Exploring the Micro, Meso and Macro
Proceedings of the European Distance and E-Learning Network 2018 Annual Conference
Genova, 17-20 June, 2018
ISBN 978-615-5511-23-3
ISSN: 2707-2819
doi: https://doi.org/10.38069/edenconf-2018-ac-0061

A MULTI-SCALE APPROACH TO LEARNING INNOVATION DESIGN

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Abstract

This paper presents the "Learning Innovation Network", a learning innovation multi-scale design tool, developed by METID Politecnico di Milano, that provides a synoptic vision of the factors enabling a learning-teaching process. The decision makers at each level are stimulated in reflecting about actors, objectives and constraints, but also supported in designing in a creative and integrated context all the components (physical and digital) of a transformative collaborative experience (channels, activities, contents, relationships with the outside world, etc.), shifting the focus from the "content centred" approach, still deep-rooted in traditional academic institutions.

Introduction

Constructive alignment is the synthetic definition of the main theoretical underpinning of the outcomes-based curriculum provided some years ago by Biggs (2003). This simple but fundamental approach can be described as the learning design process able to assure coherence between assessment, teaching strategies and intended learning outcomes in an educational programme (McMahon & Thakore, 2006). *Teaching strategies* is often considered as a synonym of *pedagogical approach*, but the bridge able to support the fill of the gap between the formulation of learning outcomes and its positive assessment is actually a complex system of methodologies, tools, contents, exchange channels, activities, relationships where each single part have to be carefully designed consistently with the others in order to reach the expected goals. The challenge is even more complex if the objective is to reach specific learning outcomes by *teaching innovation*, seen as the implementation of strategies able to transform traditional transmission-based teaching practices in student-centred processes, stimulating active learning within supportive environments, engaging students in authentic and real-life problem-solving (Brandon, 2004). This vision has been furtherly developed by suggesting that learning innovation involves also creative teaching able to foster students' creative potential (Ferrari, Cachia, & Punie, 2009). Until this moment we can count on wide debate about pedagogical frameworks to be applied, while a relative lower attention is paid to the systemic design of the learning experience at its different scales: from the regional systems, to the classrooms. This paper proposes a systemic design tool based on the cross-fertilization between the pedagogical culture and a very specific branch of the *design discipline*: the *design for services*.

Going beyond the traditional approach

The panorama of conceptual and practical tools available for supporting institutions, instructional designers, individual teachers or groups of them in starting and in performing a learning innovation process is wide and diversified (Conole, 2013). Some of them are very well known and largely applied and have been strongly influenced by the ICT culture, mainly because of the frequent identification of learning innovation with the implementation of digital tools or resources. An effective example of this is Agile Learning Design (Boyle, Windle, Leeder, Wharrad, Alton, & Cook, 2006), an approach evolved from the software development industry. Its basic philosophy is to reach rapidity and flexibility in providing "innovative contents and tools" thanks to an interactive and iterative approach to design that typically prioritizes speed in design and in implementation. It has been proposed as an evolution of traditional approaches like ADDIE Model (Analyse, Design, Develop, Implement, Evaluate), first developed for the U.S. Army during the 1970s, that emphasized accuracy and multiple validations (Peterson, 2003) at each step of design and implementation of each part of a learning path, with a particular focus on contents. With a different perspective, mainly focused on the massive re-use of learning contents and tools, other guidelines, as the Pedagogical Patterns Approach (Weisburgh, 2004), helps to focus and to synthesise the essence of the new learning practice or content in a compact form that can be easily communicated, shared and reused. Other approaches are more linked with the teacher training activities needed in order to kick-off the learning innovation process as, for example, the TPACK model, which focuses on the interplay of three primary forms of knowledge (Content, Pedagogy, and Technology) to be considered when training teachers supporting them in the design and implementation particularly of e-learning experiences (Mishra & Koehler, 2006).

Getting furthermore closer to the practical design tools, teachers can use autonomously several software tools useful for designing learning content and activities (e.g. LAMS – https://www.lamsinternational.com, CompendiumLd – http://compendiumld.open.ac.uk), providing a flexible visual interface to support the mapping of ideas and the design of *learning items*, the related timelines, resources needed and so on (Conole, 2013)

Nevertheless, in recent years, several authors have underlined that something is still missing, particularly in the role of the learning innovation design methodologies in supporting the creation of new consistent ideas in a systemic context. A new vision of design methodologies could still give relevant contributions in educational practices for supporting institutions, teams and individual teachers in creating in implementing new educational processes able to better match learning needs (Goodyear & Retalis, 2010; McKenney & Reeves, 2012) and also to develop a culture of educational quality (Ghislandi & Raffaghelli, 2015).

The Learning Innovation Network

The Learning Innovation Network, is a learning innovation design tool, developed and tested by METID – Politecnico di Milano (MEtodi e Tecnologie Innovative per la Didattica/Methods and Innovative Technologies for Learning, http://www.metid.polimi.it), that stimulates

ISBN 978-615-5511-23-3

decision makers and teachers to a new vision of the learning experience and of their role of "innovation facilitators" in the full respect of their own teaching in a systemic perspective.

The Learning Innovation Network is based on the strong belief that learning innovation is an actual design story where useful innovation rises as a result of a synergic effect, often sprouting in the gap between the different stages of the structured processes and it's a lot more than a sum of steps and activities.

The Learning Innovation Network is an elicitation tool whose application can be applied at different zooming scales in order to design new concepts and ideas for tan education system, an institution or a whole course. Furthermore, it can be integrated with the use of specific conceptual and practical design tools, as those described in the state of art, for going deeper in some specific details.

The conceptual and operational pillars that inspires the Learning Innovation Network are:

- *the directed storytelling,* a conversational and new ideas generator tool introduced by Evenson (2006) in the design for experience in order to explore behaviours and their potential as innovation drivers;
- *the empathic conversations*, suggested by Raijmakers et al. (2009) to link the phase of analysis of the context and in creating a context of cooperation;
- *the multi-agent communication graph* (Pacuit & Parikh, 2005) used for shaping and designing the learning experience rising form the physical and virtual exchanges among the key nodes: the *learning actors*.

The Learning Innovation Network is thus at the same time an *empathic conversation catalyser* and a *new ideas elicitation tool* that guides and supports the decision maker or the teachers in order to:

- promote their awareness of all the components of the learning dynamics in where they are already acting recognising their role in it;
- help them in focusing problems and limits perceived or emerged by facts;
- mobilise their interest for playing the role of "designers of useful learning innovation";
- kick off the process of learning innovation by identifying main actions to be planned and implemented.

The Learning Innovation Network nodes are made up by all the subjects, all the *actors* that interact in the knowledge transformational process.

Teachers and students are categories that should not be perceived as binding. A network of peer learners can occur where everyone is playing the role of a person aiming to achieve a goal of durable transformation of his system of knowledge, skills and styles, and desiring at the same time to facilitate this transformation into other components of the Network.

The key concept is that the experiences able to catalyse learning are raising from the knowledge sharing among *people* (e.g. each single student and his colleagues of the current and the previous

ISBN 978-615-5511-23-3

years, teachers and their collaborators or colleagues, external subjects such as the authors of adopted books, or authors of any available digital resource, or also families, cultural external actors, etc.) acting in an environment and connected to each other thanks to *communication channels* that allow them to co-shaping a network where the learning experiences occur: the Learning Innovation Network.

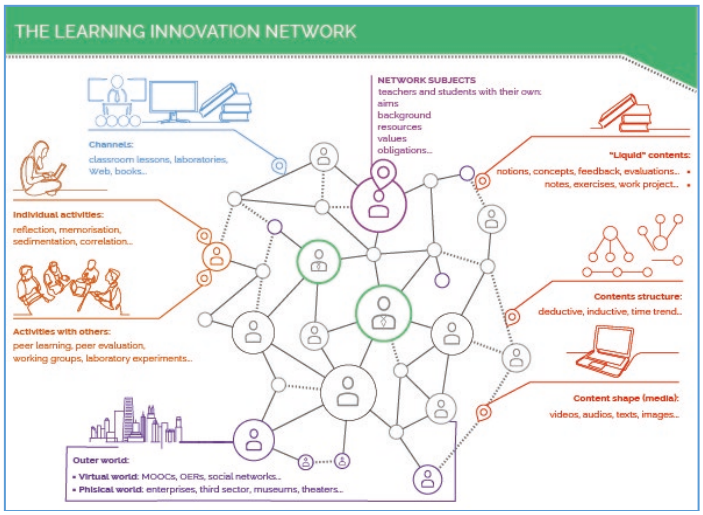

Figure 1. The Learning Innovation Network (source: METID 2017)

The Subjects-nodes are defined by:

- their basic features:
  - objectives: implicit and explicit purposes that occur within the learning experience at all its scales (regional, institutions, course);
  - background: formative, experiential, including relevant *preconceptions* or *misconceptions* about the discipline or the context;
  - resources: resource sets that can be activated in the process (time, economic resources, tools, materials, etc.);
  - role: the role within the network can be static or dynamic (for example, the role of *teacher* can be stably played by one of the subjects or being dynamically filled by many subjects);
- the actions they can accomplish:
  - autonomous actions: reflections, consolidations, exercitation, memorization
  - channel activation: development of mono, bidirectional or multidirectional communications with other subjects

The Arches (the elements that connect the nodes) of the Learning Innovation Network are the channels through which the communication among the subjects' flows and are articulated in:

- physical arches (classroom, laboratories, etc.);
- virtual arches (Learning Management Systems, Social Networks, etc.).

The Contents (concepts, ideas, information, instructions, etc.) flow through the channels among the nodes. There are "liquid" and their flow is allowed by the fact that they have a

ISBN 978-615-5511-23-3

structure (time-based, deductive, inductive, etc.) and a shape defined by the media used (text, video, image, etc.).

A component of the Learning Innovation Network asking a particular attention is the role of the "Outside world" that could be at the same time a relevant part of the learning path but also a key driver of learning Innovation. A deeper and wider interaction with all the actors involved in the production and reproduction of the knowledge in our societies, could help us in designing innovative learning path that have to be not just multi-actor and connected, but also chaotic, dynamic, difficult to contain or, in a world, *rhizomatic*, taking inspiration by Deleuze and Guattari (1980). They used the terms *rhizome* and *rhizomatic* to describe the theory that allows to use multiple, non-hierarchical entry and exit points in knowledge construction and representation. by opposing the rhizomatic approach to a traditional, hierarchic, tree-like, conception of knowledge, which works with dualist categories and binary choices. A rhizome works with planar and trans-species connections, while an arborescent model works with vertical and linear internal connections. In such a vision of the models of production and reproduction of knowledge, the Learning Innovation Network could catalyse the teachers' engagement in the emersion, formalization and sharing of the knowledge that is asset not just of the Academy but also of the main actors of our society: companies, GLAMs (Galleries, Libraries, Archives, Museums) and institutions, third sector, citizens, paving the way to truly new scenarios for more effective and integrated learning experiences.

Also in its own structure as operational tool the Learning Innovation Network hasn't any hierarchical organisation: each single components of the Learning Innovation Network can be the starting point for the learning innovation design and several iteration of the model leads to the internal coherence of the results.

Conclusions

In a scenario of learning innovation, a political decision maker, an institution, an individual teacher or a group of teachers can find and use a lot of well-known conceptual and practical tools for helping the learning innovation process. In the large panorama of these tools, there are very effective supports which focuses on the process, on the creation of the conditions for the proper transmission of resources and contents or on the detailed planning of contents and activities seen as modules to be composed. But decision makers and teachers need also conceptual and practical tools to help them in developing the awareness of the actual situation and to imagine its evolution, with a synoptic vision of all the components on which it is possible to act for improving experiences and its results: not just *contents* or media, but also relationships with the *outside world*, physical and digital channels, individual and collaborative activities in a dynamic flux and in collaboration with experts, colleagues, students.

In this perspective, the Learning Innovation Network helps decision makers and teachers in separating learning innovation from the pure problem of a dialectics with technologies and the digital world, and focuses instead on building a multi-actors interaction strategy that mobilizes

ISBN 978-615-5511-23-3

a wide range of tools in a synergistic and evolutionary learning experience increasingly integrated with the world *outside the classroom*.

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