# DEVELOPING CO(DESIGN) PROCESS AND TOOLS TO INNOVATE EDUCATION THROUGH DIGITAL DO IT YOURSELF

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**ABSTRACT**
The current societal trend of digitally enabled self-production (i.e. digital Do-It-Yourself) is emblematic of the contemporary and diffuse attitude to make and create. It also reflects the new attitude of people to rely on the strengthen of collaboration to improve their life. It has been seen as an opportunity for social and technological innovation based on collaboration and knowledge sharing. These practices and technologies have many potentialities that are changing the world on an everyday and community level (i.e. attitudes to consumption, sustainable solutions and community networks). The resurgence of DIY and craft industries "is a strong indicator that people are seeking ways to express their creativity" [1].
In this context where Digital DIY is playing a leading role in developing a more creative society and where everyone does design, professional designers may have to find their new roles.
The paper describes the DiDIY design process as a result of human centred co-design workshops held within the framework of the EU funded project 'Digital Do-It-Yourself (DiDIY) in two different countries [2]. The main workshops objective was to test and validate a specific co-design process and the related design toolkit, developed by IDEActivity Centre, helping people to apply the innovative aspects of DiDIY in their professional field. In the specific case the paper present the application of the process in the Education&Research area investigated by the EU project.

*Keywords: DiDIY co-design process, Co-design workshop, Design Thinking, Toolkit, Creativity.*

## 1 INTRODUCTION

In a changing world, everyone does designs: each individual person and each collective subject, from enterprises to institutions, from communities to cities and regions, must define and enhance a *life project*. Sometimes these projects generate unprecedented solutions: sometimes they converge on common goals and realize larger transformations. [3]

Digital DIY is one of the ongoing social innovation phenomena in which people reinvent their ways of living, especially thanks to ubiquitous digital technologies, connecting people on a global scale (e.g. Internet 2.0).. [4]

The phenomenon has been acknowledged as an opportunity to generate innovation. It was estimated that 80% of innovation in scientific tools have been generated by amateurs. [5]

The contemporary making attitude is considered creative, innovative, inventive, collaborative, resourceful and empowering. Makers and digital DIYers are non-linear thinkers, curious inventors and problem-solvers. This social phenomenon do allows the increasing of a diffused creativity that represents the intangible substrate for innovation. [6]

Creativity in this sense *enables* a person, or group working as co-creators, to generate new ideas and outcomes, such as original or inventive projects at different levels.

In this context of diffused creativity, design is called to identify a role to play and some designers have been investigating potential areas of intervention.

The analysis of the current scenario of digital DIY as a social innovation phenomenon and the changing role of design enabled us to make reflections about the possibility of educating active communities of people to apply a specific design process to face challenges in their specific field of knowledge, bringing innovation through a strategic application of digital technologies.

Within the framework of the EU funded Digital DIY project, IDEActivity Centre has developed a design toolkit and guidelines based on a specific co-design process built with and for non-designer with a specific methodology.

The main objective of this paper is to describe the approach used in the construction of the digital DIY co-design process based on a Human Centred Design. The paper will also highlight the twofold intention of building a process with people using a bottom up approach training them at the same time to let them become ambassador of that method.

The resulting process can be applied and repeated in different field of interest. In this paper we present experience of application in the education area where a group of multidisciplinary experts were involved.

To this purpose, section 2 briefly introduces our idea regarding the role of the design in a DiDIY context, section 3 describes the DiDIY co-design process and the approach used to build it, section 3 presents the experimentation had in the specific case of the educational field.

## 2   DIGITAL DIY ENHANCING DIFFUSE CREATIVITY

Digital DIY is here envisaged as a creative practice through which people may generate innovation increasing their self-confidence and empowerment by developing new skills and knowledge.

Since the last decades of the 20th century, research in learning processes have suggested the importance of making and doing as a means to foster the acquisition of skills, especially the creative ones. Creativity and the ability to produce ideas, knowledge, and innovations is a key player.

Within this research, the term "creativity" is intended to encompass a range of creative interactions. It includes the creativity of individuals who are making objects using DiDIY technologies; the creativity that results from the social interaction of individuals coming together and exchanging ideas and working on DiDIY projects; and creativity in the wider community, for example, the creative impact on society that results from how DiDIY projects are manifested in the wider world.

There are creative implications for this progressive engagement, for example, the exchange of creative ideas and inspiration via online communities enables widespread dissemination of designs.

Collaborative engagement opens the way to potentially enabling creative solutions to local, social and environmental problems. Free and open access is concerned with the protocols allowing or restricting the use and modification of designs and as such has implications for both the creators of designs and those wishing to use them, moderating the shared use of creative capital.

Digital DIY enables the shared production of creative content and therefore greater opportunities for co-design and the creation of collaborative value chains.

### 2.1  How design can foster Digital DIY creativity

What does it mean to design in a world characterized by diffused creativity?

Design literature has suggested since a long time that everybody is a designer [7] [8], and more recently that "in a world in rapid and profound transformation, we are all designers". [9] These theories refer to the ability and need for untrained people to create what they need even without the support of professional designers.

Manzini stresses that *"if it is true that we live in a society where 'everybody designs', designers should accept that they can no longer aspire to a monopoly on […]. In this new environment of diffuse creativity, designers have to learn how actively and positively to participate in the social processes where new and, hopefully, promising ideas are emerging"*. [10]

The role of design in the era when everybody does design needs to be reshaped. Indeed, professional designer could lead, guide, provide scaffolds, or offer a clean slate to DIY practitioners, according to their interests and creativity level. [11]

The challenge lies in the ability of facilitating participatory processes, where phases of listening, observation, inspiration, involvement and verification with users become essential components of the project. As facilitators, designers support the development of the project drafted (or defined) by the DiDIY practitioner.

In this research, we propose that professional designers may contribute by facilitating the creative process of making, especially within the digital social innovation phenomenon frame, as a means to foster people empowerment. *As design researchers, we aim at contributing by developing an ad hoc co-design process and related (co)design-driven tools specific for Digital DIY that can help people to create innovative digital solution in their professional field.*

We decide to create a design toolkit for the digital DIY b*ecause the people are the experts*. They are the ones who know best what the right solutions are.

The toolkit doesn't offer solutions. Instead, it offers creative techniques, methods, tips, and worksheets to guide people through a process that gives a voice to communities and allows their desires to guide the creation and implementation of solutions.

Creativity is the context and the reference frame where innovation can develop in a sort of humus and rich soil in order to be fostered and spread. The future of the economy and society is becoming more and more influenced by creativity and by the ability to produce ideas, knowledge and innovations. This ability has always been important, but in the last twenty years has literally exploded. Relying on the idea that creativity is the basis for innovation, to learn and manage creativity techniques becomes strategic to meet a company or organisation's need for innovation.

We planned to use co-design methods and tools to involve people in the construction of the design process and in the creation of knowledge about Digital DIY. Therefore, we make use of human-centred co-design workshops because it can help connect better with the people involved allowing the transfer of the design process while it is creating.

## 3   THE DIGITAL DIY CO-DESIGN PROCESS

Within the framework of the EU funded Digital DIY project, IDEActivity Centre has developed a process and a set of tools for design, focusing especially on the importance of creativity in achieving innovation.

IDEActivity identifies a ***design and creativity based model*** that is able to generate innovation in different areas of interest (i.e. education, work, legal system) through the exploration of digital DIY as a mindset and a social practice. We can consider it as a process, with a strong social connotation, where people's creativity and self-improvement through the development of new skills and knowledge are key elements.

This iterative DiDIY co-design process focuses on two main stages*, Explore* and *Generate*. The first stage – *Explore* – aims at the identification of a significant objective and its possible development in relation to a given context. Users are supposed to structure a common vision in relation to a problem or challenge with the actors involved in the creative process. Reciprocal understanding of needs, hopes and the aspirations is crucial, and an analytical process of information interpretation is fundamental to identify opportunities.

The second stage – *Generate* – aims at delivering and prototyping ideas, through creative sessions based on a series of tools designed to stimulate people creativity and generate suitable solutions in line with the given context and the objective.

The Process is moving through four main steps: Immersion, Define, Ideation, and Build to Think.

1.   **Immersion** (within the Explore area), which aim is to get closer to the social and cultural context of Digital DIY. The Immersion step, is broken down into two parts: Preliminary Immersion and In-Depth Immersion. Preliminary Immersion seeks an initial understanding of the context. In-Depth Immersion aims to identify the needs of the people involved in the DiDIY, and the opportunities that are likely to arise from an understanding of their experience regarding the issue under scrutiny. This "plunge into context" frequently generates a mass of information so vast that it becomes necessary to organize the data visually so as to indicate patterns that will help to provide an understanding of the whole and identify opportunities and challenges.

2.   **Define** (within the Explore area), which aim is to identify potential opportunities. This step is essential for the goal to be fully understood. Through different approaches, research can reveal valuable information providing potential opportunities, in ways that are unexpected at times. This practice trains participants' intuition and awareness, using tools that prompt new avenues of consideration, and gives shape to the project's scope, providing relevant and viable opportunities.

3.   **Ideation** (within the Generate area), which aim is to generate innovative ideas. The idea generation phase usually begins with creative sessions conducted by the team with regard to the theme to be investigated. This activity is carried out with support from different tools, used to stimulate creativity and generate suitable solutions consistent with the context and the goals to be achieved. The tools used during this phase are aimed at: generating numerous ideas, selecting ideas, visualizing ideas.

4.   **Build to think** (within the Generate area), to prototype and implement a concept. It helps to make ideas tangible, so as to provide continuous learning and eventual validation of the solution.

Each step has specific activities and tools that guide non-trained people in the definition of a design challenge and the creation of a concept based on the fundamental element of Digital DIY.
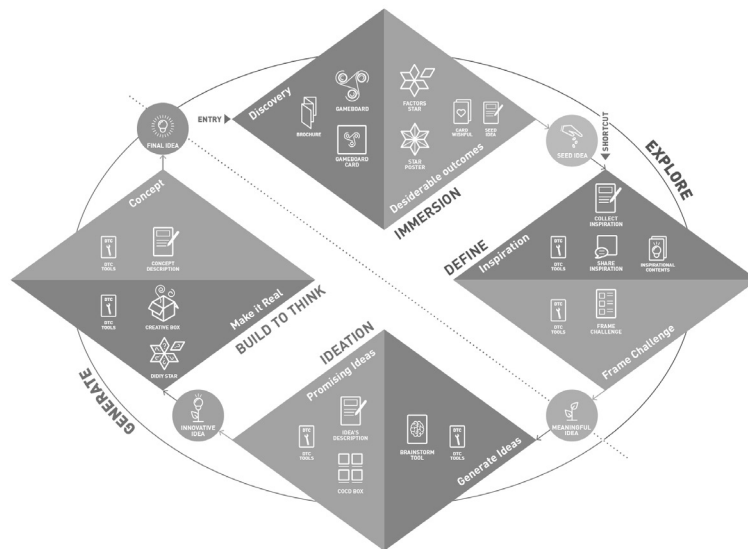


*Figure 1. The DiDIY Design Process*

Each of the main steps of the creative design process has two phases: *Divergent and Convergent.*

In other words, each step starts with a 'problem' definition, followed by a divergent phase which includes the 'creation' or 'widening' of a field of possibilities which includes collecting and generating facts, problem statements, and ideas, without criticism. Then resultant solutions are clustered and categorized, followed by a convergent phase in which there is a narrowing of choices based on criteria of what is useful and relevant.

So, we explored ways of fostering participants' creativity collaboratively drawing on design thinking. We first modelled a possible process reflecting how participants could develop such knowledge co-design experience and eventually we developed and applied a supporting toolkit.

Our objective is to provide participants (and eventually everyone) with these tools and toolkit which will enable local groups and citizens to develop their 'design thinking capability', through a structured design process substantiated with their experiences, emotions and thoughts.

This process and related tools and activities will end up in a design toolkit that will enable collaborative actions aimed at identifying and solving problems through the direct involvement of users.

The toolkit represents all the techniques and tools designed and collected whilst the guidelines include the conditions necessary to start and set up a session of co-design and the flow of activities to be performed during the session, referring to the specific tools.

The toolkit doesn't offer solutions. Instead, it offers techniques, methods, tips, and worksheets to guide participants through a process that gives a voice to communities and allows their desires to guide the creation and implementation of solutions.

## 3.1 Co-design as a tool of analysis and as a process for DiDIY

In order to achieve this objective, we used Human Centred Co-design workshop based on IDEActivity [12] i.e. a human-centred participatory methodology formerly developed by IDEActivity Centre and applied in contexts where innovation is pursued (e.g. companies, institutions and organizations), using the potential of creativity and Design Thinking while co-creating with the people involved in a project. Human-centred design offers a chance to design with communities, to deeply understand the people, to dream up scores of ideas, and to create innovative new solutions rooted in people's actual needs. [13] (Ideo, 2015). To meet the objective of creating innovative solutions that engage the technological universe and are aimed at the DIY, the co-design workshop was designed by us.

By using co-design workshops we involve non trained designer in the testing and refinement of the Digital DIY design process creating tools that speak the language of common people.

In this way, we give the possibility of such approach to be adapted and used as an empowerment tool by people of different Digital DIY communities. Empowerment tool is here intended as something allowing people to 'take control' of their ideas in a participative and pro-active way instead of re-active one, in a system where self-improvement through the development of new skills and actionable knowledge is pivotal.

In this perspective, people are considered all the way as co-design researchers and companions. The division between expert designers and the laypeople becomes blurred and so do the borders between research and practice. In order to do so, Scheldeman (2012) suggests that the designers should allow for "meaningful relation… design should not prescribe or predict, but enable.

On the other side, co-design workshop represents the opportunity to train specific people to use and apply a method and a design process allowing them to become ambassador of that method and to replicate it in their specific professional field. The co-design workshops give us the opportunity to explore whether people can go through this design process on their own, supported by our toolkit.

The experiences of the workshop have contributed to continuous experimentation, verification and implementation of a project-building process, of specific activities and relative tools in order to produce the toolkit and the guidelines.

## 4 DIDIY CO-DESIGN PROCESS AND EDUCATION

The chapter describes the application of the Digital DIY co-design process in the specific field of Education&Research investigated by the EU DiDIY project. [14]

The aim of the Education workshop is to test and design, together with teachers and educators, the design process and to train them to apply it in the different educational environment to increase such skills as creativity, critical thinking, collaboration and communication.

The final goal is to contribute to the creation of a valuable learning experiences based on creativity where the teacher became the designer of the activities and the facilitator of the learning process.

According to some literature issue, it was important to identify the correct personalities to involve in order to create a group with mixed skills that could observe the phenomenon of DiDIY and education from different points of view: primary and secondary school teachers that already apply digital technologies at school, high school and university professors that use alternative educational methods, makers interested in education, educators that run educational programs outside schools using digital making (inside museums or Fablabs), professionals in different departments of the school system.

One explorative and one generative workshop - in two different countries -have been organized.

In particular, the explorative workshops allowed collecting the fundamental elements that the people involved deemed were qualifying for digital DIY, together with a series of challenges that tackle real needs in the area of education.

To make some example of educational challenge:
- *How can digital DIY be exploited to keep 'motivation high and constant' during educational activities?*
- *How can we organize and manage an educational community of digital DIY including through assigning roles in it?*
- *How can digital DIY become a strategy or a system of connections to create an educating community?*

Some of this challenges were answered in terms of possible scenarios and innovative ideas during the generative workshops, where the participants defined a concept of the selected idea, considering the fundamental factors identified in the exploration phase.

To see some of the ideas and concept designed during the DiDIY&Education workshop with the application of the DiDIY design process please consult the project deliverable at this link: http://www.didiy.eu/public/deliverables/didiy-d4.7-1.0-pub.pdf [15].

A significant concept that emerged from the workshops is that teaching can no longer be understood solely within the scholastic system, but it is fundamental to speak of an ecology of the educational system, understood as the set of components that intervene and impact education and the relationship between them. The "educating community" include not only the family, the school and educators, but also the local area of reference, therefore the neighbourhood or, better, the city. Thanks to the spread of digital technologies, the distances in the area are shortened and the possibility of action of education by formal and informal experience has extended. Building up an educating community is a new skill of the teacher that weaves relations with the local area, the families and the educators, and also ought

to know and map out the local, national and international possibilities of intersection, connection, support and learning.

## 5   CONCLUSION

The experience of applying the methodology and toolkit at the workshops led to very positive feedback. Participants pointed out how the effectiveness of the transfer of the methodology and the toolkit materials had been facilitated by the overall atmosphere, space and communication management.

It is widely recognized that the use of creative techniques enhances competitiveness and efficiency of the organization or group production process. These kinds of playful activities are intended to stimulate people's creative potential, and preventing negative emotions. They promote active and creative relationships at both cognitive and relational levels and have proven, in our experience, to be a very effective means of knowledge-transfer.

An entrepreneurial culture to stimulate, encourage and foster the development of individual and group abilities emerges as an inspiration for innovation strategies.

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