



# Practice-based Knowledge on System Innovation and Climate Change. A Learning Approach for Practitioners through Active-Blended Format

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## Abstract

*This study provides evidence of the application of a practice-based knowledge in educational activities in the field of innovation, climate change and sustainable transitions based in active-blended format. The learning approach follows a modular knowledge framework where the varied needs of practitioners and different bodies of knowledge (i.e. transitions management, innovation management, systemic thinking, design thinking and project management) are combined and adapted to create a dynamic learning process. Modules are presented through practice-based visual tools with the aim of facilitating concept mapping and contextualization to practitioner's activity.*

*This learning format got tested, in two different education programmes as well as six professional training workshops, across different European locations. The learning approach is based in Flipped and Seamless learning with the aim of being tailored to the diverse professional education programmes of Climate-KIC. Classroom and eLearning activities are combined to take information out of the classroom and introduce more practical and problem oriented exercises to finally facilitate learning by problem solving. The tools are presented through different types of activities, at different times and with multiple resources. Collaborative learning is also introduced by group work, project development related activities and peer-to-peer interactions driven by practitioners needs and priorities.*

*Based on participant and various stakeholder feedback learning materials and activities are continuously adapted, striving towards well tested innovative new practitioner oriented learning methods. Evidence shows that practitioners demand adaptable and flexible tools easy to transfer to their challenges and problems as well as new learning methods in which experts and mentors work more horizontally with practitioners and problem owners. Thus, this study is aimed to contribute to understand the potential of complementarities between experiential and experimental knowledge as a critical element for a learning approach.*

*Keywords: practice-based knowledge, active-based format, participatory approach, concept mapping collaborative learning, visual tools, system innovation, climate change, experiential learning, problem-solving.*

## 1. Introduction

The idea of system innovation has been widely diffused to refer to major transformation through technological breakthroughs, reorganizations of industries and the implications of a globalised economy. Climate-KIC has widely applied elements of system innovation and transition management by combining other general project and innovation management elements. That experience has revealed the difficulties of applying new concepts and perspectives to day-to-day practice. Furthermore, the lack of understanding of climate change and the misperceiving of the related risks by the general public hinders action and appropriate policy decisions. Therefore, creating conceptual change and removing misconceptions is essential to address climate change.

Practitioners demand adaptable and flexible tools and methods to easily work on their challenges and problems. They are targeted as users of practice-base knowledge who carry on activities in SMEs, applied research, NGOs as well as local and regional governments. This study presents the results of the experience of responding to that practitioners' demand by focusing in the concept of experiential learning and introducing visual tools aimed to facilitate conceptual mapping through participatory process. The paper is aimed to provide better understating of active-blended format as a learning process closer to problem owner's context and needs.

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The paper is organized in five sections. It begins by bringing together key concepts of the conceptual framework. The third section introduces the key elements of the active-blended format based in modular knowledge and experiential learning. This is followed in the fourth section with a brief presentation of the implementation of the learning approach in a program run in multiple European locations. Final reflections are aimed to capture first lesson learnt of the full process of design and implementation of this new learning approaches aimed to facilitate practice-based knowledge for innovation.

## 2. Conceptual framework

### 2.1 Practice based-knowledge based in experiential learning

In educational science, the concept of 'conceptual framework' is used to explain how people attain new knowledge. Combinations of concepts, tacit knowledge, emotional connotations and past experiences can be used to form statements or propositions and their linkages form a conceptual framework through which a person interprets the surrounding world [1]. Experiential learning can be understood as the continuous practices of trying to look at a problem from different perspectives by being open to the way an experience can change current understanding while being open to incorporate how others have perceived the same experience [2].

The materialization of that learning process into practice-base knowledge is required step to develop a deeper and longer-lasting connection between complex concepts as system innovation and climate change. Concept mapping is a technique used to identify the concepts and existing interrelations in a person's conceptual framework [3] [1]. In a concept map, concepts and elements about a certain topic can be written down, usually in one word, and draws connections between them. While concept map will never be entirely representative, due to the tacit nature of conceptual frameworks, concept mapping still is a very useful technique because it provides context to the individual concepts and gives instructors more insight in possible misconceptions [1].

To overcome misconceptions, social learning has been suggested as a set of learning methods that use participative or group learning to help adopt alternative perspectives and achieve conceptual change [2]. There are some clear benefits of participatory processes, and not just in the classroom learning. Collaboration between stakeholders on complex ecological issues (like a regional sustainability challenge) helps participants to establish alternative perspectives [2] [4]. It can help building trust, respect, shared ownership of the task in question and critical self-reflection [4]. Even when no consensus is reached, participants can learn from the process [5].

## 3. Active-blended format

The design of learning process by integrating concept mapping, experiential learning and participatory process requires significant flexibility and focus in contextualization. With that respect, the active blended format introduces practice-based knowledge by the application of tools on the users' cases as part of a problem-solving process. The approach is defined by simultaneous co-design and implementation of tailored trainings with practitioners in thematic area of Climate Change. Active blended is based in flipped learning and seamless formats:

- **Flipped learning.** Classroom and eLearning activities will be introduced as a mechanism to combine cooperative learning processes with group assignments. The blended format is facilitated with practitioner-oriented explanations through a multi-format learning platform including multimedia tools combined applications of learning nuggets and regional examples.
- **Seamless learning.** The learning process can involve different types of activities, at different times and with multiple resources. This involves several interactive workshops by combining several bottom-up exercises on the one hand and group work and professional practices where practitioners are introduced in existing local actions or projects managed by public or private organizations. a feedback loop is then created between the introduction of new practical knowledge and the experiential learning achieved with the practical application.

Climate KIC has introduced the *Visual toolbox for system innovation* [6] to build up the active-blended approach through a collection of ready-to-implement tools to structure and manage the challenges and exploit opportunities of sustainability innovations and transitions. The tools -available online and in the booklet format- were released after being tested with practitioner in six projects and training

workshops over 2 years and finally reviews by 12 experts (academics, business and government) from 7 different countries.

The general idea of visual tools seeks to provide a simple mechanism for concept mapping based on simplification of science-based methods. It was designed to facilitate alternative learning pathways through a coaching approach based on co-operative learning and participatory process. The science-based methods facilitate the gathering and codification of information for further analysis and discussion with the practitioners. Fig.1 below shows the example of Context map tool.

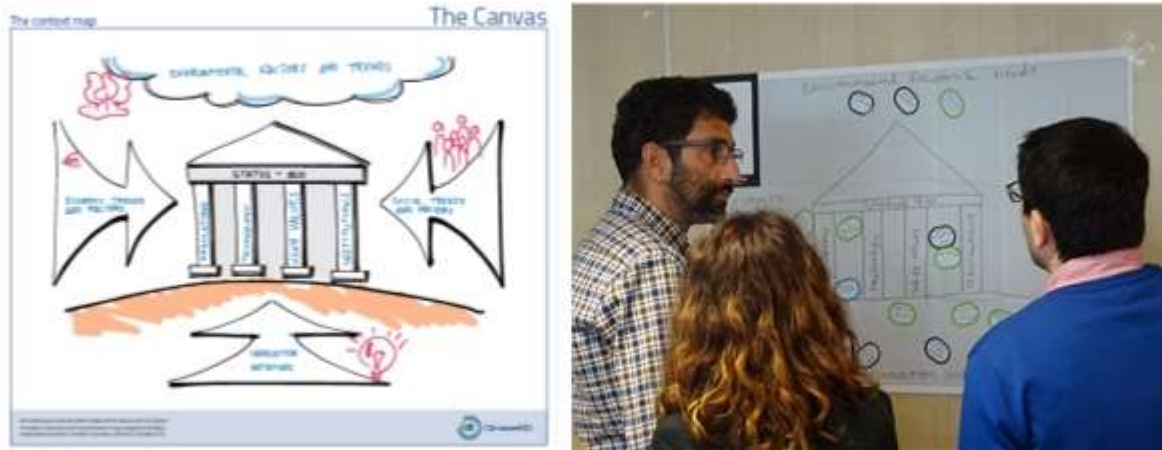


Fig.1 Active-blended approach – Context Map tool (Canvas & Application)

Both face-to-face and online activities [7] are rooted in the same modular structure built upon four modules that account for the main steps in the system innovation process. That is: a) Stakeholder management, b) Multi-level perspective, c) Visioning and backcasting and d) Niche management. This structure is meant to facilitate the problem-solving process by setting out a pathway in the always blurred, uncertain and fuzzy process for system innovation. The four modules holding the tools feed into a multidisciplinary setting, including transitions management but also practical elements from innovation management, systemic thinking, design thinking and project management.

#### 4. Implementation & results

The active-blended approach has been applied in several programs including long formats as Pioneers into Practices and shorter trainings as Innovator Catalyst. The first program was implemented during 2016 in 12 European locations. Overall, the result of the implementation indicates that one of the strength of the approach was the application in practical situations. The Table 1 bellows shows a sample of general indicators based A feedback survey was conducted to participants in 8 locations (sample: 86 participants).

The overall elements of the learning approach such the Visual Toolbox and the blended format have been rated significantly well with lower rate for the learning process though eLearning platform affected by technical problems during the first stage. A good performance was also obtained in the perceived learning and experiential learning but relatively lower in the application of day to day activities and the application during the professional practices. Both situations can be explained by the intrinsic nature of the tools which is more oriented to middle-long term projects and multiple stakeholder context rather than traditional daily and short term project management activities.

Table 1. General Indicators – Feedback Pioneers into practice program 2016

Feedback question	Rate
<b>Overall rate of learning elements (1-5 scale, 5 Max rate)</b>	
The Visual Toolbox	3,87
The concept taught during the e-learning modules got clearly applied in practical challenges.	3,76
Combined inputs of e-learning modules & on site workshops enabled you to structure challenges and identify appropriate tools to further develop a project or an idea.	3,85
<b>Feedback on perceiving learning (5. Fully agree 1. Totally disagree)</b>	
...use the toolbox to drive system innovation initiatives on the ground?	3.91
... apply these tools in day to day activities?	3.75
<b>Feedback on experiential learning (5. Fully agree 1. Totally disagree)</b>	
You have applied the tools for improving your understanding of practical problems.	3.90
The tools helped you for the preparation of the working plan of the group project.	3.84
You successfully implemented elements of the visual toolbox during your placement (i.e professional practices in local projects).	3.40
You feel prepared to apply these tools in day to day activities.	3.92

The learning materials got generally valued high by a large rate of participants. The application of tools in workshops was highly rated while there was there was diverse assessment regarding the eLearning material as trade off were identified in terms of level of difficulty, the flexible approach, or the theoretical content among participants with different qualifications and expertise. Suggestions were made regarding the participants that require more guidelines in terms of provide indication of progress, include more interactive elements and moderators for the online group interactions and discussion forums.

## 5. Final reflections

This study has presented the key elements of a learning approach designed in response to demand of flexible and adaptable tools raised by practitioners working on innovation in the climate change arena. The use of experiential learning and concept mapping has been explained in terms of the active-blended approach that includes flipped and seamless elements.

The results of the implementation show that the use of visual tools has contributed to problem-solving process and the better understanding of challenges and project pathway as part of participatory process with multiple stakeholders. Preliminary evidence shows lower impact in the potential use of daily activity which can be related to the diversity of practitioners working in the field in terms of different background and competences. Further improvements should focus in interactive elements and better guidance through the learning process.

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