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Design in the new Do-It-Yourself age: trialing workshops for repairing

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ABSTRACT
Traces of a renovated interest in Do-It-Yourself (DIY) have been observed in relation to technological advances and lowered prices facilitating the access to the practice at different levels of skills.
This research envisaged the DIY trend as an opportunity to foster sustainable impact in a society where everyone can and does design. In this paper the role of Design in this 'new' DIY age is addressed. In particular professional designer as facilitator in investigated when supporting the DIY practitioners in repairing, reusing and in general practices prolonging product lifespan (RE-DIY).
The facilitator role is studied through action research approach by setting four workshops in Italy in which designers supported practitioners in repairing and repurposing in ideal workspaces.
The repairing workshops validated the hypothesis of a positive contribution by design in supporting the development of RE-DIY practice by optimizing resources (e.g. saving materials), informing on processing (e.g. 3D printing), increasing quality (e.g. refining the aesthetics). Critical components of the workshops have been identified such as the relevance of facilities, availability of time, emotional attachment to the item. These can be overtaken through the use of professional Design expertise based on abductive approach, finding an ordering principle and reasoning on multiple levels.

The 'New DIY age'

Since late 2000s traces for a renovated interest in Do-It-Yourself (DIY), i.e. "the realm of making practices intended for personal purposes, in substitution of paid usually professional service" (*Author of this paper*, 2015) have been observed. Traditionally DIY was considered a common practice especially for home-improvement, such as repair, decorating and gardening. Over the time, the dynamics of DIY practice have been considerably reshaped plausibly in relation to technological advances and lowered prices facilitating the access to the practice at different levels of skills (Watson and Shove 2008). Consequently, DIY has expanded to include any sort of self-carried activities to create, transform and repair artefacts out of the working time[1].

The current relevance of this phenomenon has led several researchers to suggest a paradigm shift to DIY invention (Fox, 2013), to the extent that a 'new' DIY age (Hoftijzer, 2009) or a Post-Professional Era (Atkinson, 2010) is undergoing. Contemporary DIYers, such as fabbers and makers, craft consumers (Campbell, 2005), lead users (von Hippel, 2005), 'prosumers' (Anderson, in Toffler, 1980), professional amateurs (Leadbeater and Miller, 2004), communities of practice (Lave and Wenger, 1991) and creative communities (Manzini, 2006) are and plausibly will be able to self- or collaboratively create artifacts that they desire, supported by technologies (e.g. Atkinson et al., 2008), networks (e.g. Leadbeater, 2008) and even business models (e.g. Franke et al., 2006). Furthermore, the spreading of physical and virtual places[2] where people can undertake creative activities is enabling the coalescing of individual creators in 'creative communities', i.e. groups of people who cooperatively invent, enhance and manage innovative solutions for new ways of living (Manzini, in Bœuf et al., 2006). It has been estimated that the 80% of innovations have been generated by non-professionals devoting their spare time to practices (Leadbeater, 2008).

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[1] This applies to at least in industrialized countries; DIY can be a common practice in non-industrialized countries to solve everyday problems and necessities.

[2] Examples of these places are Fablabs, Techshops, Ponoko, Quirky. See section 'Designers in RE-DIY workshop' for more examples.

Although DIY has been spotted as a major trend in contemporary society (Anderson, 2012), it is still a relatively unexplored domain both of consumption and of practice (Watson and Shove, 2008). Recently concluded research by the author (2013) addressed contemporary DIY through the sociology practice theory (Reckwitz, 2002; Shove, 2006; Warde, 2005), according to which DIY practitioners (i.e. the carriers of the practice) are viewed as "knowledgeable actors whose acquisitions are in some sense an expression of their capabilities and project-oriented ambitions" (Watson and Shove, 2008).

The research (*author of this paper*, 2013) envisaged this contemporary self-production phenomena as a window of opportunity to foster sustainable impact through, for example, personal growth, community empowerment and waste reduction. Further research on the topic is advocated and in this paper the contribution of Design is addressed. In fact, the spreading of this 'social and participatory innovation' is particularly influential for Design (Abel et al., 2011) especially because of the debatable role of professional designer in a society where "everyone can and does design" (Cross, 2011, p. 3).

Design in the DIY age

In the 2010 conference, the Industrial Designer Society of America debated if the DIY resurgence is making people question the need for mass production, and by extension, the need for designers. Throughout the Design history, new kind of partnership between design professionals and final users in the creation process has been investigated and often advocated (Ehn, 2008; Pacey, 1992; Papanek, 1979). Manzini (2006) suggested that in this new environment of diffuse creativity, designers should accept that they can no longer aspire to a monopoly on design and they have to learn how actively and positively to participate in the social processes where new and, hopefully, promising ideas are emerging.

DIY has been defined as a more democratic design process (Atkinson, 2006). DIY's creative nature and the implied 'design thinking' (Cross, 2011) reasonably facilitate interventions by designers and their dialogue with DIYers to the extent that it can represent a business opportunity (Fox, 2013, 2012).

In 2010, the exhibition 'TechnoCRAFT: hackers, modders,

fabbers, tweakers, and design in the age of individuality' curated by the designer Yves Béhar showed several typologies of intervention - ranging from platforms for collaborative creation to modular and incomplete products - where the designer acts as arbitrator of the dialogue between the product and its user. Opportunities for design have been proposed and explored. Facilitated access to the production system by consumers could, in theory, lead to inefficient consumption of resources and increased waste, and thus the sustainability of this trend is still being debated (Troxler, in Abel et al., 2011; Watson and Shove, 2006). Craft consumers (Campbell, 2005), for instance, are still inseparable from mass production (Watson and Shove, 2008). In fact, contemporary DIY and Makers movements may appear contradictory as they have been shifting from a pure production to a – maybe more sophisticated – consumption experience, a possible contradiction with respect to their original openness principles (Carelli et al., 2014). The disruptive innovation brought by these movements and trends risk being seen as reduced to a new form of production and consumption of more remedial goods, essentially a new form of capitalism (Ritzer and Jurgenson, 2010).

Design for RE-DIY
Design can act as a catalyst for the amplification of the sustainable potential of the DIY practice. In fact, DIY may contribute to the provision of individual and social empowerment (Manzini, 2003) beyond human wellbeing while reducing the consumption of resources (Lorek and Spangenberg, 2014).
The question is then how to align the current DIY Design trend with sustainability national targets. Grassroots innovations – such as contemporary DIYers engaged in low impact practices – are recognized as incubators of the social change that is needed to minimise future environmental change (O'Brien, cited in Feola and Nunes, 2014). In fact, there is a growing and heterogeneous population applying the DIY approach to the replication, re-pair, regeneration, redesign, or refunctionalization of existing products (e.g. fixers, remakers, refurbishers, customizers and hackers) (Bianchini and Maffei, 2014), with consequential benefits for the environment.
Previous research by the author (2013, 2014) addressed self-

production as a means to prolong product lifetimes by re-using, re-pairing, re-purposing, and re-appropriating, hereafter named 'RE-DIY'. RE-DIY was investigated there in relation to the most voluminous bulky waste, i.e. furniture and other domestic products (excluding electric and electronic devices), which accounts for around 60% of landfilled waste in the United Kingdom (Waste & Resources Action Programme, 2012) and other European countries, e.g. Italy (Centro di Ricerca Economica e Sociale Occhio del Riciclone, 2010). Furthermore, the majority of these items is still in such good condition that the reuse of furniture has been acknowledged as a key policy area at European level (Beasley and Georgeson, 2014).

The research identified the suitability of the place where the RE-DIY practice is performed as one of the promising elements to work on to generate potentially positive impacts on the environment. Interviewed practitioners declared that they practice RE-DIY in places of their houses such as the cellar, outdoor shed or the room where the object will be placed. However almost all the interviewees would appreciate to carrying on the practice in a better place in terms of equipment (e.g. professional or bigger machineries) and environmental setting (e.g. dry room, lights, no concern for producing dust and dirt). They also expressed a desire for support in the ideal place where the practice could be carried on. Hence, in the same research, designers have been proposed to support RE-DIYers as either collaborators with experts or as facilitators (or even educators) with less experienced practitioners according to their level of creativity (Sanders and Stappers, 2008). As collaborators, designers bring an equal contribution into a project shared with practitioners. As facilitators, designers support the development of the project drafted (or defined) by the practitioners.

This paper addresses the role of designers as facilitators assisting RE-DIY practitioners over the creative process in places where the practice is and can be carried on, in order to infer the skills and competences that designer might need to valorize to have a role and provide a contribution.

Designers in RE-DIY workshops
In the last decade many DIY workshops equipped with users-

friendly devices have spread (e.g. 373 FabLabs, 1801 Hackerspaces, over 1,000 Men's sheds, plus 100k Garages, TechShop). Generally aiming at providing facilities for self-production, these workshops offer members the opportunity to share skills, knowledge and projects with other passionate about DIY and/or electronic equipment. Some efforts have been addressed to address the environmental impacts by recently established organizations such as The Restart Project[3] and ReFab Space[4]; both are social enterprises supporting the extension of electric and electronic equipment lifespans by teaching and sharing fundamental repair and maintenance skills in their premises or during workplace events, envisaged as an empowering practice. The focus on repairing is currently pursued also by grassroots initiatives such as Fixit Clinic[5] or Repair Café[6], local, community-led initiatives of amateurs supporting citizens intending to repair their items.

At the time of the research these repairing-oriented workshops and communities were still in the early stage of ideation and development. Furthermore a declared interest in and involvement of professional designers has not been observed in the above workshops and communities so far, i.e. the scenario hypothesised by this research and addressed in the following sections of this paper.

Therefore the research investigated how designers can facilitate the RE-DIY practice in such places, bringing knowledge (e.g. about materials and technology) and competences (e.g. design thinking) in order to minimise resource consumption and empower individuals.

The concept of a design-driven RE-DIY workshop has been explored through co-design (Stappers et al, in Abel et al, 2011) and action-research experiences intended to promote social change and social analysis (Greenwood and Levin, 1998).

The ideal environmental conditions and settings for practicing RE-DIY have been co-designed with 4 practitioners previously interviewed (*Author* 2013, 2014). The result is the identification of the preferred components under the product categories of

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[3] http://therestartproject.org
[4] http://www.refab-space.org
[5] http://fixitclinic.blogspot.it
[6] http://repaircafe.org

tools, sources of materials, support and storage.

The concept of the RE-DIY workshop has been introduced and tested in 4 different occasions, between April and September 2012 in Italy, where the main body of the research has been carried out. They took place in occasion of:

1. Autoprogettazione 2.0, hosted by FabLab Italia and Domus Magazine, in Milan;
2. Special session for members, hosted by FabLab Italia, in Turin;
3. Undergraduate module at School of Design, hosted by Politecnico di Milano, in Milan
4. Researchers' night, funded by the European Community, in Milan.

First RE-DIY workshop

The first workshop aimed at trialing the concept on a small case explored. Facilities and support of the Fablab Italia resources, such as rapid prototyping machineries (e.g. 3D printer and laser cutter) and staff members was provided. Ten participants expressed their interest in participating during the days before the event and five attended. After the reciprocal introduction of the participants and the presentation of the initiative (including some examples of possible concepts), participants developed a concept intended to save an item owned by them or provided by the organizers. This three hour workshop was facilitated by the author (designer) and supported by staff members of the Fablab. The developed concepts were a 3D printed plastic sword-handle for a broken umbrella and a laser cut acrylic seat for a broken Thonet chair, a coat-hanger, a piece of tableware, the handle of a piece of cutlery.

Practitioners appeared engaged in the practice although three of them could not conclude the project by the end of the workshop. The major insights gained from this first workshop and taken into account for the following ones are:

- Short workshop sessions can work for practitioners with defined concepts, otherwise more time is needed to finalise the project;
- The projects were finalized by those participants who brought and owned the item;
- Practitioners might aim at particularly complex projects for which higher levels of manual and knowledge are required.

figure 1 First RE-DIY workshop, in Milan

figure 2 Second RE-DIY workshop, in Turin

Second RE-DIY workshop
The second workshop pursued the collaboration with the Fablab Italia members thus exploring the concept with more skilled practitioners, in a equipped with a wider range of facilities over a longer time frame (2 consecutive half days). Eight invited and an additional Fablab members from different backgrounds attended the workshop. Half of the participants brought a personal item the rest used discarded items provided by the organizers and collected in the areas surrounding the venue before the event (e.g. Naskaloris lamp, umbrella container, drawers, chemical laboratory glass equipment, rechargeable torches, empty perfume bottles, empty paint bucket, pig shaped money saver). Practitioners tended to adopt a trial-and-error approach to produce a concept that was identified in a particularly short time. Two attendees – that were going to create casing for speakers and revisited table lamp even before the RE-DIY workshop – adopted a structured approach aiming at identifying technical solutions that could be durable and aesthetically pleasant.

A strikingly collaborative approach emerged during the workshop. Participants supported each other with the provision of suggestions, materials or a hand; two members teamed up to deliver one shared concept. The enthusiastic approach to the workshop has been interpreted as an expression of interest to the practice and the proposal; in fact two participants accepted to support in a subsequent RE-DIY workshop.

In this workshop practitioners were relatively informed and skilled. They were aware of elements of physics, engineering or familiar with the use of machineries. In this context the designer and facilitator mainly catalyzed the process of valorization of ideas and items, namely by informing about the historical value of some items (e.g. Kartell or Danese products), and also suggesting solutions to improve the aesthetic quality or usability of their ideas.

Several concepts could not be finalized by the end of the workshop although longer than the previous one, and only the practitioners bringing an item intended to further develop the idea afterwords.

Third RE-DIY workshop
The third RE-DIY workshop involved voluntary students from a final year module addressing also the topic of this research.

figure 3 Third RE-DIY workshop, in Milan

Participants were invited to reuse, repair or repurpose a domestic or personal item at the end of life (e.g. unused or discarded), such as umbrellas, chair, floppy disk, coffee cup, spirit bottle, toys, photo frame, vase, wallet. Objects brought by the participants only could be used and no items were offered by the organizers. The duration of the workshop was extended to three weeks as a trigger for pursuing concept rather than accomplishing a task.

Support from designers and technician was offered, in particular with during a tutorial session in a workshop equipped with wood, metal, plastic and rapid manufacturing tools and facilities.

This third action research experience achieved the most interesting results. Participants resulted engaged in the practice. The quality of the delivered artefacts resulted particularly appreciable to the organizer in terms of mechanical reliability, aesthetical details, interpretation of the affordance of the selected item, and valorization of the emotional content if related to practitioner's memories.

Fourth RE-DIY workshop

The fourth and last RE-DIY workshop took place during the Researchers' night', i.e. an EU funded initiative intended to disseminate and inform public audience about research running in universities across Europe.

The time constrain (one day) and the location (temporary 4x8 meter stand) did not allow for the replication of the most successful experience, i.e. the third RE-DIY workshop. However, the possibility to reach a wider audience sounded an opportunity to observe the reaction and collect feedback on this concept from a multitude of participants with unpredictably different and wide range of skills and interest to the practice.

The workshop was equipped with several tools, machineries (3D printer, laser cut, sawing machine) and materials (sugru, kinstugi, woolfiller, makedo).

Attendees of the general event showing interest to the stand of the RE-DIY workshop were invited to know more about the initiative and to take part to RE-DIY sessions with the support of designers, experts in rapid manufacturing and other practitioners. Participants were offered the possibility to use a personal belonging (e.g. earring, USB memory stick, wool sweater, shoes, wallet) or discarded items provided by the organisers (e.g. cups and mugs, ashtray, colander, toys, cutlery, tableware, frames). The workshop received relatively high interest by the attendees of the event. 29 visitors willing to apply some RE-DIY practice left a filled questionnaire revealing the general satisfaction and interest into the practice and into the possibility of using a

figure 4 Fourth RE-DIY workshop, in Milan

permanent RE-DIY workshop.

Interestingly, the average age of these respondent is 17 years old, because of the major involvement of children. This highlights also the interest and educational potential of the workshop.

Discussion and conclusion

The four RE-DIY workshops sustained the hypothesis of a possible contribution for professional designer to be the facilitator that "drives the engagement of people through the design process; which is fundamentally a constructive and optimistic process of searching for possibilities" (Body et al, 2010). Designers can act as catalysts of the creative skills and the 'design intelligence' that every individual has got at different level and can train (Cross, 2011). In particular design can support the development and management of internal and elementary design properties, such as material, structure, form (Hubka and Eder, cit in Roozenburg and Eekels, 1995) in favour of environmentally lower impacts. This objective can be achieved by design through the valorization of the 'design thinking', that is the ability to be intuitive, to recognize patterns, to construct ideas that have emotional meaning as well as functionality, to express ourselves in media other than words or symbols (Brown, 2009). RE-DIY practitioners might not be familiar with these processes and some major conclusions (and suggestions) are summarized below.

Time resulted a key component for higher quality outcomes from the workshop. The shorter workshops (e.g. a day) might lead to environmental rebound effects as attendees resulted more interested to experiment with materials and technologies rather than saving artefacts and resources. The experiences of the workshops confirmed the position by Roozenburg and Eekels (1995) according to who non-professional designers are most interested in the 'descriptive' approach to design, i.e. through logical structural analyses, and empirical research. On the other side professional designers, will more likely adopt a 'prescriptive' approach, i.e. a more structured approach demanding the application of established and new methods, especially in the process of creation, analysis, testing and evaluation of proposal until satisfactory (Dorst 2010).

To this end, longer workshops are suggested. However, it cannot

be excluded the even shorter workshop could trigger the interest to the practice and promote environmentally sound practices in the future, as perceived in the fourth RE-DIY workshop. Monitoring the consequences of short workshops could be beneficial.

Participants to the RE-DIY workshops generally benefitted from triggers to identify a possible concept to pursue with their items. Untrained practitioner may struggle in the handling of creative process because of a lack of 'abductive thinking' (Cross 2011), i.e. the problem solving approach in finding a solution or a 'working principle' for a given problem that is peculiar in professional designers (Dorst, 2010). This limit can be overtaken by providing examples of objects at different levels of complexity, style and required skills offered by the designer to the RE-DIY practitioner, as it proved beneficial in suggesting trajectories and solutions in the RE-DIY workshops.

Furthermore a wide range of available resources in support of the practice can act as a trigger for ideation and accomplishment of the practice. A couple of practitioners especially in the first workshop dropped the original concepts because of unavailability of materials. On the other side, the introduction of the potential of such unfamiliar materials and technologies - such as Sugru and the 3D printer - stimulated the creativity of the practitioners. Such devices extend the skills of the practitioners towards tasks that otherwise were though unapproachable by the user. They contribute to moved the boundaries of the competences distributed between the user and the artefacts (Latour 1992). More importantly, the attachment to the object of RE-DIY practice is fundamental. Practitioners who were given an object resulted less concerned about the accomplishment and the valorization of the items. The final aim of reducing the impact of such practice can be more likely achieved when the practitioner is attached to the item or to the concept that s/he wants to achieve.

The above points reflects the complexity of the involved elements of the practice. Designers can support the managing of complexity for the attitude in the identification of the 'ordering principle' solving problems at different level, managing different elements in parallel (Cross 2011). The managing of such complexity might benefit from the contribution of facilitators from

different backgrounds. The mixture of supporters and the collaborative approach between practitioners from different background provided major benefits.

These final conclusions can support to the development of future RE-DIY workshops. In order to be effective, generate resilient impact and scale up on a wider level, the practice should be nurtured and sustained. The author (2013) proposes the introduction of RE-DIY culture and practice in education programs (e.g. Design Universities), social enterprises and repair workshops. Government and policy makers can play a crucial role in sustaining design-led initiatives for the involvement of local and global communities in SCP projects. Possible actions include support for establishing and developing infra-structures to facilitate RE-DIY (e.g. local workshops) and deepening relationships with local communities and industry (e.g. funding for collaboration) (*Author of this paper*, 2014).

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