Digital DIY – Knowledge Framework

Creating and Maintaining a Shared Knowledge Framework on DiDIY

This module has the following learning objectives:
1. *Get an understanding of the complex Digital DIY phenomenon;*
2. *Learn about Digital DIY and its relationship with classic DIY;*
3. *Discover the atom-bits convergence and why it matters;*
4. *Understand Digital DIY and its influence on our society.*

MODULE OUTLINE

This module provides a general overview and more importantly an educated perspective that allows for a deeper understanding of the Digital DIY phenomenon and all its characterizing features.

FOCUS

DIY and DiDIY
The term "digital do it yourself" is used to denote a phenomenon whose boundaries are still unclear and dynamic; therefore it might not (yet) be properly defined in a precise way.
By viewing DiDIY as a specific kind of DIY and understanding what DIY structurally is, DiDIY can be classified around a fundamental tension: seeing DIY as something that someone (an individual, but possibly also a group, a class, a company, society as such):

- *does*, e.g. an *activity*; the creation, modification or repair of objects; a production and consumption process,
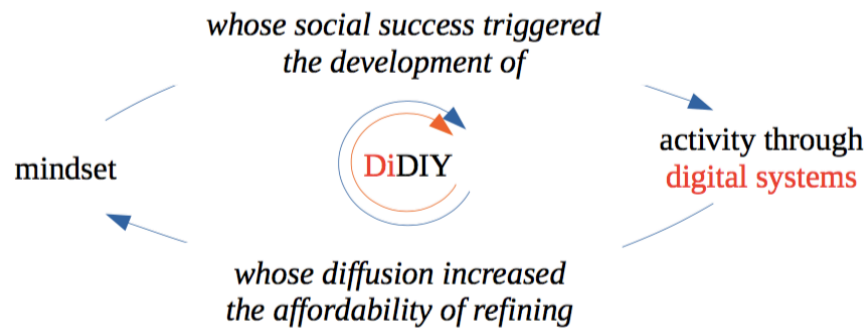
or:

- *has*, e.g. a *mindset*; an attitude; a producing and consuming culture.

This duplicity emphasises the complementary interpretation of DIY as:

- an objective phenomenon: DIY as an activity is studied via the analysis of tools, products, structure of collaborations, ... and:
- a subjective phenomenon: DIY as a mindset is studied via the analysis of motivations, competences, social contexts, ...

Typically, the co-presence of the "objective" and the "subjective" components activates a positive feedback (self-reinforcing) process, thus progressively transforming DIY into a socio-technical system:

whose social success triggered
the development of

mindset   DiDIY   activity through
digital systems

whose diffusion increased
the affordability of refining

Ethical positions, individual attitudes and motivations, transformation methods and tools, etc. have contributed and are contributing to make the system a recognisable phenomenon and to develop new dimensions and directions to it.

In this perspective, the diffusion of digital systems has further amplified the feedback effect.

In the broader picture, the digital component can then be intended as a means to lowering technical and relational barriers, easing the access to information, resources, and opportunities, and hybridising the distinction between the physical and the informational realm.

FOCUS

The Meaning of Digital

Lately the term "digital" has been widely exploited to convey a generic message of 'being novel'. We shall avoid this trap and maintain a specific meaning for the term: "digital DIY" is not a synonym of "current way of DIY", but a kind of DIY specified by some use of digital tools. In order to achieve a useful characterisation of what DiDIY is, the concept 'digital' is then a critical component of our analysis and exploration.

Let us recall that the opposite of *digital* is *analog* (also spelled "analogue"): Why should something that is not analog be digital? And what is specifically the scope of these opposite features? In other words, what can be analog-or-digital? (For example, a table is plausibly neither analog nor digital.)

Based on the common understanding of the concepts, "digital" does not mean:

- 'discrete' (vs continuous: a clock whose hands assume only discrete positions – as in an electronic display where the angular position of each hand changes by making the hand disappear in a position and reappear in another one – is analog);
- 'based on electronics' (vs mechanical or something else: many electronic devices – such as traditional radios, telephones, amplifiers, etc. – are analog);
- 'related to computer-based online communication' (vs offline computing or something else: digital computers are digital also if disconnected from the Internet);
- 'informational' (vs physical: many informational devices have been and are analog).

Despite this list of what digital is not, the concept is not empty, nor purely marketing-related: understanding it is helpful, if not necessary, to explain the critical role of the 'being digital' in digital DIY, and therefore to maintain the appropriate focus in our project.

Since information can be communicated only by means of signs that are then somehow "written" on a physical system (ink on paper, sounds, etc.), the encoding / decoding stage, be

it analog or digital, is crucial to making communication possible. The common characterisation of physical devices as analog or digital is then elliptical: a device is analog / digital because it deals with information coded in analog / digital form.

FOCUS

DiDIY and ABC

Traditionally, information is statically embedded in physical artefacts and dynamically recognized and operated only by natural cognitive agents (animals, particularly humans), according to the (implicit, because assumed as obvious) equation:

information processor = animal, i.e. wetware processor

DIYers, starting from (i) informational entities (knowledge, skills, designs, …) and (ii) physical entities (raw materials, components, tools, …), generate new information-laden physical artefacts. The relation between information and physical artefacts (metaphorically: bits and atoms) is then at the core of DIYers' activities.

Then something changed: Technological devices have been developed able to dynamically operate on digitally coded information, so that the equation has become:

information processor = wetware or hardware processor

where the critical novelty is the very existence of technological digital information processors, that has triggered the widespread diffusion of:

- the (technological) phenomenon of communication networks (from the Internet to the Internet of Things / Internet of Everything);
- the (social) phenomenon of information shared in open formats (freely reusable digital data   on everything: texts, music, images and videos, geolocalisation of objects, shapes of objects, …);
- the (cultural) phenomenon of open collaboration and innovation (open source communities, IPR management via Creative Commons licensing, etc).

Communication networks, open formats, and open collaboration and innovation have been the effective breeding ground for new DIY tools, such as 3D scanners and printers and Arduino systems, which operate at the interface between bits and atoms. This emerging scenario can, in a specific sense, be considered digital DIY, intended as DIY with a structured (instead of implicit) and technological (instead of psychological) interface between the physical and the informational components of the system, where the physical process of DIY is enabled or empowered by digital tools, and this is realised both directions,

- from bits to atoms (i.e. encoding and writing, as in 3D printers and in actuators connected to Arduino boards)   and
- from atoms to bits (i.e. reading and decoding, as in 3D scanners and in sensors connected to   Arduino boards).

Hence, what results from digital DIY is a new paradigm that can be called Atoms-Bits Convergence (ABC).

FURTHER RESOURCES

Articles:

✓ Gershenfeld, N., (2012). How to make almost anything. The digital fabrication revolution. Foreign Affairs, 91, 6, pp. 43-57.
✓ Gershenfeld, N., (2007). The coming revolution on your desktop. Basic Books.
✓ Hertz, G., (2013). Making critical making: The value of DIY production. CHI'13, Paris, France.
✓ Hod Lipson, M.K., (2010). Factory @ Home: The emerging economy of personal manufacturing. Report Commissioned by the Whitehouse Office of Science & Technology Policy.
✓ Fox, S., (2013). Paradigm shift: Do-It-Yourself (DIY) invention and production of physical goods for use or sale. Journal of Manufacturing Technology Management, 24, 2, pp. 218-234.
✓ Fox, S., (2014). Third wave Do-It-Yourself (DIY): Potential for prosumption, innovation, and entrepreneurship by local populations in regions without industrial manufacturing infrastructure. Technology in Society, 39, pp. 18-30.
✓ Gauntlett, D., (2011). Making is connecting: The social meaning of creativity from DIY and knitting to YouTube and Web 2.0. Polity Press.
✓ Jackson, A., (2010). Constructing at home: The experience of the amateur maker. Design and Culture, 2, 1, pp. 5- 26.
✓ Sennett, R. (2008). The craftsman. Yale University Press.
✓ Shewbridge, R., Hurst, A., Kane, S. K., (2014). Everyday making: Identifying future uses for 3D printing in the home. DIS 2014, June 21–25, 2014, Vancouver, BC, Canada.
✓ Tanenbaum, J., Tanenbaum, K., Wakkary R., (2012). Steampunk as design fiction. Proceedings of the ACM SIGCHI Conference on Human Factors in Computing Systems, pp. 1583-1592.
✓ Toombs, A., Bardzell, S., Bardzell, J., (2013). Becoming makers: Hackerspace member habits, values, and identities. Indiana University.
✓ Wolf, M., McQuitty, S., (2013). Circumventing traditional markets: An empirical study of the marketplace motivations and outcomes of consumers' Do-It-Yourself behaviors. Journal of Marketing Theory and Practice, 21, 2, pp. 195-209.

LEARNING ACTIVITIES

You can choose the activities of your liking, although we recommend that you start with the first and follow the given order. Please document each of your chosen activities and publish the documentations in the appropriate location, so peers can access them and contribute feedback. [LINK to course spaces, forums, recommendations on social netwrok uses, #hashtag]

✓ Choose three online platforms, where people share designs and/or projects, and explain how they differ in terms of users and projects.
✓ Pick an online project and discuss how it is part of DiDIY in terms of ABC.
✓ Think of a project you design yourself and discuss where (if) you would upload it and why.

QUESTIONNAIRE

1. What is the relationship between bits and atoms in ABC?
2. What is the meaning of digital in Digital DIY?
3. What are DiDIY's main areas of influence?

DiDIY
DIGITAL

4. What is the role of prosumers in reshaping a new kind of DIY?
5. What is the role of online communities in the diffusion of the phenomenon?