

# DIGITAL CREATIVITY ABILITIES FOR DESIGNING SUSTAINABLE AND FAIR FUTURES. REFLECTING ON THE RESULTS FROM THE DM LEARNING LAB MADEIRA

**Valentina Vezzani**

*Department of Art & Design, University of Madeira / ID+ (Portugal)*

## Abstract

The ever-changing digitally enabled world we live in requires preparing young creatives and entrepreneurs with more suitable abilities and set of skills to face the challenges of ongoing digital transformations. The Erasmus+ funded project DC4DM aims to implement a human-centred educational model to train Digital Maturity Enablers. This new type of professionals would be able to drive small and medium organisations towards their digital maturity: owning specific creative digital skills, they would be able to extract value from what the technological landscape offers and respond to the human needs through the principles of ethics and sustainability. This paper aims to describe the DC4DM educational model and share some aspects of its first application at the *DM Learning Lab 'Feeding Madeira'*, a 10-days design-led workshop on the island of Madeira in July 2022. The workshop gathered 36 university students, diverse for country of origin and study background, 6 start-ups, and several local mentors and stakeholders to co-design 6 compelling future scenarios for the island of Madeira where digital technologies are enablers for the sustainable development. Finally, the paper reflects on summarised learnings from the *LLab1*, particularly from the educators' perspective.

**Keywords:** *Digital creativity, digital maturity, digital creativity abilities, HE education, design education.*

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## 1. Training the Digital Maturity Enabler to shape sustainable and just futures

“As globalization and rapid advancements in technology continue to transform civic space and the world of work, education systems have grown increasingly disconnected from the realities and needs of global economies and societies” (WEF, 2020). The WEF's Schools of the Future report (2020) highlights the need for new education models capable of responding to the new drivers of growth introduced by the Fourth Industrial Revolution (4IR) (WEF, 2020). The emerging technologies of our century – such as Artificial Intelligence, Machine Learning, IoT, Virtual Reality – are transforming the industrial economy requiring companies to start a process of digitalisation and transformation toward Digital Maturity (Canina & Bruno, 2021). As suggested by the EU *Digital Skills and Jobs Coalition* (EC, 2023), the WEF *Reskilling Revolution* (WEF, 2023), and the WEF's *Future of Jobs Report 2020* (WEF, 2020), upskilling work force is key, particularly focussing on digital skills along with human skills such as complex problem solving, strategic and creative thinking, critical thinking, emotional intelligence, communication and negotiation, relationship and network building abilities (Canina & Bruno, 2021). Today's education systems must provide new generations with this mix of 'hard' skills, such as technology design and data analysis, and 'human-centric' skills, such as cooperation, empathy, social awareness, and global citizenship, to enable learners to shape future inclusive and equitable societies (WEF, 2020). In the context of Higher Education, also, great change is required, particularly design and engineering education should co-evolve with the human, technological and cultural evolution considering that digital transformation is changing people's mindsets, behavioural and social attitudes; also, all emerging digital technologies are changing the process of creating and innovating (Bruno & Canina, 2019). In this context, the Erasmus+ funded project “*Digital Creativity for developing Digital Maturity future skills*”<sup>1</sup> aims to implement and disseminate a human-centred educational model able to develop and empower digital creative abilities to strategically drive the application of future emerging digital technologies in any fields, achieving a Digital Maturity. The DC4DM project wants to provide HE educators and companies with a suitable set tools and methods to train and nurture the *Digital Creativity Enabler*, a digitally wise professional whose role is to interpret the digital landscape and suggest SMEs strategic paths towards innovative and sustainable solutions.

<sup>1</sup>DC4DM – Digital Creativity for developing Digital Maturity future skills is a three-year project funded by ERASMUS+ Programme - Key Action: Cooperation for innovation and the exchange of good practices. Project Ref: 2020-1-IT02-KA203-079913 www.dc4dm.eu

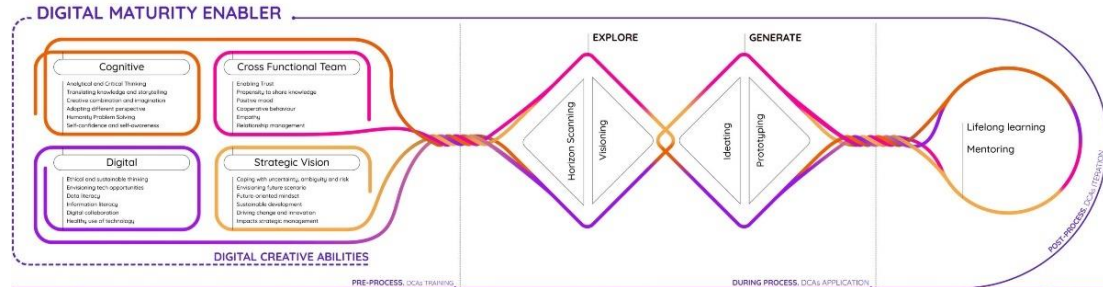
Through *Digital Creativity Abilities (DCAs)*, this professional can creatively extract value out from what the technological landscape offers while responding to human needs in an ethical and sustainable way. A *DM Enabler* has got either a design, engineering or managerial background and owns competencies such as: (a) Understanding technology potentialities and designing digital solutions through a human-centred design approach. This also requires consciously understanding and applying new technologies with full awareness of their potential impact from a social, ethical, economic, and environmental perspective. (b) Working smoothly within cross-functional teams. This means being able to communicate effectively with people coming from different disciplinary fields and developing a shared digitally minded culture. (c) Navigating and tackling complexity and uncertainty. (d) Envisioning possible future scenarios and defining long-term strategies by taking into consideration both opportunities and risks that digital technologies might generate.

## 2. The DC4DM educational model

Up-skilling future generations of creatives and entrepreneurs to proactively face the ongoing radical changes and deal with such ever-emerging digital challenges, means to encourage their awareness and understanding on core topics such as sustainability, technology foresight, cross-functional collaboration, data collection and sense-giving. The DC4DM educational model aims to support the development of a new set of skills to enhance their creative abilities while enabling them to spot and exploit the viable potentialities of emerging technologies. In a world where complexity – of information, knowledge, problems or challenges – is destined to simply increase, human creativity remains as an essential ability to successfully navigate it.

The DC4DM model (*Figure 1*) is based on three sequential phases: (1) the *pre-process* concerns the training of those types of knowledge and skills that are propaedeutic for the DM Enabler to go through the whole process; the training basically starts from developing the *DCAs*. (2) The *process* is based on a divergent-convergent Future Design Thinking approach; this phase aims to guide the DM Enabler through the design of new digital solutions with a projection toward the future. (3) The *post-process* consists in supporting the DM Enabler in iterating and continuing to add value to their abilities.

Figure 1. Training of the Digital Maturity Enabler through the DC4DM model.



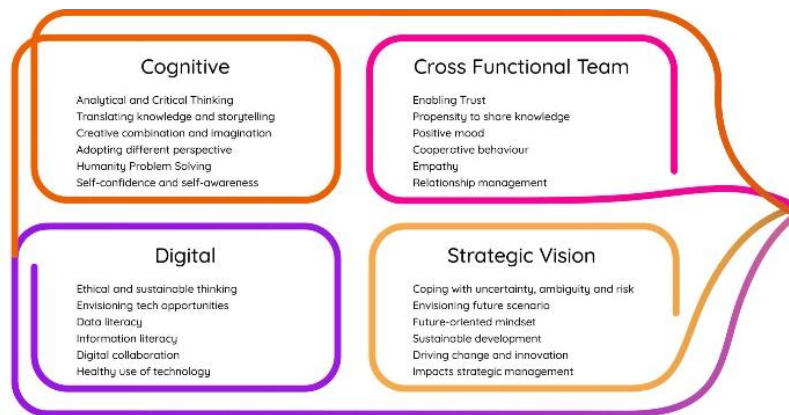
DM Enablers possess *Digital Creative Abilities (DCAs)* grouped according the Cognitive, Digital, Cross-functional Team, Strategic Vision dimensions. Such DCAs help DM Enablers to navigate disruption, make sense of complexity, and deal with uncertainty to envisage the medium and longer-term futures (5-15 years) of social and technology environments [9]. These DCAs are useful to face the ongoing digital transformation, because they include not only a broad range of skills (cognitive, social, emotional, etc.), but also disciplinary and procedural knowledge, attitudes and values that can guide a person to face the complexity of today and tomorrow’s challenges (*Figure 2*).

The DC4DM educational model intends to train these future talents through some foundation concepts, called *drivers*. These foundation concepts have the power to drive the creative process towards positive innovation and change. The drivers which have been identified as fundamental today and have been proposed in the DC4DM toolkit, are three and are: Tech-foresight, Ethics, and Sustainability. New drivers, as also new DCAs, may be identified according to the changes in the technological, socio-political, economic and environmental landscapes. In fact, to train Digital Maturity Enablers means also to constantly update what should drive the future digital talents and their creative process.

The DC4DM project includes different activities to transfer the DM method and tools within a European network of HEIs, SMEs and Startups, Business Incubators. On one side the *Digital Maturity* and *DM Sharing Days* act as informative events; on the other, the *Learning Labs (LLab)* consist in intensive design sessions where to provide the participants with suitable training and mentoring towards the development of the key digital creativity competencies. At *LLabs* students, SMEs & Start-ups get to work together on a given design challenge using those DC4DM methods and tools which make sense for the participants’ level of

experience, the selected theme and duration of the workshop itself. Finally, *LLabs* are also an opportunity for educators to learn how to use the DC4DM model and build experience in facilitating and teaching practices towards digital maturity.

Figure 2. The 24 Digital Creativity Abilities currently identified to prepare the next generation of DM Enablers.



The DC4DM model is product of research and testing which started already with the EU project Digital DIY (Digital Do It Yourself, 2023; Salvia et.al., 2016), and in order to become a practical and usable methodology for educators, companies, and individual learners, it was tested three times through three different *LLabs*: [LLab1] “Feeding Madeira” at Universidade da Madeira, Funchal (Portugal), July 2022; [LLab2] “Mobility” at Télécom Saint-Etienne, Saint-Etienne (France), November 2022; [LLab3] “Futuring Care” at Politecnico di Milano, Milan (Italy), February 2023. The three *LLabs* had in common the following objectives: to allow to learn about digital transformation; to guide participants to create a working environment that enhances the value of individuals, increasing personal motivation and fostering integration with other members of the group; to identify the main parts and procedures of a *training format* to be applied for the organisation of new *LLabs*. The three *LLabs* were organised and run differently because the goal was to understand how flexible and adaptable each part and phase of the model is; how to involve SMEs and Startups along the process to bridge their needs with the training objectives; and finally, how to engage students coming from different disciplinary background along the whole process. By organising and running three *LLabs* became clearer how critical the definition of the *training format* elements and instructions is, so as to adapt the DM process according to the type of participants and learning goals. Just to mention few elements: how to set up the working space; how to engage both students and companies throughout the process; how to build cross-functional teams which will work smoothly; how to select mentors capable to stimulate the participants’ thinking process; how to facilitate multidisciplinary teams; how to communicate tasks and tools in a clear and effective way.

## 2.1. The DM Learning Lab 1 “Feeding Madeira”

In the context of a small island in the Atlantic Ocean such as Madeira, the delicate balance between human needs and the availability of natural resources is under constant threat. This requires preparing future generations of creatives and entrepreneurs with the right mindset and skills to collaborate and ideate opportunities for sustainable futures. Today the goal is to learn to design and implement systems that can be distributive and regenerative, to benefit individuals and communities, local economies and the environment. The role of digital technologies is considered fundamental in this process of rethinking the way we design and implement future sustainable scenarios. Digitalisation is advocated in the scientific literature and public debate as an enabler and accelerator for the transition to a circular economy (Piscicelli, 2023).

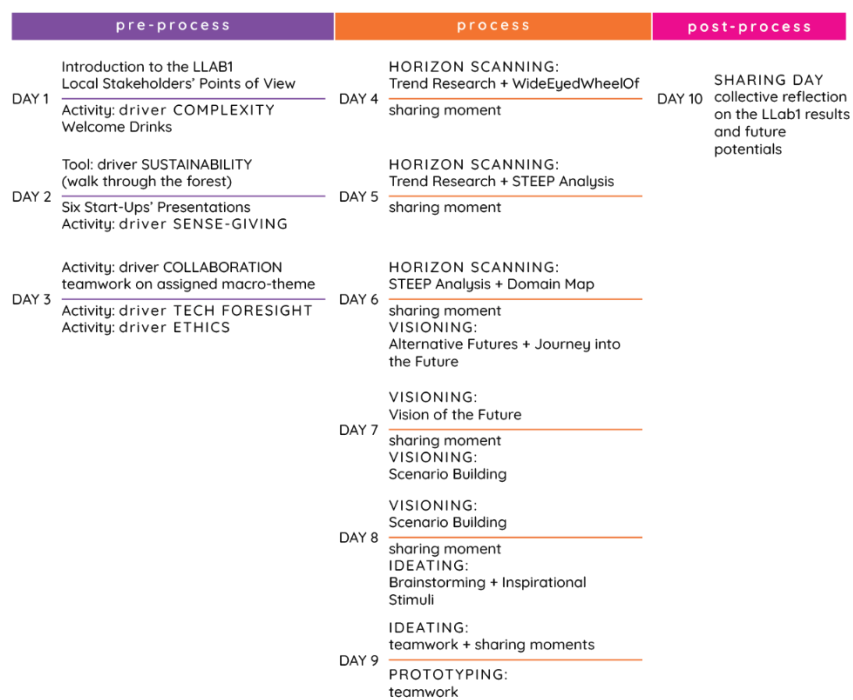
The *LLab1* “Feeding Madeira. Regenerative and Distributive Food Systems for Sustainable Island Futures” tried to challenge the participants in thinking about the island as a testbed for sustainable and potentially circular systems where digital technologies can enable the shift towards distributive and regenerative local food systems. Following the experience of the ‘Atlantic Wonder’ research activities (Bertolotti & Vezzani, 2021; Vezzani et al., 2019), the participants were invited to respond creatively to the general challenge through the lens of one of the following macro-themes: (1) *Agrobiodiversity* is our safety net; (2) *Forest & Water* as island life-blood; (3) *Pollinators* our saviours; (4) *Waste* as opportunity.

The *LLab1* involved 36 masters and undergraduate students from Politecnico di Milano, Télécom Saint-Etienne, Mines Saint-Etienne and Universidade da Madeira, with diverse study backgrounds in the areas of design, engineering and organic agriculture. Organised into six multidisciplinary and multicultural teams, the participants encountered numerous and diverse local stakeholders able to stimulate their understanding of the island challenges concerning sustainable development. Six local start-ups were selected, each one assigned

to one of the teams, to become part of this creative process towards Madeira’s digital transformation. The *LLab1* programme (Figure 3) was defined by interpreting the *pre-process* and *process* phases according to the special location and the focus on sustainability. In fact, compared to the other two *LLab* locations, the island of Madeira differs in terms of type of economy, resources and industrial development. The natural and rural character of the location obliged to focus first on the meaning of sustainable development and how to bring together the different types of expertise and knowledge which would allow to achieve it. The digital technologies indeed were presented to the teams as a means to foster that cooperation of expertise, encourage a new more-than-human perspective within the local population, imagine tech-solutions to boost a local regenerative economy which would care about the future of communities and natural ecosystems. The six teams were provided with a set of learning activities and tools to: (1) develop individual and team abilities in managing complexity and collaboration [*pre-process*] and (2) design future scenarios enhanced by digital technologies [*process*]. These activities and tools were shared through an open-access MiroMultiverse board<sup>2</sup> and Guidelines (DC4DM, 2023).

Finally, the six teams presented their ideas of sustainable future for the island of Madeira at the *Sharing Day*. This public event gathered the six start-ups, as some representatives from the public sector, local NGOs, and scholars to encourage a local conversation on digital technologies as leverage of positive change towards possible sustainable futures for the island.

Figure 3. The *LLab1* programme and activities. The scheme aims to highlight the adaptability of the *DM* model according to learning objectives, types of participants and main challenge.



### 3. Reflecting on what training the future digital talents means

The *LLab1* was special, not only because it was the first opportunity for the DC4DM consortium to reflect on the *DM* model and *training format*, but especially because it demonstrated that the learning experience can expand beyond a big group of international students and involve a local community, made of scholars, start-ups, staff from the public sector and even NGOs. Connecting a great diversity of people, types of expertise and points of view, beyond the dimension of each team, meant to boost those individual *Digital Creativity Abilities* specifically belonging to the ‘Cognitive’ dimension (Analytical and Critical Thinking; Translating knowledge and storytelling; Creative combination and imagination; Adopting different perspectives; Humanity Problem Solving; Self-confidence and self-awareness) and the ‘Cross-Functional Team’ dimension (Enabling Trust; Propensity to share knowledge; Positive mood; Cooperative behaviour; Empathy; Relationship management). It can be said that this first opportunity to test a set of activities, methods, tools that till that time was simply a theoretical model, allowed the educators who facilitated the teamwork and future-thinking process, to reflect on the importance of a collective effort in preparing young

<sup>2</sup>*MiroMultiverse* has been identified as the open collaborative platform through which share the DC4DM model and Toolkit. The final version will be accessible at <https://www.dc4dm.eu/model-and-tools/> from August 2023.

people to the challenges of the future, so that they can go through the design process quite smoothly. In fact, the *LLab1* showed how the human and relational skills concerning emotional intelligence, network building, communication and negotiation are even more important when the learners come from various disciplinary backgrounds and experiences, and present different levels of capacity in projecting themselves and their creative ideas towards the preferable, the probable, the plausible, the possible future (Voros, 2022).

Finally, on a *DM model* and *training format* level, new improvements were considered to: (a) simplify the process steps and quantity of methods and tools to offer; (b) turn some of the language less technical and make the toolkit more accessible; (c) involve the SMEs and Start-Ups more along the design process so that the learning process can be indeed shared and reciprocal.

The DC4DM project will conclude next August 2023 with the online publication of the *EDUbox*, a container of open-source educational materials for a *Digital Maturity Community* to expand. The DC4DM educational model has been designed to keep evolving according to ever changing digital scenarios and learning needs. New educators and trainers interested in preparing future creative talents to face the challenges of our world are invited to become part of the *DM Community* and contribute with their knowledge and expertise. In fact, “in the end, it all comes down to people and values. We need to shape a future that works for all of us by putting people first and empowering them. In its most pessimistic, dehumanized form, the Fourth Industrial Revolution may indeed have the potential to “robotize” humanity and thus to deprive us of our heart and soul. But as a complement to the best parts of human nature—creativity, empathy, stewardship—it can also lift humanity into a new collective and moral consciousness based on a shared sense of destiny. It is incumbent on us all to make sure the latter prevails” (Schwab, 2016).

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