

the OpenBook
for Digital Creatives



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The Open Book for Digital Creatives | September 2023



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The Open Book for Digital Creatives is one of the intellectual outputs produced within the Erasmus+ funded project “Digital Creativity for developing Digital Maturity future skills - DC4DM” (Project Ref: 2020-1-IT02-KA203-079913).

Contents by the DC4DM Consortium members:

Politecnico di Milano, Universidade da Madeira, Telecom Saint-Etienne, Startup Madeira, Mines Saint-Etienne



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Foreword

We are living a new chapter in human development enabled by the constant advancements of digital technologies. The Fourth Industrial Revolution, “is forcing us to rethink how countries develop, how organisations create value and even what it means to be human. The Fourth Industrial Revolution is about more than just technology-driven change; it is an opportunity to help everyone, including leaders, policymakers and people from all income groups and nations, to harness converging technologies in order to create an inclusive, human-centred future” (WEF).

In this context, organisations such as small and medium enterprises, struggle in coping with the rapidity of digital transformation, consequently, reach digital maturity. On one hand many of these businesses still rely on outdated

Digital transformation, on the contrary, requires a shift in type of mindset and attitude, processes, and organisational culture.

systems and infrastructure that may not be compatible with modern digital technologies; and upgrading or replacing these systems can be complex, time-consuming, and expensive. On the other hand, by nature, people are considerably resistant to change. Digital transformation, on the contrary, requires a shift in type of mindset and attitude, processes, and organisational culture.

Parallely, “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. 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 workforce 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 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. Then, in a complex digitally enabled world, it is human creativity that can strategically and wisely unlock the multiple opportunities brought by emerging technologies.

This small and free-to-download publication is one of the outputs from the Erasmus+ funded project called DC4DM – Digital Creativity for Developing Digital Maturity Future Skills (Project Ref: 2020-1-IT02-KA203-079913) and gathers the main concepts and values which led the consortium in developing a new educational model for enhancing a culture in digital creativity, both in business and higher education environments. More than just an informative document to store somewhere, The Open Book for Digital Creatives aims to inspire new ideas, conversations, and experiments among those who are curious to take part in the DC4DM movement and wish to develop their digital creativity. This Open Book addresses both members of the academia, in particular educators and students from Design, Engineering and Business study fields, then companies and entrepreneurs.

The Open Book is divided into three sections. Chapter 1 introduces the DC4DM project principles by inspiring the readers through A Manifesto for Digital Creatives. Chapter 2 contextualises the need of training and investing in digital talents called Digital Maturity Enablers. Chapter 3 provides an overview on the DC4DM model and its core components. This small publication allows the learner, the educator and the entrepreneur to get a general idea on what Digital Creativity for Digital Maturity means and suggests how to continue to learn and apply the model and tools through further outputs gathered in the DC4DM EduBox online.



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1. Be part of the DC4DM movement

In an era characterised by globalisation and rapid technological advancements, the world is undergoing profound transformations (Teichert R., 2019). The ubiquitous influence of digital technologies has permeated every aspect of people's lives, while a comprehensive understanding of their impact is yet to be achieved. The advent of new digital technologies carries the power to reshape behaviours, reinvent social relationships, and redefine the very fabric of humanity. What we call the Fourth Industrial Revolution corresponds indeed to a sweeping "transformation of humankind" (Schwab, K., 2016) as also a great opportunity to design and give shape to more sustainable and just futures.

Through Chapter 01 we want to set the tone for this positive transformation enhanced by digital technologies. A **Manifesto for Digital Creatives** and the perspective by some of the experts who guided and supported our research work help us to lay the foundations for a new culture on digital creativity for digital maturity. The reader is here invited to embrace the same vision and set of values and join the **DC4DM Community**.

A Manifesto for Digital Creatives

The Manifesto for Digital Creatives is a ten points statement which outlines the core beliefs we, DC4DM founder members, stand for and how we plan to effect positive change through digital creativity.

We invite individuals, communities, and business organisations to embrace the following set of values and attitudes to become able to envision and build more sustainable and just futures through the employment of ever-evolving digital technologies.

By considering digital creatives all those who want to contribute to the Fourth Industrial Revolution by supporting companies and organisations to achieve their digital maturity, here we aim to set the foundations for a new culture on digital creativity and innovation.

Digital creativity is the new you.

Being digitally creative means being capable of generating innovative design responses by strategically taking advantage of the numerous opportunities offered by the emerging digital technologies. Like a muscle to be trained and empowered with time and dedication, your digital creativity lays in developing that critical ability to laterally think and select the most suitable options. Being digitally creative doesn't mean to be device dependent then, because adopting digital technologies, such as AI, can only boost the idea generation, but certainly not allowing conscious, strategic and courageous decisions for a digital future!

Have faith in the future.

You like it or not, our future will depend exponentially on the application of digital technologies. Our private, social and work life will be managed and maybe even ruled through the constantly emerging technologies. Thus, the same destiny will be for our access to essential services, such as education, healthcare, and politics. Staying faithful towards digital technologies and considering them as enablers for the creation of more sustainable and just futures, is key. To have faith in a digital future, means to believe that by focussing on developing the right skills and attitudes to understand and master digital technologies, it is possible to design a better world.

Growth in the era of digital transformation means becoming digitally mature.

Growth in the digital era is about adapting to delve into a continuously changing digital environment and wisely adopting digital technologies to serve people and planet needs. It is strategy, not technology which guides the digital transformation. Understand the idea of growth as becoming digitally mature. This will ask you to embrace sustainable long-term visions, the ability to collaborate within cross-functional teams, and to scale small, iterative digital tech experiments before investing on enterprise-wide initiatives.

Every action has an impact. Digital technologies too.

It is easy to be carried away by new exciting pioneering technologies and the incredible application opportunities which they may carry with them. Designing healthy and just future scenarios ask you to ponder carefully the possibilities which new digital technologies might offer and the impact they might have on economy, but above all on society and environment. To be digitally mature asks you to be responsible and make ethical creative and strategic decisions.

People and Planet future needs before cool ideas.

Good design and responsible tech-solutions happen when the creative process begins from observing and understanding real problems and needs. Listening actively to various stakeholders is surely an enriching and promising posture to ensure that technology remains at the service of people. Equally important, being curious and thoughtful towards the numerous and diverse natural ecosystems, allows you to develop a planet-centric approach to problem solving and achieve future regenerative and distributive solutions enabled by the application of suitable digital technologies.

Digital technology evolves. Keep feeding yourself with new learnings.

As technologies are and will always be evolving, a fixed and permanent model to learn about them cannot exist. The best option is to accept the idea that what you already know might be obsolete. No matter how complex and specialised understanding the working principles of quantum computing or generative AI, or the fundamental principles behind the planetary boundaries are, the implications of these technology leaps and global limitations go far beyond the circle of experts who can master their inner mechanics. Learning in the era of digital transformation means to embrace an attitude of openness and collaboration towards the numerous disciplines and types of expertise which could lead new learning paths.

Cross-disciplinary and cross-functional teamwork: get used to it!

The wicked problems and ethical dilemmas brought by the application of digital technologies, as also the complexity of the world's challenges in the matter of sustainable development, require cross-disciplinary and cross-functional teams to identify the right questions and creatively and strategically respond to them. Getting used to cross-disciplinary ways of solving problems starts from your level of openness to other people's vision, ideas and way of thinking. It can be a painful process because it is very much based on the ability to trust and compromise. But as with any process, you can train and improve! Starting from your empathetic skills and attitude to collaborate, a cross-disciplinary and cross-functional approach and work environment would become a normal praxis.

Empower Tomorrow: cultivate digital minds, master strategies!

Digital maturity is about developing and disseminating a new culture and mindset which will affect change in the way people and organisations operate, their routines, but above all their beliefs, values, and ability to imagine a better future. The investment in educating and nurturing the digital mind becomes imperative when ensuring continuity to digital innovations and social and economic evolutions. Being digital creative means being an active contributor in this cultural shift process which will empower the tomorrow of education, industry and policies!

Heading into the future: embrace complexity, take risks and envision scenario.

Digital transformation is a reality and necessity for both individuals and organisations to evolve and thrive. Imagining and designing future scenarios based on how the technologies might evolve reveals a high level of complexity and uncertainty. Taking some risks is inevitable then! Just be excited for this because to envision the most plausible or possible future scenario, you will become an expert in interpreting mega trends and trends, speculate on how it might be, and take creative and strategic decisions which might lead to significant positive and sustainable innovations.

Skilful collaboration for Impactful digital innovation!

Designing future scenarios capable of bringing positive impact need the participation of multiple types of expertise. Collaboration becomes key to digital innovation and sustainable transformations. Being a digital creative asks you to be open and trust in other people's ideas. Also, to become able to think laterally across the diversity of stimulations offered by the Design ability of thinking strategically, the Engineering technical and grounded knowledge, the Business and Entrepreneurial ability of understanding the economic impact and opportunities.



What do our experts say?

To build a more diverse and complete vision on digital transformation and understanding of future challenges both in the context of business innovation and higher education, we have invited some of the experts who have been following and supporting the DC4DM research project development to share their perspective. Particularly, by answering questions regarding digital transformation, digital creativity, new skills and competencies, challenges both in higher education and business environments.

The following informed opinions serve as intellectual stimulation to reflect on the importance of preparing both creatives, entrepreneurs and organisations in embracing the complexity and uncertainty brought by the constant development of new digital technologies.

What does digital transformation mean?

“

Digital transformation represents a multifaceted metamorphosis that lies at the intersection of technology, society and economy. It embodies the dynamic process of integrating appropriate technological advancements into organisational frameworks, with a keen focus on empowering individuals to wield these tools effectively. By embracing digital transformation, organisations can shed the shackles of mundane operations and tap into the boundless opportunities offered by an interconnected ecosystem of stakeholders in the online realm. It is crucial to grasp that technology serves as a catalyst rather than an endpoint in this transformative journey, as true metamorphosis emerges when technology seamlessly permeates organisational culture, fostering collaborative synergy, innovative thinking, and optimised workflows.

Dr Spyros Bofylatos
RCA Royal College of Art and European Academy of Design

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Digital Transformation means a new era in manufacturing processes and industry. Beyond automation and robotics, human activities and interaction with product lines will be supported by a new mindset and approach: data availability, data-driven decisions, real-time monitoring, quality. Also, the effectiveness of machines will Wmake people develop new skills and amplify their overview on the global process of manufacturing. AI will rapidly re-transform the digital experience into the newest era (in less than 10 years) of operations, management and leadership both within factories and the world of labour. Digital Transformation regards applying sustainability processes in a short time: it must be real, achieving small maybe, but continuous results. New generations of consumers will be more and more sensitive to this concept and their choices will follow this approach.

Paolo Sbuttoni
Creative Thinking Coach; Marketing & Communication, ROLD

What competencies should an individual, a team, or an organisation develop to keep up with the speed of digital transformation?

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The transformations taking place are systemic; specialised skills alone are no longer sufficient: cross-cutting and complementary skills are needed. Innovative behaviours ranging from generative skills (perspective, vision, imagination, creativity, observation, research, curiosity) to implementation skills (design, experimentation, error capitalization, user-centred development, simplification) must be deployed. Finally, connective and consensus-building skills are needed (networking, inspirational leadership, argumentation, relationship care, storytelling, diplomacy and negotiation).

Alberto Robiati
Innovation and foresight expert; Director of Forwardto -
Studies and skills for future scenarios

What does it mean to be creative in the age of digital transformation?

“

In the era of digital transformation, being creative takes on a profound significance. The emergence of new tools, particularly AI, presents a unique opportunity for creatives to unleash their artistic potential while alleviating the burden of productivity. These innovative tools can augment their creative processes, freeing up time and energy for experimentation and ideation. However, as creatives transition from being mere producers to becoming curators of technology-integrated practices, the need for critical thinking becomes paramount. They must navigate the vast array of possibilities, critically evaluating the impact of new technologies on their work. By embracing both creative exploration and critical discernment, creatives can truly harness the transformative power of digital tools in this emerging landscape.

Dr Spyros Bofylatos
RCA Royal College of Art and European Academy of Design

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It means activating “fusion skills,” composed of hard skills, for instance, STEM, and complementary skills, such as expressive and artistic skills, as well as skills summarised by the acronym HECI - humanities, ethics, creativity, imagination. Being creative means combining imagination and concreteness, combining the possible with the real, and activating relational skills aimed at experimental development and practical concretisation.

Alberto Robiati
Innovation and foresight expert; Director of Forwardto - Studies and skills for future scenarios

What are the challenges for small and medium enterprises and organisations to nurture digital talents able to creatively face future problems and navigate the constant evolution of digital technologies?

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Stimulating and training digital talent are the main challenges for SMEs in the future. Companies that want to innovate must plan nudging initiatives that stimulate employees’ creative and lateral thinking to enhance their talent, with a particular focus on digital talent. Simultaneously, it is essential to activate talent “training” programs that enable the promotion of best practices and individual development. The “Talent Academy,” whether physical or digital, will be the place of cross-pollination where resources can pursue their growth path, and the company can build a knowledge and competence ecosystem by collaborating with universities and research centres.

Roberta Anelli and Vincenzo Tanania
PWC Innovation Team

“

Organisations need to spread innovative behaviours (ideas generation, implementation and promotion) and strategic foresight capabilities internally at all levels (strategic, production, operational, business) so that employees and related stakeholders are more aware of the changes ahead. To do so, it is necessary to start by creating conditions for new organisational cultures and activating new mindsets among people, strengthening the collective capacity to deal with alternative future scenarios, shortening the time to understand changes and the actions that can respond to them. In this sense, individuals and teams increase their potential for elaborating strategic and aspirational visions and developing “future prototypes.” The effect is a collective strategic, organisation-wide intelligence capable of implementing functional strategies to make transitions to the future.

Alberto Robiati
Innovation and foresight expert; Director of Forwardto - Studies and skills for future scenarios

If you had to define digital maturity by naming at least three major aspects or characteristics which an organisation should achieve or embrace, what would these be?

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Strategy: defining a strategy driven by digital is crucial to better compete in today's exponential era and guarantee a sustainable competitive advantage. Organisations need to be flexible and adaptive with innovation at the core of their strategy to continue relevant and better serve a rapidly changing customer base. People: digital transformation is not really about technology, but about people. Exploring new digital disruption requires a whole new mindset and set of skills. Digitising the core: organisations need an end-to-end approach to digitisation that isn't limited to automating existing processes, but completely rethinking how value is delivered to the end user.

Paulo Abreu
ARDITI Madeira; Digital Innovation Hub (DIH), the Smart Islands Hub}

What are the challenges for small and medium enterprises to achieve their digital maturity?

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The main challenge for SMEs to achieve digital maturity is to have awareness of the path to be taken. Objective and specific "Digital Assessment" tools will need to be used to understand the level of digital maturity and define the action plan. The focus will be primarily on two levels: the first is "levelling" to bridge the gaps, and the second is "growth" that follows sector-specific technological trends and trajectories that intersect with primary innovative solutions. A detailed roadmap will enable the company to plan Change & Adoption activities prioritised through careful analysis of expected operational costs and benefits.

Roberta Anelli and Vincenzo Tanania
PWC Innovation Team

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The cultural mindset in place (at any stage). The real killer sentence would be "We've always done like this!"

Transforming from routine processes into routine competencies, aka engage employees in any new solution before applying it.

Being able to apply for European or regional grants with proper knowledge or finding support by experts. Sustainability: real, continuous and measurable.

Paolo Sbuttoni
Creative Thinking Coach; Marketing & Communication, ROLD

What are the challenges in higher education to prepare new creatives and entrepreneurs in tackling future problems and the constant evolution of digital technologies?

“

Digital transformation does not happen in a vacuum. It is always related to other parallel global and local developments in society, culture, economy or politics. The new technologies themselves evolve constantly, following new trends, sometimes even radically changing the rules of the game from one day to another, disrupting what we have been used to just yesterday. Young entrepreneurs need to understand the impact of technology in the context of these temporalities and “learn how to keep on learning” constantly, staying flexible and responsive to all these flows. Higher education needs to prepare them for these challenges with a good ethical mindset, excellent critical and creative skills, and a focus on sociocultural and environmental awareness. In that sense digital maturity isn’t just about achieving technological innovation itself, for the sake of it, but an ability to conduct a considerate, balanced transformation on all the levels involved in it and influenced by it. In other words, successful digital maturity is maturity at large, a state of continuously looking into all implications of digital transformation into account as we go.

Pawel Pokutycki
Lecturer at the Royal Academy of Art (KABK) in The Hague and Design Academy Eindhoven}

“

The constant change necessitates a focus on basic skills and knowledge rather than on the tools themselves. For example, programming languages have changed in recent years, but algorithmic principles have not. Databases have changed and are more powerful, but they are still based on relational algebra. A solid theoretical foundation, along with skills to react to constant change, is necessary to face a dynamic future. These skills include the ability to learn, critical thinking, investigative ability, and the ability to integrate into work teams, among others.

Dr Eduardo Fermé
Associate Professor at University of Madeira

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The challenge in higher education is the significant disparity between the pace of technology evolution and the relatively sluggish progress in curriculum adaptation. As digital technologies advance at a rapid rate, the integration of mature technologies within educational programs lags behind. Bridging this gap requires a concerted effort to update curricula, ensuring students are equipped with the necessary skills to navigate the dynamic digital landscape for a long time. Moreover, fostering a culture of adaptability and critical thinking is essential. Students must complement their technical proficiency with an understanding of the broader implications of technology, enabling them to effectively navigate complexities and tackle future problems as creative entrepreneurs in an ever-evolving digital world.

Dr Spyros Bofylatos
RCA Royal College of Art and European Academy of Design

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Training must be exploratory, adaptive, imaginative; it must train people to ask the right questions and provide tools to manage and live with complexity and uncertainty. Therefore, higher education pathways must supplement their educational offerings with experiential, field-based workshops that enable students to learn at the intersection of disciplines, sectors and territories. Approaches based on multi-perspective, contamination, interconnectedness, on the one hand, and on relational skills, the ability to care for human relationships from the nurturing of the skills of the self, on the other hand, must be taught.

Alberto Robiati
Innovation and foresight expert; Director of Forwardto - Studies and skills for future scenarios



Join the DC4DM community

The DC4DM model is open and malleable, as is its community!

Creative professionals, students, educators, business and HE organisations, as you are starting to dive into this Open Book, feel warmly invited to become part of the DC4DM community starting from the two main community channels:

- the website dc4dm.eu
- and the LinkedIn group www.linkedin.com/groups/12830776/

We have thought of different ways you can join the DC4DM community, some require more proactivity than others. Our idea is that anyone can contribute in building and disseminating a culture of digital creativity, with their own skills and within their own work environment and disciplinary field. Achieving digital maturity is a complex journey which requires people and organisations to collaborate and engage with change in a holistic way! The DC4DM community aims to acknowledge this collaborative and sharing approach to the digital transformation period we are all experiencing in our lives.

What can you bring to the community and what can the community bring to you?

Train yourself through the DC4DM MOOC and share your feedback

If you are an educator or a potential future Digital Maturity Enabler who would like to learn more about the DC4DM model, explore the DC4DM MOOC at:

www.dc4dm.eu/model-and-tools/
or at
www.pok.polimi.it/courses/course-v1:Polimi+DCDM101+2023_M7/about

Then share your thoughts and feedback through either the MOOC online platform or the LinkedIn group. Tell us about which training chapters were useful to you, the experience of applying the DC4DM methodology yourself, or ideas of projects you would like to develop by using the model.

Participate in DC4DM events

Find all DC4DM events and news at:

www.dc4dm.eu/events/

Take part in DC4DM events, such as DM Sharing days, Digital Maturity days, conferences, and Learning Labs. These are all amazing opportunities for you to meet with other members of the community, share knowledge and experiences, and get to understand more how digital transformation is evolving.

Create your own dissemination event or DM Learning Lab and announce it to the community

If you organise either a dissemination event or a new Learning Lab which follows the DC4DM methodology and ethos, share it through [@DC4DM](#) social networks and LinkedIn group. If it is easier for you, you can also drop us a message through the contact form at:

www.dc4dm.eu/contacts/

and we will take care of spreading the voice through the DC4DM channels. DC4DM methodology yourself, or ideas of projects you would like to develop by using the model.

Participate in a Learning Lab and share your thoughts

Whether you are a student, an educator, a professional, or represent a business organisation, either familiar or new to the challenges of digital transformation, join the community through a DM Learning Lab, a unique training session which will provide you with the right tools and methods to navigate the complexities of the digital era. When a new DC4DM LLab OpenCall is published, apply for it! Then through the DC4DM LinkedIn group share your impressions of the whole experience, comment on the macro-themes and tools which you were provided with, and finally show some photos of your work!

Use the DC4DM Toolkit and share your results

Join the community by using the DC4DM Toolkit yourself, either within a higher education or business environment, and sharing feedback and reflections both on process and results through the DC4DM LinkedIn group. Other members of the community might get inspired from your experience and test the toolkit themselves!

Share your feedback on the application of the model

You have tested the DC4DM model, tools, activities or the complete process, the community is waiting for your feedback. What are the issues, the themes you have retained, what skills have you targeted, what pre-process activities have you chosen to apply? a new driver of skills? Tell us everything, everyone can learn from your experience.

Share your bibliographical references of the domain

If you have any interesting new articles or books to suggest to the DC4DM community, share them on the LinkedIn group. With the constant evolution of digital technologies and so with challenges and wicked problems to tackle, it is important to build a shared and up-to-date understanding of what digital transformation is and what business and higher education organisations are asked for. The DC4DM Community can build such debate and solid common vision by sharing valuable references.

Publish your own research

If you are a researcher, either in academia or business organisation, studying and developing tech solutions, designing new methods to foster digital transformation, and want to share your work and achievements, publications or calls for papers, feel free to use the LinkedIn group to do so!

Ask the community

If you have any question, if you are looking for an answer to your problem as either educator or professional, use the collective intelligence of the DC4DM Community to inspire and advise you! Post your questions on the DC4DM LinkedIn group and let the conversation start.

Become a mentor

If you are active in this digital transformation era and you understand the needs and challenges for either higher education and business development, if you are one of those learners who have already trained with the DC4DM model and tools, come share your knowledge and experience as a mentor at new DM Learning labs. Your digital maturity will lead new learners through the design process, providing them with the right understanding of the methodology, examples of concrete application, and support in critical and strategic thinking.

2. Nurture the abilities to be a digital creative

It becomes crucial to recognize that emerging technologies have far-reaching effects, often exceeding the initial expectations. As the renowned quote by Amara (1980) suggests, we tend to overestimate their short-term impact while underestimating their long-term consequences. It is precisely this recognition that drives our focus on **digital maturity**. Individuals and organisations must acquire new competencies and skills to navigate the ongoing digital transformation. They must embrace creativity, or better, **digital creativity**, and possess the ability to responsibly harness new technologies, contributing to the attainment of digital maturity within organisations.

Chapter 2 will introduce you to the concepts of **digital creativity** and **digital maturity** and describe the need of preparing future creatives and entrepreneurs to become **Digital Maturity Enablers**. This new professional profile will be able to guide organisations, such as small and medium enterprises and start-ups, through their digital transformation path. You will get to know more about the fundamental **Digital Creative Abilities (DCAs)** which DM Enablers must keep training and refine alongside with the constant technological developments, so with the needs and opportunities appearing within the Fourth Industrial Revolution. Finally, you will get to learn about the Drivers which would lead both the digital creative thinking process and so the companies and organisations' ethos towards Digital Maturity.

The era of Digital Transformation

In the last decade digital technologies have rapidly evolved leading to the development of Industry 4.0 and the beginning of a new phase of the Information Age in which people and organisations find themselves more and more digitally enhanced. Think of all those digital applications which can extend and enhance our cognitive capabilities, such as electronic storage, digital data-gathering and decision-making tools which enable us to gather more data than we could on our own, helping us perform more complex analyses than we could unaided. Then think of all those emerging technologies, such as Artificial Intelligence, Virtual Reality, machine learning systems and big data analytics, which can easily hybridise reality and other forms of reality, contributing to radically change the human condition in profound ways. The Fourth Industrial Revolution we are living today, shows us that digital technologies are rapidly changing the way humans create, exchange, and distribute value. Also, how the digital transition has been impacting on society in terms of culture, skills and mindset.

It is for the multifaceted nature of the phenomenon that we cannot reduce the idea of **digital transformation** to one definition. Of many, we like to describe it as the process of change which organisations go through to adapt and compete in a constantly evolving digital scenario. This process of change, which is gradual and holistic, is enhanced by the application and use of digital technologies, but surely regards re-shaping internal mindset and praxis. Digital transformation is about how technology changes the conditions under which business is done. It enables organisations to take advantage of new technologies to drive innovation, improve efficiency and create opportunities for growth, but first it re-considers and values the skills, attitudes and expectations of their employees, partners and customers.

Digital transformation is today essential for companies and organisations to survive and stay competitive. Though, it is not an easy process to undergo without the necessary resources and mindset. From being resistant to change, or simply lacking awareness of the potential impact of digital technologies on their sector, many small and medium enterprises

find themselves entrenched in old systems and processes, making the adoption of new technologies too difficult. Also, the limitation in both financial and human resources can be a great obstacle to investing in technology infrastructure, training, and talent acquisition, as also the lack of digital leadership and vision at the highest level of the organisation may be another key factor in the inability to keep up with this digital transformation.

In this scenario it becomes necessary to re-educate and empower these organisations to become able to shape their digital strategies and vision, by investing in digital creativity and digital talents who surely will lead them towards great levels of innovation and maturity.

To learn more about the best practices to achieve Digital Transformation, see the following references:

Bakhshi, H., Downing, J., Osborne, M., Schneider, P. (2017)
Castells, M. (2010)
Prensky, M. (2001)
Schwab, K. (2020)
WEF (2020)

What is Digital Maturity?

Digital maturity emerges along with the development of digital economies and Industry 4.0 models, and it concerns the ability of an organisation to cope with and respond to the rapid development of digital technology with creativity and efficiency.

To become able to effectively leverage digital technologies, strategies, and processes to drive growth, innovation, and adaptability, organisations must go through an internal process of transformation first. This requires reconsidering the internal organisational infrastructure which will support the strategy to implement changes, allocate resources, and manage people. More importantly, it regards the organisation's willingness to embrace the transformation and invest in new skills and competencies which will leverage both the organisation's digital transformation process and its ability to innovate and succeed in more competitive and uncertain technological scenarios.

Though digital maturity is a dynamic and continuously evolving concept due to the constant transformation of its landscape, we can establish that digital maturity is about going through a process of progressively systemic changes. The term maturity reflects the ability to implement changes, but also to forecast and adapt towards future transformations, and to react creatively and efficiently to specific issues and situations. We can also say that organisations can achieve digital maturity by adopting four key practices:

- **Encourage collaboration within cross-functional teams.** This requires implementing systemic changes within the organisation itself to form a new cross-disciplinary and cross-functional workforce able to collaborate and lead towards innovative and future-oriented solutions.
- **Invest in a common digitally minded and strategic-thinking culture** to be always ready to respond to the ever-changing and complex world challenges.
- **Focus on scaling small, practice-based, iterative digital tech experiments** to then turn them into enterprise-wide initiatives and finally create greater impact.
- **Attract digital talents and develop their cognitive abilities.** By attracting and retaining new digital talents, companies would also allow their employees to develop and improve their own digital skills and make them thrive within the organisation itself.

In short, digital maturity is the ability to effectively harness digital technologies, align them with common goals and create an agile, human-centred organisation. It encompasses strategic alignment, digital leadership, data-driven decision-making, agility, collaboration, and continuous learning. Digital maturity enables both organisations and people to thrive in the digital age, adapt to change and open new opportunities for growth and success.

To learn more about Digital Maturity you can start from these references:

Canina, M. R., Bruno, C., & Boga, F. (2022)

Deloitte (2018)

Gurumurthy R., Schatsky D. (2019)

Kane G. C., Palmer D., Phillips A. N., Kiron D., Buckley N. (2017)

Teichert, R. (2019)

What is Digital Creativity?

The implementation and adoption of emerging technologies such as artificial intelligence, virtual and augmented reality, robotics, among others, are not just changing organisations, the way they operate and respond to the challenges of a complex market, but above all radically changing the human condition. Individuals and society are co-evolving along with the introduction of more and more invisible and ubiquitous digital technologies into people's lives. We can talk of a digitally enhanced generation of individuals who show different and new learning preferences, new skills, new social behaviours and work styles.

In this evolving scenario, creativity has become the driving skill to navigate the digital transition, empowering individuals and organisations to achieve digital maturity. Though we would use a more appropriate term, that is digital creativity. Digital creativity can be described as the human ability of coming up with innovative and original digital outcomes by strategically benefiting the opportunities offered by new and pioneering technologies. This ability is driven and empowered by the interconnection of different human factors, such as groups of cognitive, attitudinal, emotional and social aspects. Digital creativity is a complex phenomenon to study and to be trained in because it depends on the multitude of these human factors which themselves are constantly affected and influenced by the developments of the digital age. In fact, the use of constantly new digital technologies and applications requires people to continue reviewing the skills, knowledge, values and attitudes which usually activate and empower their creative process.

Through the DC4DM model, which you will discover in the following chapter, we want to support individuals and organisations to boost their digital creativity abilities to achieve digital maturity. This means to provide them with methods and tools to train both the digital creativity factors and the creative design process for innovation.

How is creativity evolving?

Defining creativity has been one of the most difficult tasks for scientists. Indeed, the panorama of studies on creativity is complex, presenting more than fifty types of definitions within the fields of psychology, sociology, neurosciences, education, history, economics, engineering and more. The concept of creativity itself evolves over time according to the development of human societies and opportunities presented by new technology and schools of thought. Creativity evolution can be observed by going through the different ways many psychologists scientifically studied it. For instance, in the 1950's creativity was linked to personality traits, such as human perseverance and the attitude of taking risks. In the 1970's, instead, scientists started to investigate the cognitive mechanisms shared by all individuals. Later, a more socio-cultural perspective was adopted, and scientists acknowledged that creativity exists only if related to a social environment. This change of thought was led by observing the mediation possibilities offered by computer technologies. Finally, at the beginning of our century, researchers have started to investigate how digital technology influences, redefines and enhances creative processes.

This new emerging domain of study - called Digital Creativity - doesn't have dominant scientific theories of reference, but mainly a multitude of fragmented contributions from different disciplines, which study the phenomenon from multiple perspectives. Two to mention: (1) creativity in the digital age, that is how creativity is understood in a time where everything has become digitised; (2) the digitally mediated creativity which concerns the study of how creativity can be supported and enhanced by digital technologies.

(Bruno, 2022).

To learn more about Digital Creativity you can start from these references:

Berberović D., Smailhodžić E. (2020)
Bereczki E. O., Karpati A. (2021)
Lee, M. R., & Chen, T. T. (2015)
Bruno, C. (2022)
Bruno, C., & Canina, M. R. (2022)
Zagalo, N., Branco, P., & Zagalo, N. (2017)

The need of a new professional: the Digital Maturity Enabler

To stay competitive, or simply to keep up with the rapid evolution of digital technologies and the potential they bring, organisations, such as small and medium enterprises, startups and business incubators, need the guidance of professionals with specific creative digital skills, capable of leading them towards their digital maturity. The role of this professional is to interpret the digital scenario, understand social, technological, economic, environmental, and political trends and, finally, suggest strategic paths for innovative and sustainable solutions.

We call Digital Maturity Enabler that digital talent capable of identifying opportunities for innovation and growth within the digital scenario. DM Enablers can design and implement human-centric strategies and solutions through the principles of ethics and sustainability. Within companies they can inspire and drive a cultural shift towards Digital Creativity, encouraging employees to adopt new ways of working, experimenting, and adapting towards digital transformation.

There is a need of up-skilling future generations of creatives and entrepreneurs to proactively face the ongoing radical changes and deal with such ever-emerging digital challenges.

There is a need of up-skilling future generations of creatives and entrepreneurs to proactively face the ongoing radical changes and deal with such ever-emerging digital challenges. Training Digital Maturity Enablers means to provide them with methods and tools to develop both an individual and collective digital creativity and intelligence. It means also to encourage their awareness and understanding on core topics such as sustainability, technology foresight, ethics, and cross-functional collaboration.

Who is the Digital Maturity Enabler?

The Digital Maturity Enabler is a professional with either a design, engineering or managerial background who:

- Consciously understands and applies new technologies with full awareness of their potential impact from a social, ethical, economic and environmental perspective.
- Shares ideas and specific knowledge within cross-functional teams.
- Has got a strong future-oriented mindset and uses foresight methods to identify and depict original future scenarios

In a continuously advancing digital landscape, the Digital Maturity Enabler owns the right competencies to support organisations to thrive, which are:

- Understanding technology potentialities and designing digital solutions through a human-centred design approach.
- 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.
- Navigating and tackling complexity and uncertainty.
- Envisioning possible future scenarios and defining long-term strategies by taking into consideration both opportunities and risks that digital technologies might generate.

Training and Empowering the Digital Creative Abilities

The **Digital Maturity Enabler** deploys a set of essential skills to steering the ongoing digital transformation. What we call **Digital Creativity Abilities (DCAs)** are 24 abilities grouped into the cognitive, digital, cross-functional team, and strategic vision dimensions. These DCAs have been identified, integrated, and transformed by analysing and comparing the four main competence frameworks outlined by both companies and policy makers. Also, by looking closely into the needs and key practices of some digitally mature companies.

The DCAs consist of a broad range of personal skills concerning the cognitive, social, emotional spheres, several types of disciplinary and procedural knowledge, and finally some attitudes and values to suggest how knowledge and skills should be used to face specific challenges. The DCAs should be developed and applied during the creative process and practice.

In the next chapter you will finally learn about the DC4DM model, including the structure of the creative and design process, methods and tools. Before then, we would like potential digital creatives like you to discover a bit more about the nature of the identified Digital Creative Abilities and understand them as fundamental to build a strong and consistent creative and strategic mindset to drive positive change through the technology.

To learn more about the analysed competence frameworks, see the following references:

McKinsey&Company, Report 2021: Defining the skills citizens will need in the future world of work.

DQ Global Standards, Report 2019: Common Framework for Digital Literacy, Skills and Readiness.

EU Science Hub 2019, The Digital Competence Framework 2.0.

JRC Science for Policy, Report 2016 EntreComp: The Entrepreneurship Competence Framework.

The DCA cards

For each DCA, a nudge card has been designed to summarise what that ability is about, by providing the learner and educator with a clear and simple definition, the corresponding learning objective, and a set of keywords and inspirational images.

These cards are to be explored and used for the DC4DM Pre-Process activities; in fact, they are propaedeutic to the design process phase in which both individuals and cross-functional teams must embrace the right mindset and attitude to manage the complexity and uncertainty of future challenges and scenarios.

Learn more about how to strengthen the drivers through the design process by exploring the Toolkit Guidelines at www.dc4dm.eu

Cognitive

COGNITIVE

Creative combination and imagination

DEFINITION
The ability to use imagination to identify opportunities and to combine ideas, concepts and knowledge to create original and valuable discovery and possibilities.

LEARNING OBJECTIVE
Learners can imagine beyond the existing reality connecting and fusing existing concepts to generate novel and original ideas, products, entities and spot opportunities for creating value.



Illustrations designed by Eszterik

#openess #possibilities #creativity #imagination #fuseideas

COGNITIVE

Analytical and Critical Thinking

DEFINITION
The ability to analyse and reflect on facts and situations, making critical judgements and understanding biases.

LEARNING OBJECTIVE
Learners can analyse, synthesise, and evaluate information, also recognising irrelevant, preexisting patterns that affect our thinking process.



Illustrations designed by Eszterik

#reflectivethinking #methodology #prioritizing #objectivity #understanding #recognizereleableinfo

COGNITIVE

Translating knowledge and storytelling

DEFINITION
The ability to easily convey a specific domain knowledge to people with diverse backgrounds to build a shared understanding.

LEARNING OBJECTIVE
Learners can communicate and share complex information and knowledge in a simple and efficient way, by using metaphor, visualisation and storytelling techniques.



Illustrations designed by Eszterik

#simplifymessages #visualcommunication #commonvocabulary #methodology #sharing #empathy

COGNITIVE

Adopting different perspectives

DEFINITION
The ability to observe problems and look at information from different angles, generating hypotheses and ideas from a range of diverse perspectives.

LEARNING OBJECTIVE
Learners can quickly re-adapt their thinking pattern to look differently to well-known ideas and information, with an open and curious attitude, helping new ideas to evolve.



Illustrations designed by Eszterik

#outoftheboxthinking #adaptation #open-minded #nojudgement #curiosity #lateralthinking #creativity

COGNITIVE

Humanity Problem Solving

DEFINITION
The ability to solve the complex challenges of our century with a strategic approach that considers the environment and the humans and society needs/desires.

LEARNING OBJECTIVE
Learners adopt digital technologies to serve human needs. They work iteratively, continually testing assumptions and prototypes to rapidly create an effective solution to improve and adapt to changing circumstances constantly.



Illustrations designed by Eszterik

#evolution #balancebetweenhumanandenvironmentneed #prioritizing #envisioning #emotionalintelligence #methodology

COGNITIVE

Self-confidence and self-awareness

DEFINITION
The ability to believe in one's personal performance and skills, characteristics and keep developing.

LEARNING OBJECTIVE
Learners are aware of their individual strengths and weaknesses, believing that their ability could influence the course of events. They reflect on personal performance and seek feedback from others to continuously improve.



Illustrations designed by Eszterik

#creativeconfidence #failbutfailfast #practice #trust #motivation #beingperseverant #selfconscious

Cross-functional team

CROSS-FUNCTIONAL TEAM

Enabling trust

DEFINITION
The ability to understand another's behaviour, and be positively inclined to other's competencies, knowledge, skills, actions. Motivation, transparency and group dynamics are elements that regulate both the propensity and the perceived trust.

LEARNING OBJECTIVE
Learners can create a safe team environment, building psychological safety among members through reliability, honesty and genuine concern for the needs and wishes of others. They develop a propensity to interact, engage and participate with each other improving team creative performances.



Illustrations designed by Eszterik

#transparency #recognizedskills #respect #honesty #sharinggoal

CROSS-FUNCTIONAL TEAM

Propensity to share knowledge

DEFINITION
The ability to share knowledge and ideas with others, fighting blocks and understanding the value and the importance of individual contributions for completing complex tasks.

LEARNING OBJECTIVE
Learners are willing, confident and active in sharing and incorporating their individual knowledge into team one's to solve problems and complete tasks for the related project. Members are aware that their individual knowledge results in collective knowledge as output.



Illustrations designed by Eszterik

#sharing #collective #generous #tobeopenminded

CROSS-FUNCTIONAL TEAM

Positive mood

DEFINITION
The ability to keep a positive attitude and to experience and display positive emotions, feelings, and expressions, including optimism, pride, enthusiasm, energy, and joy by pursuing a challenging goal.

LEARNING OBJECTIVE
Learners can exhibit an awareness of their own moods, identify and explain their emotions and reflect on how their feelings influence their own and other actions and decisions.



Illustrations designed by Eszterik

#enthusiasm #playfulness #emotionalintelligence #adaptability #curiosity

CROSS-FUNCTIONAL TEAM

Empathy

DEFINITION
The ability to be aware of, be sensitive to, and be supportive of one's own and other's feelings, needs, and concerns.

LEARNING OBJECTIVE
Learners are sensitive to and respect others' perspectives and emotions. They understand how different personalities feel and react in various circumstances and can regulate and respond accordingly to make them feel better.



Illustrations designed by Eszterik

#feelings #understanding #perceptiveness #context/circumstances

CROSS-FUNCTIONAL TEAM

Cooperative behaviour

DEFINITION
The ability to enjoy and seek working with others, both peers and experts, involving team members in decisions, listen to other ideas and looking for others' feedback, for the construction and co-creation of knowledge.

LEARNING OBJECTIVE
Learners accept heterogeneity and cultural differences within teams, cultivating tolerance to one another and a sense of community. They build bonds and care for others' actions and ideas, acquire the awareness of interpersonal differences and commonalities, be open to others' personalities and ideas, identifying themselves as a functional unit.



Illustrations designed by Eszterik

#listen #trust #tolerance #coordination #respect #reciprocity

CROSS-FUNCTIONAL TEAM

Relationship management

DEFINITION
The ability to skillfully manage one's relationships, online and offline, through cooperation, conflict management, and persuasion, adopting behaviours that convey a sense of comfort and appreciation.

LEARNING OBJECTIVE
Learners can engage effectively, communicate and negotiate with stakeholders in intercultural and interdisciplinary dialogue. Individuals cultivates tolerance to one another and teamwork towards building and growing positive communities.



Illustrations designed by Eszterik

#conflictmanagement #inclusion #coordinationskills #communicate #respect

Digital

DIGITAL

Ethical and sustainable thinking

DEFINITION
The ability to understand and assess the ethical and sustainable implications of digital ideas, opportunities and projects.

LEARNING OBJECTIVE
Learners can act responsibly, being aware of emerging digital technology's positive or negative implications to develop responsible and ethical digital innovation.



Illustrations designed by [Ezra](#)

#responsibility #trustworthiness #knowledgeofimpacts #transparency

DIGITAL

Data literacy

DEFINITION
The ability to collect, generate, process, analyse a large amount of complex and interconnected data provides meaningful information to guide informed, optimised and contextually relevant decision-making processes.

LEARNING OBJECTIVE
Learners can create and/or use AI algorithms (e.g., machine learning, neural networks, deep learning) to process and recognise significant patterns that can improve decision-making and drive the formulation of new strategies informed by the capabilities of digital technologies.



Illustrations designed by [Ezra](#)

#dataanalysis #ethical #humanandsocialbias #humanintheloop

DIGITAL

Envisioning tech opportunities

DEFINITION
The ability to observe digital technologies' application and understand their potentialities in terms of social and cultural opportunities to innovate in a sustainable digital scenario.

LEARNING OBJECTIVE
Learners are continuously updated on technological developments, identifying opportunities to deploy new technologies, building business cases, and explaining their benefits.



Illustrations designed by [Ezra](#)

#anticipate #lowhangingfruits #digitalcrosspollinisation #technologicalwatch

DIGITAL

Information literacy

DEFINITION
The ability to effectively transform data into usable information.

LEARNING OBJECTIVE
Learners are aware of the reliable sources from which knowledge and information can be collected and are able to identify the relevant information and facts needed to draw a conclusion.



Illustrations designed by [Ezra](#)

#KISSprinciple #MAYAprinciple #datasynthesis #criticalthinking

DIGITAL

Digital collaboration

DEFINITION
The ability to communicate and collaborate effectively through digital channels.

LEARNING OBJECTIVE
Learners can adopt the suitable digital channels and tools to communicate, share knowledge and co-create within online environment also from distance.



Illustrations designed by [Ezra](#)

#agilemethodology #remoteworking #motivation&coaching #trust&guarantee

DIGITAL

Healthy use of technology

DEFINITION
The ability to understand the benefits and harms of technology on one's mental and physical health and to use technology use while prioritizing health and well-being.

LEARNING OBJECTIVE
Learners actively self-regulate their use of technology in a healthy way and know which activities can restore them providing daily energy for their own benefit.



Illustrations designed by [Ezra](#)

#mentalburnout #digitaldetox #coaching #differentperceptionsofhealthy #differenthealthimpact

Strategic Vision

STRATEGIC VISION

Coping with uncertainty, ambiguity and risk

DEFINITION
The ability to operate effectively and make decisions dealing with uncertainty and ambiguity, taking risks in the hope of great achievement.

LEARNING OBJECTIVE
Learners can create and make decisions in situations with high uncertainty, when the information available is partial or ambiguous, and are open to change their strategy when things do not go according to plan.



Illustrations designed by [Ezra](#)

#Curiosity #Managing #Attempts #Foresee #DesignForFailure #Storytelling

STRATEGIC VISION

Envisioning future scenario

DEFINITION
The ability to visualize, develop and bring to life a future scenario, envision new tech applications and turning a vision into action.

LEARNING OBJECTIVE
Learners can analyse driving forces using future thinking to map possible alternative future scenarios, inspiring and guiding people to realize that vision.



Illustrations designed by [Ezra](#)

#Alternatives #StrategicOptions #MixingData #UnlockPossibilities #Conviction #Compromise #Observation #Archetypes

STRATEGIC VISION

Future-oriented mindset

DEFINITION
The ability to orient thinking and actions on the future.

LEARNING OBJECTIVE
Learner can imagine the future and base on it, they make choices and decisions in terms of actions, strategy and resources deployment. They are well aware that today decision will have an impact on the imagined future.



Illustrations designed by [Ezra](#)

#Imagine #Develop #UpdateKnowledge #Sustainability #Ethical #Plan #Challenge

STRATEGIC VISION

Sustainable development

DEFINITION
The ability to understanding the value of digital technologies to develop sustainable long-term social, cultural and economic innovation (SDG).

LEARNING OBJECTIVE
Learners can adopt digital technologies to enable sustainable development goal, digitalizing processes, toward an inclusive, better future for all.



Illustrations designed by [Ezra](#)

#Capacity #Empowerment #EnlargedPerspective #Loyalty #SustainabilityLiteracy

STRATEGIC VISION

Driving change and innovation

DEFINITION
The ability to see opportunities and persevere for continuous improvement through innovation generates in others the willingness or desire to emulate it.

LEARNING OBJECTIVE
Learners can recognise the potential an idea has for creating value and identify suitable ways of making the most out of it, inspiring and arousing enthusiasm among team members and stakeholders.



Illustrations designed by [Ezra](#)

#Leadership #Enthusiasm #Positivity #Resilience #StrategicPerspective

STRATEGIC VISION

Impact strategic management

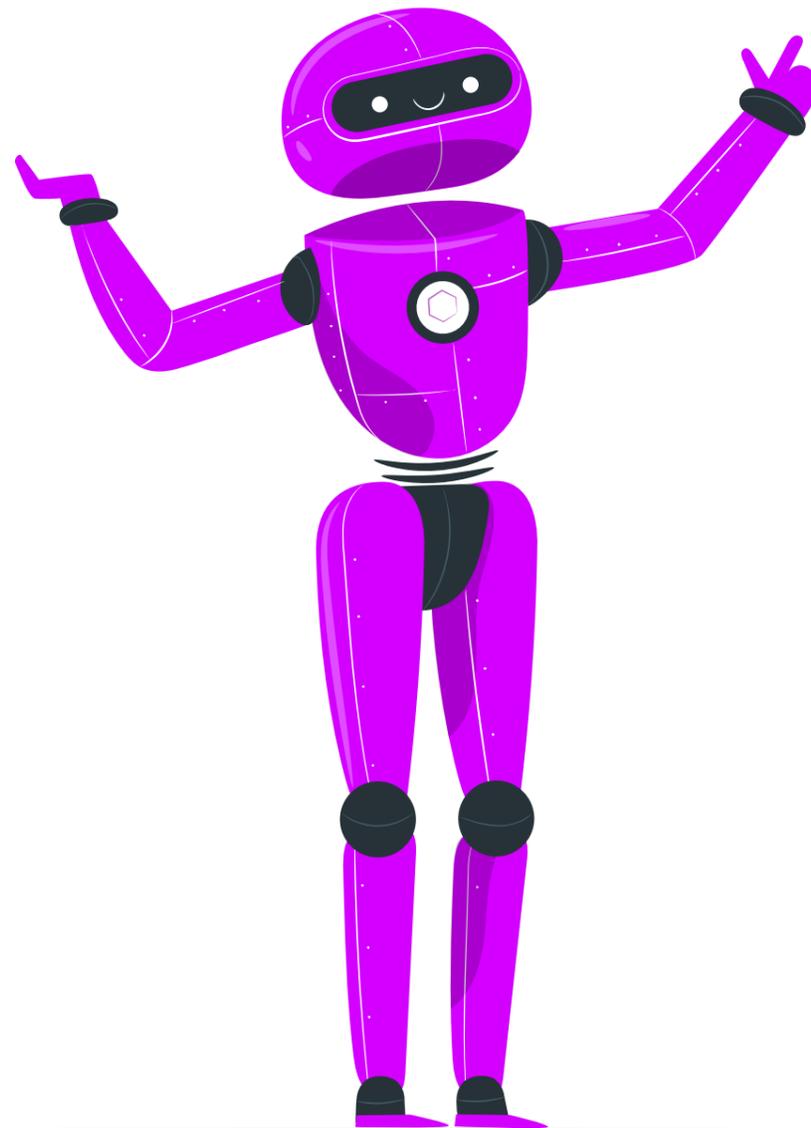
DEFINITION
The ability to plan design actions to guide tech application and scenario evolution.

LEARNING OBJECTIVE
Learners can analyse the future implications of digital technologies on humans and define design actions to react to their evolution path.



Illustrations designed by [Ezra](#)

#OpenInnovation #Agility #Crowdsourcing #ThinkingAhead #Adaptability #StepByStepApproach #InvolvingStakeholders



The Digital Maturity Drivers

To lead companies and organisations towards digital maturity, it is important to keep training and evolving the necessary Digital Creative Abilities as much as identifying the core values which should drive the creative and strategic process.

Many of the DCAs, which you learnt about in the previous section, relate to ethical, sustainable and future thinking aspects. In fact, these abilities turn out to be essential to steering the ongoing digital transformation. Thus, Digital Maturity Enablers should not only be aware of the importance of such skills and abilities but should also consider and use them as actual “drivers” of change.

Currently the DC4DM model presents three clusters of DCAs under the categories of Digital Maturity Drivers: Sustainability, Ethics, and Tech Foresight, being these three able to empower digital talents to design future scenarios by using efficiently and responsibly emerging technologies.

For the **DM Driver ‘Sustainability’** we believe that the Digital Maturity Enabler must be able to design the future with the support of digital technologies while aiming at improving and guaranteeing the wellbeing of the Planet and its human and non-human communities. This also means: to learn to see and think from the perspective of other organisms, beyond the human needs; to learn to analyse and tackle challenges by balancing the environmental, economic, technological, socio-cultural and political perspectives.



The identified DCAs to be trained for the Sustainability DM Driver are: “Humanity Problem Solving”, “Impact Strategic Management”, “Ethical and sustainable thinking”, “Sustainable development”, “Healthy use of technology” and “Positive Mood”.

For the **DM Driver ‘Ethics’** we believe that the Digital Maturity Enabler must be able to identify and understand ethical challenges and implications of digital innovation. This also means being able to drive a digital strategy by adopting an ethical attitude and behaviour during the design and implementation process.



The identified DCAs to be trained for the Ethics DM Driver are: “Empathy”, “Relationship management”, “Ethical and sustainable thinking”, “Future-oriented mindset” and “Healthy use of technology”.

Finally, for the **DM Driver ‘Tech-Foresight’** we believe that the Digital Maturity Enabler must be continuously updated on the technological developments to understand the feasible and viable future tech opportunities, from application to implications, and so to envision possible future scenarios.



The identified DCAs to be trained for the Tech-Foresight DM Driver are: “Envisioning tech opportunities”, “Envisioning future scenario”, “Impact strategic management”, “Adopting different perspectives” and “Future oriented mindset”.

You will discover that the DC4DM model is like a scaffolding for learning contents and activities which should respond to the constant developments and challenges of the digital world. This means that the DC4DM Community, in particular new educators and businesses, are welcome to contribute to the evolution of the DC4DM Toolkit by suggesting the training of new Digital Creative Abilities clustered in new DM Drivers.

To learn more about how to use these cards and how to train DCAs, explore the Toolkit Guidelines at www.dc4dm.eu

The benefits of embracing Digital Creativity

This open book aims to call the attention of businesses and entrepreneurs, educators and trainers, young designers and engineers to the need of a collective effort for the development and dissemination of a new culture on digital creativity. As mentioned in the previous chapter, we like to define as digital creatives all those who want to contribute to the Fourth Industrial Revolution by supporting companies and organisations to achieve their digital maturity, no matter of the level of experience or job type. Digital creativity must lay in the mindset, the attitude and praxis of individuals and organisations in order to bring positive change and healthy future to the way we educate, design, produce, consume, live and work in a digital world.

Before diving into the characteristics and uses of the DC4DM model, let's identify the type of contribution you may provide, as also how learning about the DC4DM methodology would benefit your own job or task.

Are you ready to become a Digital Maturity Enabler?

You are a designer, engineer or entrepreneur by training, and you are eager to come up with fantastic technology driven solutions which would make our world a better place. You see digital technologies as an opportunity to design more sustainable and just futures. You dream of working for or with companies which have great potential to technologically evolve and compete within the Fourth Industrial Revolution!



Benefits of embracing the DC4DM methodology: The DC4DM methodology will support you in training the necessary skills and competencies to design future scenarios and technological applications by responsibly taking advantage of the latest digital developments. It will also provide you with strategies and methods to become more comfortable and agile within collaborative work environments characterised by a multitude of disciplinary knowledge, types of expertise, way of thinking and approaching problems. Learning about and through the DC4DM model will empower your digital creative abilities and make sure you will be a professional able to evolve along with the digital transformation process.



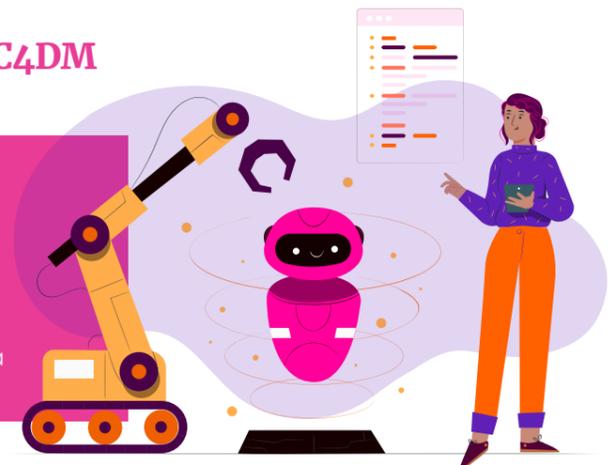
Are you ready to educate the DM Enablers?

You are interested in preparing the next generation of designers and engineers to cope with the complexity and constant evolution of technologies and market needs. You care about providing them with the right tools and strategies to be comfortable when navigating the uncertainty of future scenarios, as much as collaborating and cooperating within cross-disciplinary and cross-functional work teams.

Benefits of teaching through the DC4DM methodology: The DC4DM methodology will provide you with a model and different sets of learning activities, methods and tools which you can use according to the specific teaching objectives or challenges you need to respond to. Meant to make you fairly free to choose how to educate your students, you can decide if either stressing more on the development of their digital creative abilities or focussing on the design future methods and process to co-design innovative digital applications, or both! Finally, the DC4DM methodology can integrate other tools and methods already in use and can be adapted within different learning environments.

Are you willing to bring the DC4DM approach into your business?

You represent a small or medium company, or a start-up and you understand the importance of being well equipped to adapt to the news of the technological scenario. You are looking for ways to update skills and mindset within your own organisation. You want to adopt new strategies to compete in a digital market in constant transformation.



Benefits of investing time and resources in the DC4DM methodology: The DC4DM methodology will contribute to changing mindset within your organisation starting from training new sets of skills and attitudes across the work teams. It will provide a model to change internal praxis and promote more collaborative and cross-functional activities. It will allow your organisation to stay open and adapt to new challenges brought up by either the market or global issues.

3. Discover a new educational methodology

The overarching objective of the Erasmus+ funded project Digital Creativity for Developing Digital Maturity Future Skills - DC4DM (www.dc4dm.eu), is to implement, apply, and disseminate a human-centred educational model. This model aims to empower individuals with Digital Creative Abilities (DCAs), enabling them to navigate the future emergence of technologies. By equipping individuals with the necessary skills, the project seeks to drive progress, foster responsible use of new technologies, and propel organisations towards digital maturity.

Chapter 3 introduces you to the basic characteristics and structure of the **DC4DM educational model**, inviting you to explore more through the **DC4DM Edu Box** and its contents online. Being the DC4DM model designed to adapt to different types of educational or training context and needs, it can be applied by selecting the most suitable **Learning Lab Format** options. Images and practical tips from three different Learning Lab experiences will inspire you to give the DC4DM educational model a shot and become actively involved in integrating and evolving the way to prepare Digital Maturity Enablers for the future.

The core elements for a new educational model

Before introducing you to the structure and operative characteristics of the DC4DM educational model, we would like to explain what core values and beliefs guided our efforts in designing the most suitable learning methodology for Digital Maturity Enablers today.

Through this image we are able to identify eight core elements acting as foundational building blocks for the whole DC4DM model. Starting from four quadrants, each one representing a unique characteristic which inspired the creation of the model, the inner concepts break down the model's complexities, providing a comprehensive view of its different dimensions and a deeper understanding of how they relate to each other.

To develop a new educational model that can be efficient and effective in the times of digital transformation, we had to observe and listen to the needs and expectations of three categories of people - companies, learners (future Digital Maturity Enablers) and educators. You will understand that by starting your reading from the first quadrant on the top-right of the scheme. Despite the way of adopting the DC4DM model differs for each of these





The DC4DM educational model

Now that you are aware about those core aspects characterising a new educational model for Digital Maturity Enablers, and as such understand the need of a shift in the way we learn, think, design and operate to develop Digital Creative Abilities and achieve Digital Maturity, we can finally explain you how the DC4DM model and tools foresee:

Empowerment and Training

Get equipped with comprehensive knowledge, values, and skills (aka DCAs) needed for cross-functional teams. DC4DM model sets you on the right track.

Design Your Future

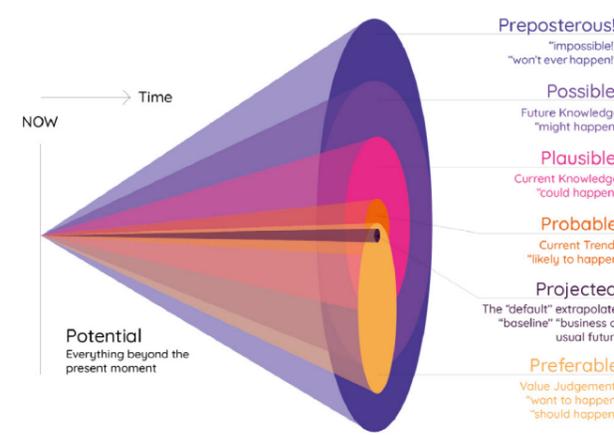
Put your DCAs into action during our Design Futures process. Collaborate with teams and foster shared expertise that sparks innovation.

Continuous Learning Journey

Enhance and nurture your skills in our post-process area, ensuring a continuous learning loop. Reach Digital Maturity and share your valuable DCAs with others.

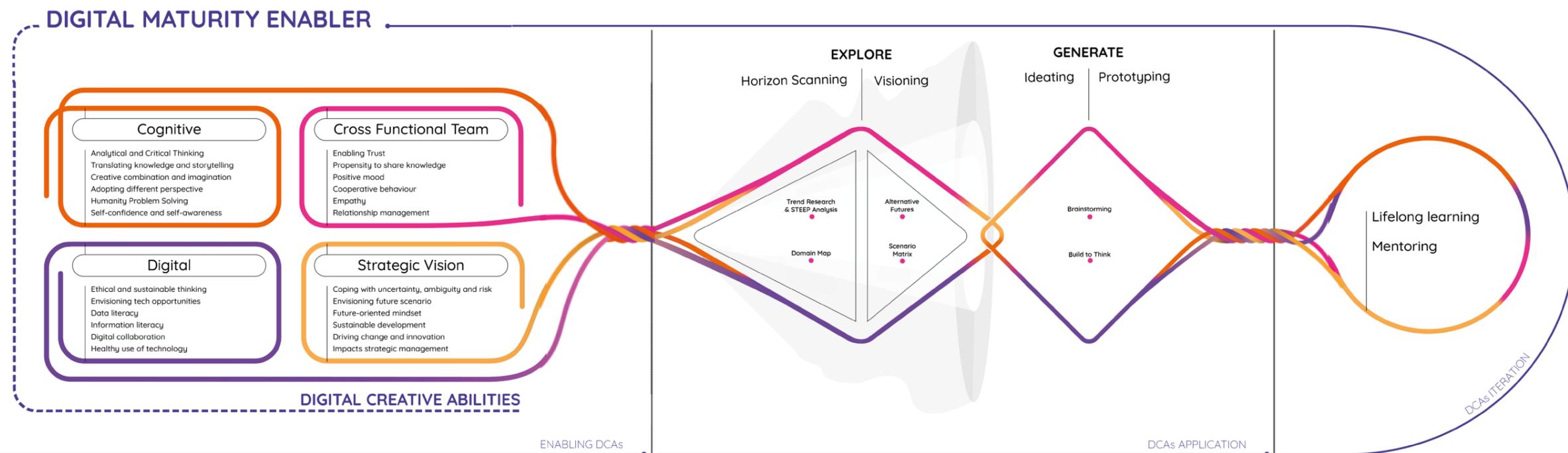
The theoretical model

Before putting into practice how to educate future Digital Maturity Enablers, that is about equipping individuals with essential skills to excel in an ever-evolving digital environment and achieve Digital Maturity, we had to define a theoretical framework able to prove that our ideas were indeed supported by the research and experience of other academics and business organisations. The theoretical version of the DC4DM model develops through a three-area structure corresponding to pre-process, process and post-process phases. The pre-process is about empowering and training learners with comprehensive knowledge, values, and skills (the DCAs) needed for cross-functional teams. Then learners put their DCAs into action through the Design Future process, fostering shared expertise among teams (the process phase). Finally, the post-process concerns nurturing and evolving these skills, creating a continuous learning loop to achieve Digital Maturity and helping other new learners to develop these valuable DCAs.

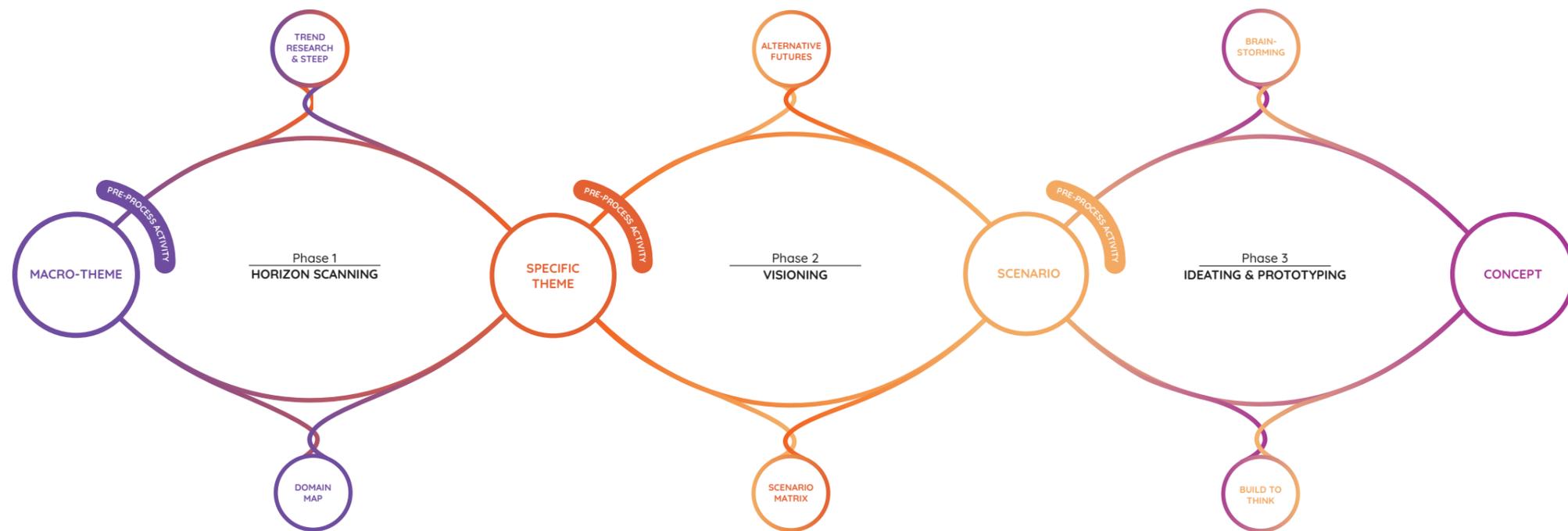


The range of potential futures can be classified based on their varying levels of likelihood, as illustrated in Voros' Futures Cone. The shape of the Futures Cone symbolises the notion that as we move further away from the present, the spectrum of potential futures expands. Conversely, as we approach the present, the array of potential futures narrows, and the most probable future becomes more clearly defined. The Futures Cone is frequently used to investigate future scenarios and evaluate the possible consequences of various events and trends. Charting the scope of potential futures aids individuals and organisations in preparing for diverse outcomes and making well-informed decisions about the future.

Voros' Cone (2017)



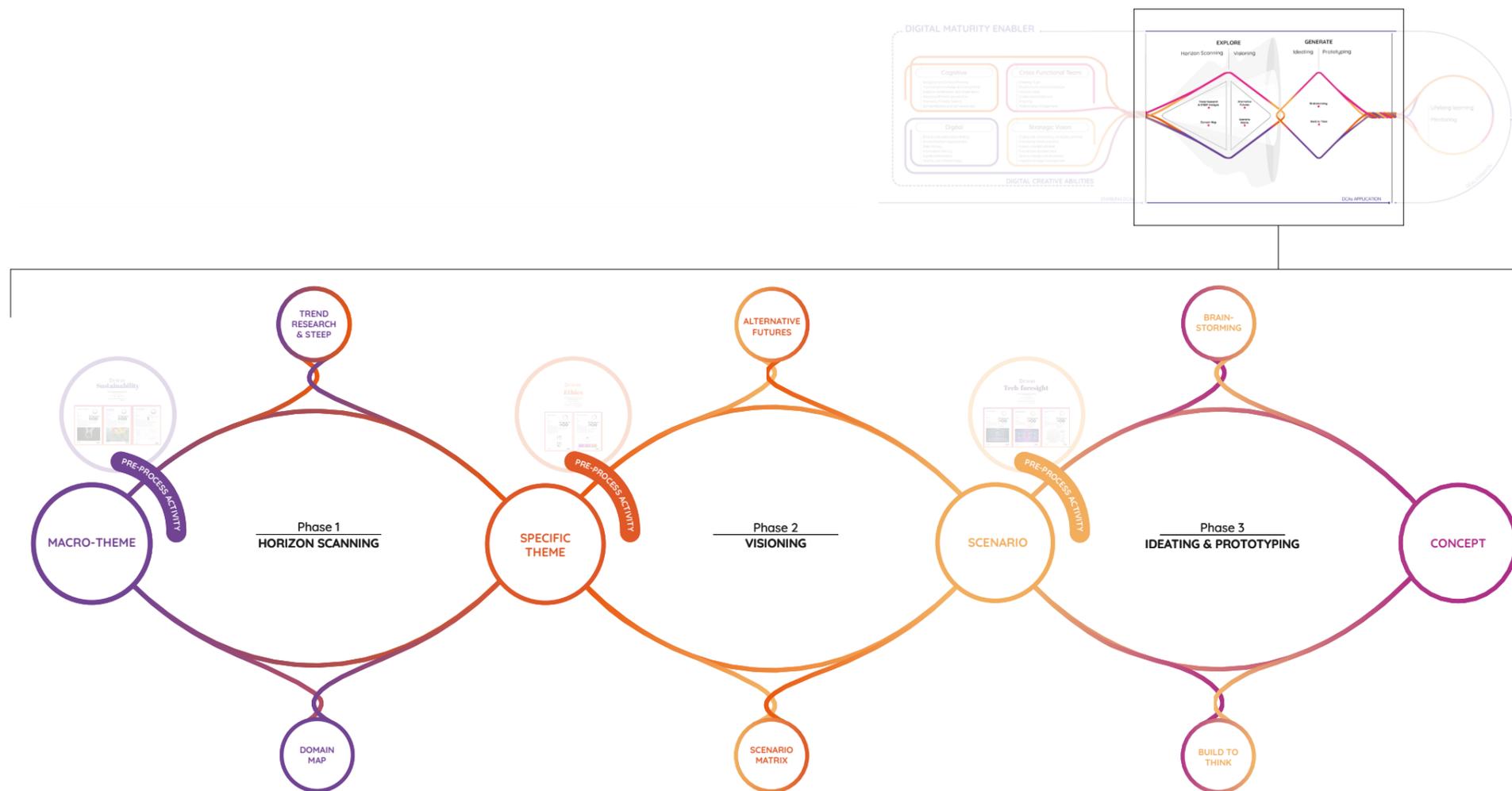
The DC4DM model into action



You can learn more about the theoretical model and how it has been built by attending the "Digital Creativity for developing Digital Maturity future skills" MOOC

Download the DC4DM toolkit to practice the model in action IDEActivity Center's DC4DM Toolkit template | Miroverse

The DC4DM theoretical model has been transformed into a practical action model, allowing educators and learners to actively engage with it and prepare for reaching Digital Maturity. This image represents how the theoretical DC4DM model can become a tool for action. To understand it better, let's start to explore the **Process Area in practice**, that is when and where the DCAs are applied throughout a Design Future Process.



In the two-stage journey which characterises the process, Explore & Generate, we blend Design Thinking and Future Thinking to scan trends, envision scenarios, and create novel solutions. It's a divergent and convergent process, deconstructed into three steps:

Horizon Scanning

It concerns exploring a topic from a macro perspective, analysing social, technological, economic, environmental, and political trends and signals. Horizon scanning allows you to uncover the landscape of possibilities that could potentially influence the future of that specific domain, leading to a future domain map that is truly comprehensive.

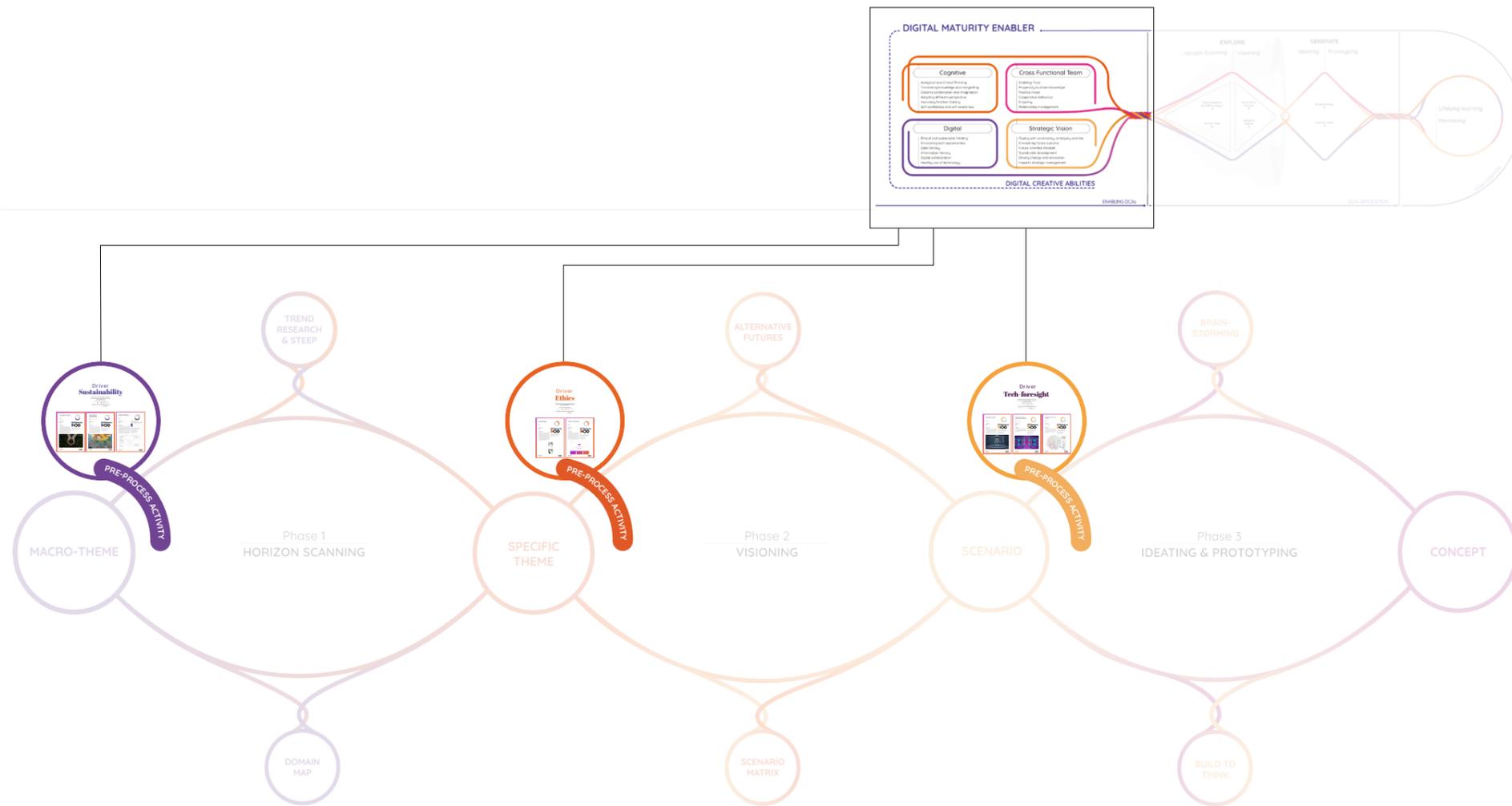
Visioning

It concerns identifying patterns and constructing maps of the future where to undertake an immersive journey. It is the phase in which you can immerse yourself in the journey of envisioning alternative futures starting from the divergent Horizon Scanning. Through Visioning it is possible to construct alternative futures which would lead you to four captivating future scenarios. Once the preferred scenario is selected – that means that the first diamond within the design process has been completed – It starts a new phase where creativity can flow to generate innovative and technological ideas which align with the needs and characteristics of the future scenario of reference.

Ideating & Prototyping

In the second diamond, where a cycle of divergent and convergent thinking is employed, many and different concepts can take shape and come to life! Especially at the beginning of the Ideation phase, you must embrace the power of iterative brainstorming and prototyping in order to finally develop the most suitable and effective solution. In this specific last phase of the process, you can witness your ideas transforming into future products, services, or strategies that shape the world.

Now we can focus on the Pre-Process Area that corresponds to enabling DCAs before delving into the actual design process. The focus is in particular on training those DCAs which would allow the design thinking and design future process to be driven by each of the three Drivers – Sustainability, Ethics and Tech Foresight. As pillars to the thinking and design process, these are drivers for achieving Digital Maturity and to design responsibly for a digital future. Each of these Drivers holds the key to digital transformation. The idea is that you can activate and strengthen selected DCAs through stimulating learning activities, gearing up for the action ahead within the specific Design Future process steps. You must consider these activities as preparatory to the process as they encourage critical reflection on personal abilities and knowledge.



The **Explore** and **Generate** stage within the Design Future process consists of two distinct phases: Divergent and Convergent. The divergent phase involves the act of ‘creating’ or ‘expanding’ a range of possibilities. This entails gathering and generating trends, facts and ideas without engaging in criticism. Subsequently, in the convergent phase, the resulting data are organised into clusters and categories. This phase involves narrowing down the options based on criteria that determine usefulness and relevance.

Here it is how which Driver is guiding the sequential phases of the design process:

Sustainability

Since from the start, the Digital Maturity Enabler must embrace the spirit of the green revolution. When stepping into the Horizon Scanning phase, it is fundamental to analyse the macro-theme of reference by thinking through both the opportunities for and obstacles to sustainable development. The DM Enabler must learn to address any inspiring case study or critical question by considering their own responsibility in designing sustainable futures! Improving and guaranteeing the well-being of the planet and its communities through digital technologies is one of the objectives of the future talents.

Ethics

Once the specific theme is defined, the Digital Maturity Enabler must practice their own ethical way of thinking and operating, adopting an ethical attitude and behaviour. Before the Vision phase, the DM Enabler is asked to practice their abilities in understanding the ethical implications of facts, ideas and actions, to drive digital strategies and pave the path for just and fair future scenarios.

Tech-foresight

The Digital Maturity Enabler must learn to scout emerging technologies, understand the future opportunities they might generate, as much as their impact on people and planet with associated implications. This allows DM Enablers to grasp the potential of new digital technologies before moving to the Ideating & Prototyping phase where new scenarios for their application can be envisioned.

Once mastered each Driver, each learner should feel more and more confident in facing new digital challenges. Navigating Horizon Scanning, Visioning, and Ideating & Prototyping steps would become much easier. The preparatory activities are crucial for generating the final digital concepts, where emerging digital technologies play a significant role. We believe that those digital concepts rising from a DC4DM process should change the world of tomorrow with maturity!

The Learning Lab Format

To put the DC4DM model, process and tools into practice, the Learning Lab Format comes in handy. Educators and businesses can set up the Learning Labs that most suit the needs of single learners and work teams to develop the necessary Digital Creative Abilities and become Digital Creativity Enablers.

Learning Labs are intensive, interdisciplinary and design future-led workshops which use the DC4DM methodology at the core of the creative process. Complementary to the DC4DM Toolkit, the Learning Lab Format offers detailed information on how to plan, organise, run and reflect on a DC4DM learning experience. In fact, the Learning Lab Format guides in setting all the key components and sets of actions up for a successful educational workshop and results. From how to select the participating students, companies and start-ups, and mentors, how to organise the logistics and workspaces, to how to build active interdisciplinary teams, facilitate and promote collaboration, and finally how to go through each DC4DM design process phase.

The Learning Lab Format is presented in two main parts. The first one aims to orient the workshop organisers and educators in understanding what is needed to run a Learning Lab, and what options are available when it comes down to timing, themes, and types of participants. By going through the main “how-to?” questions listed below, the workshop organisers and educators are first provided with concrete information and indications to gather some thoughts and get ready for the second part of the Learning Lab Format:

-
1. How to select the most suitable participants to learn and use the DC4DM model and process?
 2. How to build strong and collaborative work teams?
 3. How to successfully facilitate interdisciplinary teams?
 4. How to plan and set up a welcoming and energising learning and work environment?
 5. How to identify inspiring and challenging macro-theme and sub-themes for the teams to work on?
 6. How to create an open feedback environment to enhance a positive mood throughout the workshop?
 7. How to select and involve companies and start-ups along the process?
 8. How to keep the participants engaged throughout the whole process?
 9. How to balance the time dedicated to each phase of the process according to the whole workshop duration?
 10. How to organise and apply the DC4DM process phase 1?
 11. How to organise and apply the DC4DM process phase 2?
 12. How to organise and apply the DC4DM process phase 3?
 13. How to set communication strategies up which can be effective for the visibility and impact of the Learning Lab experience and results?
 14. How to join and be an active member of the DC4DM Community?
-

The second part of the Learning Lab Format focuses on preparing the actual action plan. The Learning Lab Format template allows to tick all boxes in preparation of an educational workshop experience that must be engaging, fulfilling and surely instructive.

The template is based on a 10-days Learning Lab, which we consider as standard duration. Though it can be adjusted for planning either shorter or longer learning experiences. The template aims to guide the decision-making regarding learning objectives, people and organisations to involve, themes and challenges to tackle, the DC4DM activities and tools to propose, and many other logistics aspects which can guarantee the success of a Learning Lab.

LEARNING LAB: Title & Subtitle

name and logo of the hosting organisation

LOCATION: _____

DATES: _____

THEME & PURPOSE

Describe what the Learning Lab is about. Use a simple language and keep it short!

THE ORGANISING TEAM

photo	photo	photo	photo
name surname	name surname	name surname	name surname
TYPE OF ROLE	TYPE OF ROLE	TYPE OF ROLE	TYPE OF ROLE
contribution:	contribution:	contribution:	contribution:

DESIRABLE OUTCOMES

Goals

What are the learning objectives?
What kind of results do you want to achieve?
What is the end goal of this experience?

Macro-Themes

Describe the macro-themes which you would propose to the teams. Why are these relevant?

Impact

What kind of impact do you expect to generate?
How would you define the success of the operation?
Which success indicators would you consider?

ACTORS INVOLVED

Learners

Who are the type of learner participants?
What is their disciplinary background?
And how many?
How to recruit them?

Trainers / Facilitators

What kind of teaching and facilitation expertise are necessary?
How many?

Mentors

What kind of expertise should integrate the programme to provide further orientation to the learners?

Companies & Start-ups

What kind of tech-companies and type of business should be involved to orient or stimulate the design process?

LOGISTICS

Location

Think of all the aspects you should take care regarding the event location and facilities, for instance: booking the venue(s); provide indications to reach the venue; setting the room up for teamwork; setting projector and sound system up; providing access to wi-fi; etc.

Host support

Think of all the aspects you should take care of as good host! For instance, providing coffee and snacks; different kinds of materials for the teams to work; a clear programme of the event; an engaging social media channel to join in; a list of local places to visit, tips to move around and eat nice food; etc.

Budget

You should plan how to manage the costs of the event. For instance, start by planning a general budget you need to organise and run the event; think of local sponsors who could cover some expenses or offer something; evaluate if you want the participants to pay a small attendance fee; and keep record of all the expenses!

LEARNING LAB FORMAT - action plan

DC4DM Digital Creativity for all, embracing Digital Learning Future Skills

The Learning Lab Format action plan layout: this first page should guide you in defining some pillar components and characteristics for your Learning Lab; for instance, main objectives and goals, people and organisations to involve, key logistics.

The Learning Lab Format template consists in a sequence of pages in which the first one is dedicated to the main information and decisions to be taken. This first page of the layout is important because it supports the workshop organisers to define clear educational objectives and put in place logistics and relationships fundamental for the success of the event.

The following pages of the layout are useful to structure the Learning Lab agenda according to the DC4DM process phases: **Horizon Scanning, Visioning, Ideation & Prototyping**. For each proposed activity within the programme, the layout helps to keep track of corresponding tasks regarding preparation, support, communication and documentation.

The Learning Lab Format template also allows the workshop organisers and educators to document their own Learning Lab experience in correspondence of each activity and tool application. By reflecting on expectations and results, using quick notes and photos from the event itself, Learning Lab organisers and educators can build on their first experience and learn to master the implementation of new DC4DM Learning Labs. Also, the DC4DM Community can help here! In fact, new Learning Lab organisers and educators are more than welcome to share their experiences by sharing their filled templates through the different DC4DM Community channels. These would foster useful discussions and ideas to improve the learning experience and keep it updated with the needs and progress of digital transformation.

One last part of the Learning Lab Format action plan layout corresponds to the planning of the Sharing Day. This is the final event which aims to present the workshop results to an open audience made of experts, companies and members of the local community. Once again, to expand the DC4DM Community, the Sharing Day should be planned and communicated carefully to enhance positive conversations to go ahead.

To learn more about the Learning Lab Format, how it integrates the DC4DM Toolkit and how it can be used, visit the DC4DM project website and explore the EduBox section at www.dc4dm.eu/model-and-tools/

To go straight into action, find all instructions and template at the dedicated page www.dc4dm.eu/format

LEARNING LAB AGENDA		LOGISTICS & MATERIALS TO SET UP	PHOTO DOCUMENTATION & PARTICIPANTS' FEEDBACK	NOTES
TIMING	ACTIVITY DESCRIPTION			
<p>LEARNING LAB FORMAT - action plan</p> <p>Define how much time to dedicate for each phase of the activity. When referring to the use of one of the DC4DM Microverse link to the activity.</p>				
<p>DAY 1 WELCOME & LLAB KICK-OFF</p>				
30*	Check-in	Printed list of participants and badges	Add here significant photos and participants' feedback from the day.	Add here your notes on what went right and what requires improvements.
15*	Welcome presentations	Projector & room set up		
45*	Theme & objectives presentation	Opening presentation file		
60*/90*	Lunch break	Lunch vouchers / Catering service		
45*	DC4DM Process & Agenda presentation	Projector & room set up & will be removed at the end of the programme and access to reverse board		
20*	Pre-formed teams / team building activity	Projector & room set up & will be removed at the end of the programme and access to reverse board		
10*/20*	Coffee break	Catering service		
60*/90*	Presentation of Macro-themes and Companies /Start-ups	Presentation files by guest companies and experts		
10*	Wrap-up	Vouchers for drinks / Catering service		
90*/120*	Welcome Drinks			
<p>DAY 2 HORIZON SCANNING PHASE</p>				
10*	Warm-up activity	instructions and material	Add here significant photos and participants' feedback from the day.	Add here your notes on what went right and what requires improvements.
15*	PRE-PROCESS activity Driver: Sustainability	DC4DM Toolkit - Pre-Process instruction material		
15*	HORIZON SCANNING PHASE presentation	DC4DM Toolkit - Presentation example		
10*	Trend Research and Sleep Analysis - teamwork	DC4DM Toolkit - layout		
10*	Wrap-up and Feedback	post-it notes		
<p>DAY 3 VISIONING PHASE</p>				
10*	Warm-up activity	instructions and material		
10*	Trend Research and Sleep Analysis - teamwork	DC4DM Toolkit - layout		
60*	Lunch break	vouchers / catering service		
10*	Domain Map - teamwork	DC4DM Toolkit - layout		
30*	Sharing time	projector		
10*	Wrap-up and Feedback	post-it notes		
<p>DAY 4 IDEATION & PROTOTYPING PHASE</p>				
10*	Warm-up activity	instructions and material	Add here significant photos and participants' feedback from the day.	Add here your notes on what went right and what requires improvements.
15*	PRE-PROCESS activity Driver: Ethics	DC4DM Toolkit		
60*	VISIONING PHASE presentation	DC4DM Toolkit presentation example		
10*	Lunch break	vouchers / catering service		
10*	Alternative Futures - teamwork	DC4DM Toolkit - layout		
10*	Wrap up and Feedback	post-it notes		
<p>DAY 5 IDEATION & PROTOTYPING PHASE</p>				
10*	Warm-up activity	instructions and material		
60*	Scenario Matrix - teamwork	DC4DM Toolkit		
10*	Lunch break	vouchers / catering service		
10*	Scenario Matrix - teamwork	DC4DM Toolkit		
10*	Wrap up and Feedback	post-it notes		
<p>DAY 6 IDEATION & PROTOTYPING PHASE</p>				
10*	Warm-up activity	instructions and material		
60*	Scenario Matrix - teamwork	DC4DM Toolkit		
10*	Lunch break	vouchers / catering service		
10*	Scenario Matrix - teamwork	DC4DM Toolkit		
45*/60*	Sharing time	projector		
10*	Wrap up and Feedback	post-it notes		
<p>DAY 7 SHARING DAY</p>				
10*	Warm-up activity	instructions and material	Add here significant photos and participants' feedback from the day.	Add here your notes on what went right and what requires improvements.
15*	PRE-PROCESS activity Driver: Tech-Foresight	DC4DM Toolkit		
15*	IDEATION & PROTOTYPING PHASE presentation	DC4DM Toolkit presentation example		
60*	Lunch break	vouchers / catering service		
10*	Brainstorming & Inspiration Stimuli - teamwork	DC4DM Toolkit - layout Post-it notes, paper and markers Boards - adaptable work space		
10*	Wrap up and Feedback	post-it notes		
<p>DAY 8 SHARING DAY</p>				
10*	Warm-up activity	instructions and material		
10*	Brainstorming & Inspiration Stimuli - teamwork	DC4DM Toolkit - layout Post-it notes, paper and markers Boards - adaptable work space		
60*/45*	Lunch break	vouchers / catering service		
10*	Brainstorming & Inspiration Stimuli - teamwork	DC4DM Toolkit - layout Post-it notes, paper and markers Boards - adaptable work space		
10*	Wrap up and Feedback	post-it notes		
<p>DAY 9 SHARING DAY</p>				
10*	Warm-up activity	instructions and material		
15*	Build to Think - teamwork	recycled material, props, tape, glue, etc.		
60*	Lunch break	vouchers / catering service		
10*	Build to Think - teamwork	recycled material, props, tape, glue, etc.		
10*	Wrap up and Feedback	post-it notes		
<p>DAY 10 SHARING DAY</p>				
10*	Warm-up activity	instructions and material	Add here significant photos and participants' feedback from the day.	Add here your notes on what went right and what requires improvements.
15*	Sharing Day presentation and instructions			
60*	Preparation of the final presentations - teamwork	room configuration and material		
10*	Lunch break	voucher / catering service		
10*	Sharing Day Presentations	venue - list of participants - projector		
20*	Sharing Day Open Discussion	venue - configuration - video documentation		
60*/90*	Closing Ceremony	printed certificates		
60*/90*	Drinks & Networking	catering service		

The Learning Lab Format action plan layout: this template provides you with a general structure to plan a 10 days workshop following the Horizon Scanning, Visioning, Ideation & Prototyping phases of the DC4DM process. This layout has been designed as a scaffolding in which one can propose the most appropriate learning activities and methods for the chosen themes, objectives and goals, and finally budget and logistics possibilities. This layout and the previous one are thought to be used as digital documents to be shared and used by the whole Learning Lab organiser team and facilitators. But they can also be printed out in a large size, taped to the wall, becoming a work in progress evidence for everyone involved in the Learning Lab experience.

The DC4DM model and LLab Format in practice

To get a clearer idea on how a Learning Lab would look like in practice, we share some of the key aspects which made up the three DC4DM L Labs successful stories, not just from a research outcome perspective, but especially as a learning experience for both participants and facilitators.

The DC4DM model has been developed theoretically and then tested through three different L Labs, to become a practical and usable learning methodology for educators, companies, and individuals who wish to become Digital Creativity Enablers. The **LLab 1 “Feeding Madeira”**, **LLab 2 “Sustainable Mobility”**, **LLab 3 “Futuring Care”** had in common the main objective of supporting the participants to create a collaborative and positive work environment, in which individual skills and attitudes were enhanced to boost personal motivation to learn a new approach to problem solving and co-design with team members coming from various disciplinary and cultural backgrounds. In fact, the three DC4DM L Labs involved 40 master’s students each, from France, Italy and Portugal, specialising in multiple areas of design, engineering, management.

The DC4DM methodology has been thought to be adaptable to different learning needs, resources and level of experience. For this reason, the three DC4DM L Labs had slightly different schedules, different strategies to both engage the participants and teams to work collaboratively and involve SMEs and start-ups along the process to bridge their needs with the training objectives.

LLab1: Feeding Madeira hosted by University of Madeira, in Funchal, Portugal, in July 2022. The emphasis was on designing regenerative and distributive food systems and imagining a sustainable development for the island of Madeira thanks to the use and application of new digital technologies. Of the 10-days workshop, the first three were dedicated to building the participants’ awareness on the local context and on the challenges related to sustainable development and food chain. Also, the first three days were focused on Pre-Process activities with the aim of training the necessary DCAs before going through the Design Future Process. The remaining seven days were focused on co-designing future scenarios and possible creative digital tech-responses. The start-ups’ participation was mainly considered at the beginning and end of the Design Future Process.

LLab2: Sustainable Mobility hosted by Télécom Saint-Etienne, in Saint-Etienne, France, in November 2022. The emphasis was on designing the mobility of the future in a broad sense. The LLab2 programme followed similarly the experience of the LLab1. What differed from the first LLab was the effort put by the facilitators in supporting better teambuilding and so allow a more efficient design process and methods application. As in the case of LLab1, start-ups and local organisations were called to interact with the teams only at the beginning and end of the process.

LLab3: Futuring Care hosted by Politecnico di Milano, in Milan, Italy, in February 2023. The main theme was broken down into macro-themes and each one was associated with specific invited experts and mentors who had the role to guide the teams in understanding the challenges. The selected start-ups and small companies were invited to participate in a co-design session so that the interaction between learners and real-world entrepreneurs would better inform the Design Future process. The programme presented a new idea of mixing the Pre-Process learning activities across Process steps so that training the DCAs could be more integrated within process and teamwork.

By putting the DC4DM model and Learning Lab Format into practice and reflecting on the proposed schedules, activities and methods, we are confident to say that to educate future Digital Maturity Enablers it is necessary to challenge the classic academic learning environment and routine. To prepare designers, engineers and entrepreneurs who must feel comfortable in tackling the constant evolution of digital technologies and the complexity of future world problems and trends, means to nurture their understanding of few points: everything changes and we must accept it; problem-solving must start from knowing about specific people and planet’s needs; to be able to collaborate with any type of expertise and knowledge becomes a must if the goal is to design and innovate for a better world. When putting the DC4DM methodology into practice, we can firstly suggest considering the following core aspects.

Make sure to engage with the local context: knowledge, know-hows and challenges

Learning Labs are an opportunity to bring together people from different disciplinary and cultural backgrounds and encourage them to engage with real problems to solve before falling in love with any new technology. To be fast and effective in becoming familiar with the proposed LLab themes and challenges, the best tactic is to immerse the group of learners into the real context, that is about putting them in direct contact with the environment of reference, and with the experts, organisations and communities who can share their knowledge, know-hows and perspectives.

“Learning-by-walking” is an effective method to engage learners with a specific place and type of environment. Especially if the walk is led by an expert who can provide important and reliable information about the place, the group gets challenged with important critical questions which will be central to the design process. During the LLab 1 the learners walked through the Madeira Island Laurissilva forest with the guidance of some local biologists who were able to demonstrate both the fragile balance that exists between different natural ecosystems and the threats which may put at risk the existence of several species and the human well-being. During LLab 2 the learners walked through the highest levels of Saint Etienne city to observe the specific topology of the territory and the associated issues which would concern a balanced mobility among human and non-human species. These two “Learning-by-walking” experiences have demonstrated the importance of connecting the learners directly with the socio-cultural, environmental, economic, and sometimes even political context, particularly to encourage them to train their ability in listening to different opinions and perspectives, and start from real needs and problems, before moving to any design action.



Local stakeholders, such as representatives of organisations and communities which can be relevant for the creative process development, should be invited to provide the learners with stimulating information and stories. These would allow the participants to better understand the proposed macro-themes and challenges and start open and critical cross-disciplinary conversations. The presence of companies, start-ups, NGOs, policymakers, scientists, technicians, and entrepreneurs in the room, in different moments of the Learning Lab, can guarantee quality to the critical and strategic thinking process, as also helping the teams to keep their feet on the ground!



Finally, our experience in running the three DC4DM LLabs suggests that the design process would work more smoothly and efficiently if the participants get some kind of preparation on the Learning Lab themes and challenges before the event itself starts. Unlike the first two, for the LLab 3 we built the teams, and we assigned one of the defined macro-themes each, so that every participant could be at the event with a minimum of knowledge and without the worry of knowing who they would be working with. In particular, we asked each learner to study and identify a few trends and future predictions concerning the assigned macro-theme so that they could present their understanding and point of view to their teammates already on the LLab first day. We believe that this upstream personal reflection helps to enrich the collective conversation and supports the individuals' confidence in sharing and attitude in listening to the others. All aspects necessary for a healthy and collaborative work environment.

Guarantee a healthy and stimulating work environment

One of the most challenging aspects for Learning Lab facilitators is to maintain people's spirits high, as good levels of motivation and positivity through the whole duration of the workshop. Surely, to guarantee a healthy and stimulating work environment it is necessary to embrace a holistic perspective when planning the event programme and logistics. Paying attention to details such as the type of activity to propose, the type of coffee breaks to offer, the personalities to bring in to mentor and facilitate, the language and body language to use, defines the quality of the social interactions and collaboration.



Teamwork is easier when positive energy flows between the team members. This is surely a discourse on the ability to trust, empathise, compromise, self-believe, focus, and more. A Learning Lab must consider time and space for energizers or warm-up games which would favour that necessary positive energy throughout the hard and intensive workshop days. Choosing the right energising activity can be tricky though, because it requires first to understand what the participants need and how they feel. For instance, games which support team building and stimulate curiosity must be proposed at the beginning of the programme; while activities which require either focus or creative effort are more appropriate when teams are facing important design decisions. What the three DC4DM LLabs taught us is that discovering how a person acts and reacts during a funny and recreational activity, enables team members to get to know each other a bit more, accept each other's ways to communicate, and learn how to interpret non-verbal language.



Another important factor lays in planning carefully the workload and associated stress. Each phase of the DC4DM model requires different levels of focus and effort; individual learners and teams must be provided with the right amount of time and support to understand the task, give it a try, and get feedback before moving on. Enhancing good communication within the teams by facilitating their internal conversations, can help in clearing some internal misunderstanding or frustrations out. Also, the three DC4DM LLabs demonstrated the efficacy of the sharing moments. At least once per day, each team should be asked to present their work progress to the whole group of participants. These sharing moments, in fact, contribute to maintaining a positive approach throughout the workshop, because the open conversation encourages a sense of mutual understanding and support between the different teams and sets a constructive tone to a collective learning journey.



Planning and setting up the physical workspace for a Learning Lab must take into consideration several aspects. The quality of the facilities is as important as the capacity of the space to be rearranged according to the needs of different learning activities, as also of individuals and teams. From the three DC4DM LLabs we learnt that the room in which the workshop takes place must allow each team to have their own "island" where to have conversations, share and visualise ideas and streams of thoughts. At the same time, the space must feel open and fluid allowing all teams to exchange information and mutual support, attend to theoretical or instructional presentations, engage in warm-up activities. The workspace sets the mood and the social interactions that develop within it. Make sure that your Learning Lab happens in a comfortable physical space where people can focus, but also socialise over a coffee and a laugh during sharing moments!

Last but not least, to maintain people's spirits high, as good levels of motivation and positivity throughout the whole Learning Lab, we warmly suggest actively listening to the participants' feedback and suggestions during the progress of the event itself. On one hand, this would help to improve different aspects of the workshop, on the other hand, more importantly, this would allow the learners to feel relevant, boosting their confidence and motivation to achieve the best results both as individual and collective!

As we are trying to build a new culture on Digital Creativity, it sounds just right to say that Learning Labs represent a great opportunity to start setting up the bases to new ways of educating, learning and working together.

All you need is in the DC4DM Edu Box

Now that you have learnt about the potentialities of using the DC4DM model to train the Digital Creative Abilities and contribute to a new Digital Creativity mindset and praxis, feel free to explore the **DC4DM Edu Box**. It is an online container of learning materials and resources which have been organised into three sections to orient future Digital Creatives like you to 1. Learn about the model, 2. Apply the model, 3. Get inspired!

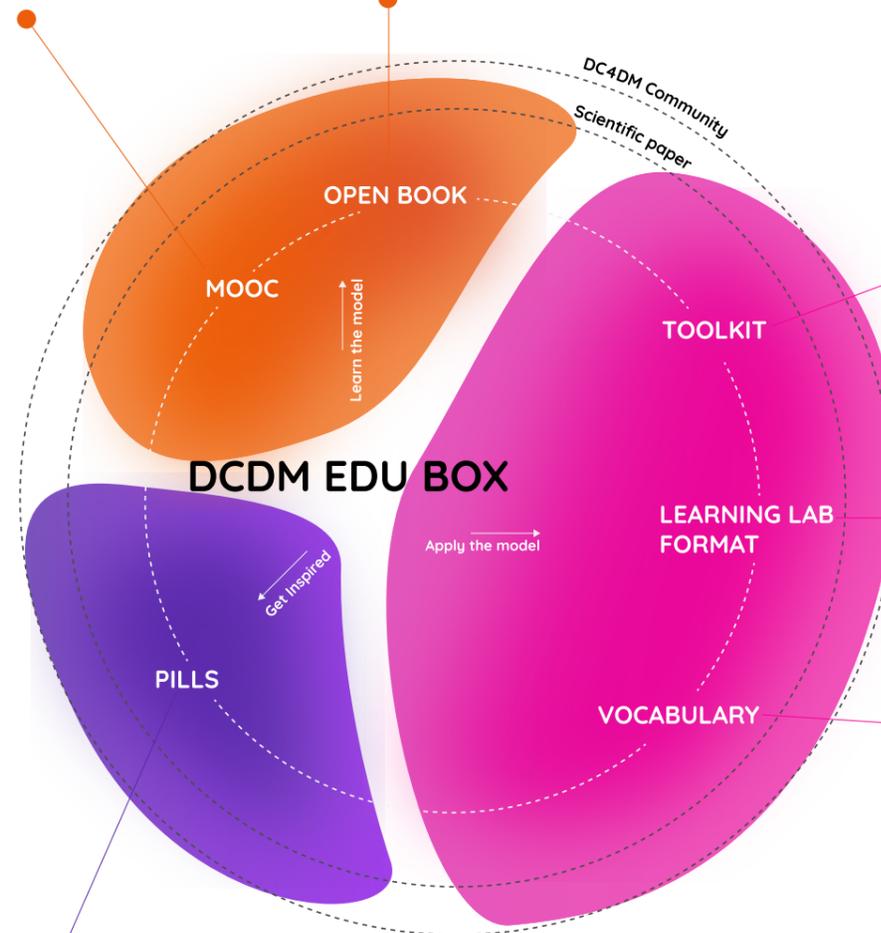
We suggest accessing the Edu Box contents through this numeration for a gradual and orderly understanding. Though, if one is already familiar with some of the presented themes or processes, can jump directly to the parts which are found more useful. So the Edu Box can also be explored and used according to the level of curiosity, time available and level of in-depth study one wants to achieve. This means that, for instance, a business could discover how to start reskilling people within the enterprise. An educator would find detailed instructions on how to train future Digital Maturity Enablers or at least to experiment a new teaching format within HEI courses. Finally, young designers, engineers or entrepreneurs who are eager to contribute to ethical, sustainable and tech foresight-oriented futures with their creativity and skills, they can dive into the Edu Box to get inspired and ready to learn!

1 LEARN ABOUT THE MODEL

Dive deep into the DC4DM model to learn its nature, structure, and Abenefits and why it is so important to train a new generation of future digital talents.

An **open online course** to acquire the knowledge on the DC4DM model and the Design Futures process to train experts who strategically **envision future digital scenarios** in a sustainable, ethical and strategic way.

A **practical book** that provide with an easy **introduction to the core aspects of the DC4DM ethos, the DC4DM manifesto**, experiences and practical **tips** about the model and its application.



2 APPLY THE MODEL

Now you are ready to explore the practical tools to apply the model and organize an intensive learning session for your students

● **Open and accessible operational resource to apply the DC4DM model and the Design Futures process** and learn how to **anticipate possible future scenarios** and define long-term strategies for digital application.

● **Training format** aimed to exploit the potential of the DC4DM model fully. **It supports and empowers teachers and educators** to facilitate and **teach practices towards digital maturity**.

● List of **terms and definitions** to become more knowledgeable on **digital technologies and future thinking approach**.

3 GET INSPIRED

Be inspired by digital transformation experts, educators, students and startupper who have already known and applied the DC4DM model.

● Short **video interviews** to **experts** and contributors from Universities, SMEs and startups collecting different **points of view, experiences and best practices** on Digital Maturity, digital creativitv and education.

Conclusion

Digital transformation challenges the status quo, requiring people and organisations to adapt to the fast-pacing technological developments, and be proactive in investing time and resources into new capabilities and a digital creativity culture. Emerging digital technologies concerning the Internet of Things, Artificial Intelligence, machine learning, big data analytics and robotics, have been revolutionising all sectors of our society such as healthcare, transportation, manufacturing, entertainment, education, and even art, allowing the creation of new business models, transforming the industrial economy and requiring new types of job roles (Bruno, 2022). Finally, major digital transformations impact on the evolution of human beings and human societies; entering a Post-Information Society, people find themselves digitally enhanced to not just pursue their personal dreams, but especially to contribute to the global agenda, including sustainable development and social justice (Bruno, 2022).

We must start from promoting new innovative educational models able to empower upcoming generations of designers, engineers and entrepreneurs to develop radically new skills and competencies

Through this open book, we try to promote the idea that a culture of digital creativity must be disseminated among those individuals and organisations which wish to smoothly navigate the complex digital transformation journey, either in the context of higher education or business. We believe we must start from promoting new innovative educational models able to empower upcoming generations of designers, engineers and entrepreneurs to develop radically new skills and competencies, and be ready to creatively, strategically and ethically respond to the opportunities offered by emerging technologies.

The DC4DM educational model responds to this task and promotes a learning process that empowers both individuals and teams in thinking of and communicating future human-centred digital solutions within sustainable and just future scenarios. As tested through the described DM Learning Labs, the DC4DM methodology encourages a new learning approach and work environment, very much based on collaboration and positive thinking, cross-disciplinary and cross-functional teamwork.

The DC4DM project, which started in September 2020 and concluded in August 2023, has been the opportunity for the DC4DM founding members to develop the Edu Box as a virtual container of open-source learning materials, with the aim of calling representatives of Higher Education Institutions (HEIs), Small and Medium Enterprises (SMEs), Startups, and Business Incubators to collaborate by using them and integrating them according to the ever-changing digital scenarios and needs.

You are invited to take part in this collaborative effort which encompasses various activities aimed at sharing knowledge and cultivating digital creativity competencies. **The Open Book for Digital Creatives is just to make you start!**

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