a lot of time together, reflecting on their work and finally they "really" started to collaborate. The common mappings showed the researchers' individual objectives, the different scales but also how the individual projects were linked (see figure 5). The mapping indicated possible directions for future collaborative work. A potential of establishing entrepreneurship training, integrating crafts production, ecotourism and energy production, was identified. The mapping activity built links and trust between the researchers.

Discussion and Conclusion

What are the challenges and opportunities of using a transdisciplinary approach? What are the outcomes? This research work, encompassing PhD researchers from two continents, demands a collaboration aiming for long-term implementation. The process is full of challenges, but gives new insights and perspectives to the individual work. Co-creation of knowledge has been a new approach to the researchers coming from different scientific and creative disciplines, and hence challenging in consolidating a common platform. To be able to produce new relevant knowledge, the process requires methods, collaborative tools and skills to reach a common understanding.

Complexity Takes Time

The study shows that a transdisciplinary approach is complex because of its multiple framings due to multiple stakeholder involvement. Frequent dialogue was identified as one of the key tools on co-creation, which requires time and perseverance.

Open Mind-set - Frame and Re-frame

The co-production process requires an open mind-set where you constantly need to frame and re-frame the scope. Each actor should be clear on their individual aims and objectives to enable sustainable integration with other actors. Co-writing a shared project proposal based on systems mapping is a useful co-creative method, since it make dynamics visible.

Building Trust

Longer field studies and spending time together is important for the research team to have a common understanding for reading and learning from each other.

The creation of a dialogue with local actors and residents early and also to report back to the community is crucial. Building trust is a precondition to reach the inhabitants and the tacit knowledge.

Shared Ownership - Build a Common Ground

All actors involved must agree on what it is and how to work. It must be a shared ownership between the practitioners and the researchers, for example, the community plays an important role in the process of problem identification because they are “the professionals”.

Prototyping - a Co-creative Method

Physical prototyping and hands-on collaboration showed to be successful ways to co-produce knowledge, since knowledge became visible for everyone involved and was easy to build upon.

A Shared Digital Working Space

A common digital platform is important when different actors working “on remote” are involved. Facebook, for example, is easily accessible to many stakeholders and make visible information. This should be complemented with a physical space on site, where as much information as possible is shared.

Reflection and Facilitation

The complex process of co-producing knowledge requires external facilitation and time for collaborative reflections.

Figure 1. Daily life in Dunga Beach. Photo: Helena Hansson

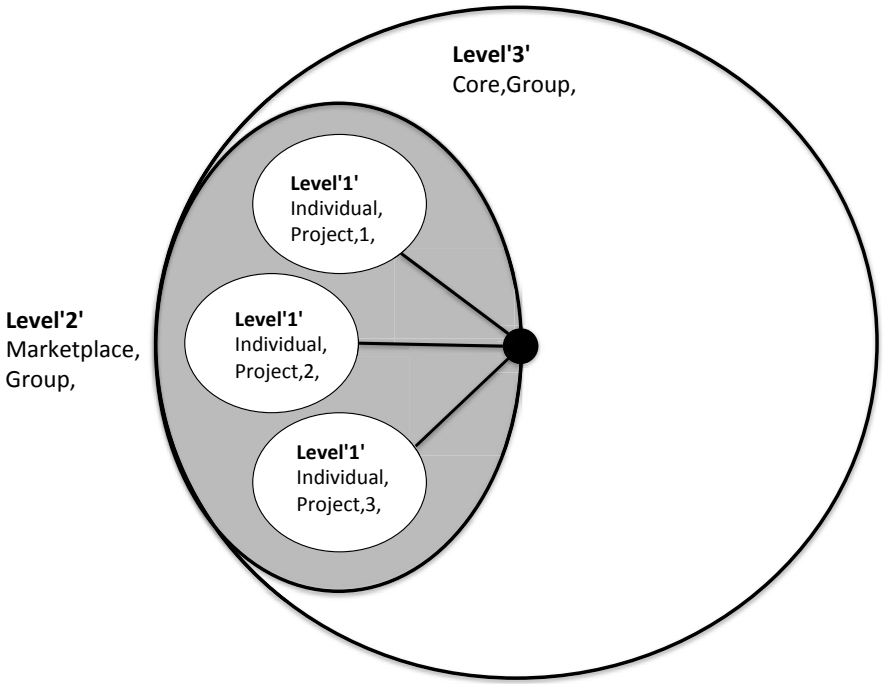

Figure 2: Model showing the multiple framings for KLIP Core group. Illustration: Helena Hansson

Figure 3. Prototyping: A Playground intervention as a co-creative method to make visible potentials ad "make people come together". Photo: Helena Hansson

Figure 4. Prototyping: Rope making intervention in Dunga Beach – a co-creative method to make visible potentials. Photo: Helena Hansson

Figure 5. Systems mapping as a co-creative method to identify potentials and challenges. Photo: Helena Hansson

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Endnotes

[1] *Local Interactive Platforms (LIPs) exist in Kisumu, Shanghai, Cape Town, Manchester and Gothenburg where the head office is located. The platform, KLIP, in Kisumu consists of a consortium representing two universities, Maseno and Jaramogi Oginga Odinga University of Science & Technology (JOOUST), the society and business (Triple Helix). Two research flagship projects are run namely Eco-Tourism (ET) and Marketplaces (MP). Twenty doctoral students, a number of post docs, professors and master students are involved in the general research. To be able to handle so many PhD students a Core Group of seven PhD students from Sweden and Kenya was created. The Core group is divided into two groups: Eco-tourism (ET) and Marketplaces (MP. The two themes are overlapping, but at the same time two separate research areas. The Core Group has some common activities with the other doctoral students; however this paper is a contribution from the marketplace Core Group.*