CYANOTYPES Strategic Skills for Creative Futures

WP2 Strategic Skills for Creative Futures
D2.1. Continuous Skills Intelligence Gathering and Mapping Analysis

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the European Union

Grant Agreement Number: 101056314
Deliverable: D2.1. Continuous Skills Intelligence Gathering and Mapping Analysis

Project Start date: 01-09-2022 **Duration**: 48 months
Coordinator: HKU

Deliverable number:	D2.1
Work Package number:	WP2
Document status:	FINAL
Dissemination level:	PU

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CYANOTYPES

DOCUMENT SUMMARY INFORMATION

Project title:	CYANOTYPES Strategic Skills for Creative Futures
Short project name:	CYANOTYPES
Project number:	101056314
Start date of the project:	01-09-2022
Duration of the project:	48
Project website:	https://cyanotypes.website

D2.1. Continuous Skills Intelligence Gathering and Mapping Analysis

Work Package:	WP2 Strategic Skills for Creative Futures
Deliverable number:	D2.1.1
Deliverable title:	Continuous Skills Intelligence Gathering and Mapping Analysis
Due date:	15/09/23, 15/09/24, 15/09/25, 30/08/26
Actual submission date:	15/12/2023
Author(s) and organization:	This deliverable is the result of the joint effort of the Cyanotypes taskforce team constituted by researchers from partners: Isabel Verdet, Gerin Trautenberger, Nerea Rojas (ECBN), Carlo Ferretti, Becky Riches and Thi Hai Ly Nguyen (MATERHUB), Rita Grácio, André Graça, Natália Gondim, Manuel José Damásio, André Graça, Tobias Frühmorgen and Alexandra Crouchinho. (Lusófona University), Soenke Zehle and Sónia Alves (HBKS), Matthew Kitching and Micol Manunta (EQArts), Prerna Bishnoi (NTNU), Angelika Zelisko and Erla Björnsdóttir (University of Applied Arts Vienna), and Marko Popovik (CIKE).
Dissemination Level:	PU
Status:	Final

Revision history:

Version	Date	Author	Comment
v.0.1	24/09/2023	Isabel Verdet, Gerin Trautenberger, Nerea Rojas (ECBN),	Initial structure
v.0.2	07/11/2023	Isabel Verdet, Gerin Trautenberger,	Initial version for contributions

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		Nerea Rojas (ECBN), Carlo Ferretti, Becky Riches and Thi Hai Ly Nguyen (MATERHUB), Rita Grácio, André Graça, Natália Gondim, Manuel José Damásio, André Graça, Tobias Frühmorgen and Alexandra Crouchinho. (Lusófona University), Soenke Zehle and Sónia Alves (HBKS), Matthew Kitching and Micol Manunta (EQArts), Prerna Bishnoi (NTNU), Angelika Zelisko and Erla Björnsdóttir (University of Applied Arts Vienna), and Marko Popovik (CIKE).	
v.0.3	24/11/2023	Angelika Zelisko and Erla Björnsdóttir (University of Applied Arts Vienna), Becky Riches and Thi Hai Ly Nguyen (MATERHUB),	Internal Review
v.0.4	09/12/2023	David Crombie (HKU)	Check by Project Coordinator
v.1.0	15/12/2023		Final version for submission

Quality Control:

	Who	**Date**
Checked by internal reviewer	Angelika Zelisko (University of Applied Arts Vienna),	24/11/2023
Checked by WP leader	Gerin Trautenberger, ECBN	24/11/2023
Checked by Project Managers	Caroline van Leuven, HKU	13/12/2023
Checked by Project Coordinator	David Crombie, HKU	15/12/2023

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ACKNOWLEDGEMENTS

CYANOTYPES is a project that has received funding from the European Union's Erasmus+ Programme under Grant Agreement No **101056314**. Please see https://cyanotypes.website for more information.

The partners in the project are HKU - University of the Arts Utrecht, ECBN - European Creative Business Network, ECHN - European Creative Hub Network, ELIA, EfVET – European Forum of Technical and Vocational Education and Training, Materahub, WKO – Wirtschaftskammer Osterreich, YNFT – Screen Skills Committee Sweden, SGI – Swedish Games Industry, FAINCE – Fashion Innovation Centre, Mediarte, All Digital, MyData Global, WRS – Wirtschaftsforderung Region Stuttgart, CIKE – Creative Industry Kosice, UAAV – University of Applied Arts Vienna, NTNU – Norwegian University of Science and Technology, Lusófona University, HBKS – Saar University of Fine Arts, EQ Arts.

The content of this document is the result of the work developed by the partners in the context of the project.

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INTRODUCTION

Skills intelligence gathering is a crucial concept within the Cultural & Creative Sectors and Industries (CCII) due to its far-reaching impact on industry dynamics and professional development. These industries are highly sensitive to shifts in societal preferences, technological advancements, and market trends. Skills intelligence aids professionals in swiftly adapting their skill sets and creative approaches to meet evolving demands. Understanding current and future skill requirements also enables strategic talent development through targeted training programs and educational initiatives, and empowers individuals within the industry to acquire relevant skills and remain competitive. Moreover, skills intelligence facilitates proactive workforce planning, allowing organizations to prepare for talent shortages and take effective measures to address them. In summary, skills intelligence gathering acts as a strategic compass, enabling professionals and organizations to navigate the ever-evolving landscape of cultural and creative industries, fostering adaptability, innovation, and sustainable growth.

This report presents the results of the work done by the CYANOTYPES Consortium within Task 2.1. Continuous Skills Intelligence Gathering and Mapping, led by the European Creative Business Network (ECBN) and developed by all partners in a collaborative effort.

The pillars of this Skills Intelligence Gathering and Mapping correspond to the main sections in this report and are as follows:

- Literature review: this includes an extensive review of academic literature, resulting in a public library related to skills and competences in the cultural and creative sectors, as well as in an analysis of the data in this database.
- Analysis of upskilling and reskilling activities: information was gathered via the CYANOTYPES survey.
- Analysis of skills demand from the industry: information was gathered via the mentioned joint survey, as well as via interviews and focus groups conducted with industry agents. In both cases, ESCO classification of a selection of occupational profiles provided the basis for the discussion.
- Identification of future skills needs: this was developed based on data gathered through workshops with experts in the CCII.

The reader may note same or similar issues – e.g. skills gaps, barriers to skills development, etc. – are approached here from different perspectives – skills provision, industry skills demand and future scenarios, among others. This is where the richness of this collaborative research effort lies. It must also be highlighted that further research iterations will be conducted during the course of the project and reported on annually in Deliverables D2.1.2, D2.1.3, and D2.1.4, to fill the gaps acknowledged here for the findings presented, and in alignment with the triple loop learning approach of the CYANOTYPES project. The final version of this report will be available at the end of the project (30.09.26).

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In addition, WP2 is preparing a synthesised **Playbook** which will be used by WP3 and will form the basis of a public-facing document that summarises the findings and contextualises them in the work of the project during the coming year.

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1. LITERATURE REVIEW

1.1. INTRODUCTION

In the context of **Cyanotypes WP2 Intelligence gathering**, we conducted a Literature Review. Our goal was to map the digital, green, entrepreneurial and other skills needs in the European Cultural and Creative Sector (CCI), in the post-pandemic world, as well as to map the initiatives to address those skills gaps.

We follow the European Union's definition of the Cultural and Creative Sector, as provided in article 2 of the legal basis of Creative Europe, hence "those sectors include, inter alia, architecture, archives, libraries and museums, artistic crafts, audiovisual (including film, television, video games and multimedia), tangible and intangible cultural heritage, music, literature, performing arts, books and publishing, radio, visual arts, festivals, and design (including fashion design),".

In this report we present the methodology undertaken to conduct the Literature Review, followed by the main results found in the academic literature. Finally, we present our final remarks (section 5). We also include Appendix A with the bibliographical references.

This report is an initial version and subsequent deliverables will update this on an ongoing basis to project partners and in D2.1.2, D2.1.3, and D2.1.4.

1.2. METHODOLOGY FOR THE LITERATURE REVIEW

A literature review is a desk-based research method by which the researcher critically describes and appraises what is already known about a topic using secondary sources" (Jensen, 2011 p. 74).

The research questions guiding our review were: 1) What are the digital, entrepreneurial, green and other skills needs and gaps in the European Cultural and Creative Sector (CCI), in the post-pandemic world?; 2) What are the up/reskilling initiatives undertaken in the European CCI?

Our goals were: 1) to map the digital, entrepreneurial and green skills needs - and forecasted (if any)- in the European CCI; and 2) map the skills initiatives to address skills needs and gaps, provided by different stakeholders, namely tertiary education stakeholder (HEIs and VeT), and companies or other creative organizations, with a particular emphasis on the sub-sectors of design, fashion, and audiovisual (film and videogames).

We adapted the following literature review stages: Search, Appraisal, Synthesis and Analysis, as defined by Booth al (2016) that we describe bellow. Our analysis of the academic literature review is based on the screening of titles and abstracts, and not on the full articles.

1.2.1 Search strategy

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Our search strategy for the academic literature review was based on the two main academic databases, namely Scopus (a multidisciplinary database) and Web of Science. The keywords used, with the help of boolean operators, were “skills OR competences AND “cultural and creative industries”. The search on the academic databases was conducted by two researchers from Lusófona University and EQ-Arts, between February and March 2023. The results for these keywords were 4370. Through title and abstract screening, and with the help of the software Rayyan (https://rayyan.ai/), these results were narrowed down to 308 items.

1.2.2 Selection criteria

We pre-defined our inclusion and exclusion criteria for when conducting the search, deriving it from our research questions. We included literature on/by European member-states, on the CCI (with a particular emphasis on fashion, design, film and games), from 2019 onwards. We excluded documents about non-European member states, we excluded literature that would focus on “boundary” CCI sub-sectors (such as tourism, advertisement, gastronomy, among others).

We included documents about skills needs or provision in tertiary education, either Higher Education Institutions or Vocational Training Institutions, and excluded primary and secondary education (e.g.: K-12 or below).

In terms of document types, we included journals and books in the academic literature review (and excluded conference papers, news articles, working papers and students’ dissertation or thesis).

Regarding language, we choose articles and books written in English only, although we included non-English written industry reports, provided by our partners, in their native languages, accompanied with a brief description of the importance of the document, written in English.

We included literature on skills at individual, organizational level and ecosystemic level but excluded literature on creative cities, creative states, and creative economy.

Procedure and rationale applied to study selection (in order to have the corpus)
Use of the digital tool Rayyan was central to the manner in which the researchers analysed the full reference list (4730 entries collected from WoS and Scopus). These references were extracted from Zotero to Rayyan and a detailed, iterative process was then employed to refine the corpus based on the inclusion and exclusion criteria that had been identified and agreed. In the initial stages of the analysis process, executed through Rayyan, the researchers operated independently as the software supports ‘blind’ review that can be compared collectively at a later stage.

The first step was therefore to **detect duplicates**, which the software Rayyan enabled the researchers to do automatically. After Rayyan the “detect duplicates” functionality was applied, each of the Rayyan references identified were reviewed manually by each research

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(independently[1]). After deleting duplicates, the reference list was **shortened to 3470 entries**, i.e., ,3740 potentially relevant articles were identified. The 3740 entries were reviewed manually and separately by each researcher (enabled by the Rayyan "blind on" functionality). Through the screening of titles and abstracts that are listed on the Rayyan section "Undecided", decisions were made about what items to "include" and "exclude", and when that decision was made, the items would move from the "Undecided" list to one of the three other lists "Included", "Excluded" or "Maybe". Rayyan also allows the naming/specifying of the exclusion criteria through a "reason (for exclude)" tag and naming/specifying the inclusion criteria through a "label". The "maybe" list can have tags with both "reasons to include" and "labels".

When each researcher, separately, finished distributing the 3,740 entries across the categories of "included", "excluded" and "maybe", the functionality "Blind on" was turned off, which allowed for the comparison of the selected entries by each reviewer. The two researchers had agreed upon 73 entries, and there was conflict about 209 entries (see Figure 1). Moreover, the list of "Maybe" is composed by articles that were tagged as Maybe by either both researchers or just by one of the researchers (even if one of the researchers made the decision of include or exclude the article).

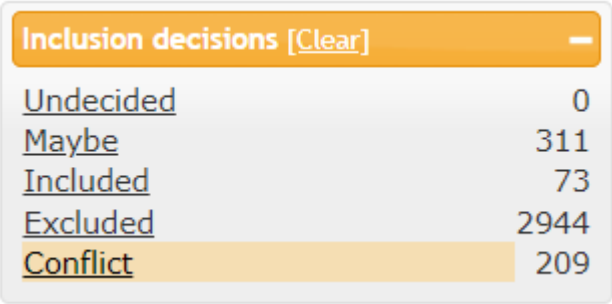

Figure 1. The comparison of the decisions taken by the two researchers working separately

The next step of the procedure (in order to get to a corpus) was to decide on the "Conflict" and on the "Maybe" list. In order to **decide about "Conflict",** each researcher goes through the list "Conflict", with the following rationale: researcher 1 goes through the "included" items by researcher 2 (i.e., researcher 1 goes through the items marked as green by the researcher 2). If researcher 1 decides to exclude what researcher 2 included, they must "add note", with an explanation of the exclusion criteria, and must label it "excluded after blind off". In order to **decide about "Maybe",** each researcher goes through the list of items classified as "Maybe", with the following rationale: the researcher who classified that item as "Maybe" - who will have their name within a box - has to check the other researcher's decisions (Include/exclude) and decide if they agree. In case they do not agree, they must "add note", with an explanation of

[1] As we had to go manually to check duplicates, we could get a first glimpse of the articles' content. While reviewing duplicates it is also possible to take notes of keywords to use as inclusion and exclusion criteria - e.g. the first impression was that there were a lot of articles on non-European countries, and on creativity writ large - not specifically creativity in the CCI - and on skills, generally speaking, which were used as "Reasons [to excluded]".

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the inclusion/exclusion criteria. If they decide to “exclude” it, the item should be tagged with the label “excluded after blind off” - unless the exclusion is due to obvious criterion that was previously missed by the researcher who tagged “maybe” - for instance, it was a conference paper, and the author marked as maybe, but it was clearly a mistake. After each researcher reviews each other’s decisions [cf Notes 1], they can always go back, through the tag reason “**Excluded after blind off**”.

The final list of “included” was exported from Rayyan in a RIS and CSV format, so it could be uploaded on Zotero, a reference management software, and the full-text articles were retrieved.

1.2.3 Data extraction

We predefined the following main categories to extract data from our selected corpus:

- first author's last name
- year of publication
- title
- Document type, if empirical: methods/participants
- CC Sector
- Job/occupation
- EU Country, and, if applicable, EU Country's Region
- Context where competences are being applied/discussed (HE, VE, education, policy-making)
- Competences (Digital, Entrepreneurial, Green, others)
- Upskilling/reskilling initiatives
- Main Findings
- References

We created a shared Excel file, containing all these categories, and extracted the data from the corpus.

1.2.4 Corpus

As a result of the screening of titles and abstracts, 677 peer-reviewed articles and book chapters that met the inclusion criteria were included. The Academic or Systematic Literature Review (SLR) finally included over 300 items. The total amount of selected items by the Academic Literature Review was categorized as follows: Document Type: Book or Book chapter (52); Industry Report (250); Year: 2019 (60); 2020 (76); 2021 (76); 2022 (70); 2023 (21); CCI: "All CCI"(18); Architecture (3); Arts and Crafts (11);; Audiovisual and Films (11); Books and Publishing (11); Circus(1); Dance (3); Design (29); Journalism (4); Music (21);

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Museums (3); Multisectoral (2); Performing arts (4); Tourism (1); To be defined (188); Visual Arts (1); Undefined (188); Competences: Digital (46); Green (0); Entrepreneurs (86); to be defined (171); Countries: To be defined (303).

We see that the entrepreneurial skills are the ones that weight more in our corpus, followed by digital, and fewer for green skills.

1.3. ACADEMIC LITERATURE REVIEW

In this section we analyse the data for each of the main skills, divided by the three contexts in which skills could be discussed: at education, industry or creative organisations, policy-making, or within its socio-cultural context.

1.3.1 Digital competences

The publications which main theme is the digital share in common a discussion of digital technologies, and their impact on th**e creative work itself** (e.g.: the nature of creative tasks and creative processes), the **creative workforce** (challenges of automation, of digital competences), and **the creative institutions** (education and industry) (Cicchiello et al., 2023a; Comunian, 2019a; Ferrara & Cerquetti, 2023a; Terzidis et al., 2022; Trezise et al., 2023).

Collaboration and Cooperation emerge as common themes, whether in the context of multidisciplinary teamwork, interactions between creative practitioners, or the collaboration between academia and industry (Comunian, 2019; Trezise et al., 2023).

The publication more theoretically oriented refer the need to adopt a **complexity** perspective to address these digital challenges in creative industries, emphasizing the need to understand different scales, and to adopt **interdisciplinary integration**, i.e., integration of knowledge from various disciplines (Altenburger et al., 2023a; Comunian, 2019b). Another theoretical framework is that of technological change (from **adaptation to radical innovation**) (Taormina & Baraldi, 2022).

Education

To face the challenges of digital age, the literature recognizes the need for integration of digital technologies in teaching, i.e., the **need to reframe education and training programs to equip students with digital competencies, and to improve students' awareness and critical thinking** (Cerquetti, 2023; Preeshl, 2019), which should be better achieved through multidisciplinarity (Bilton, 2020; Pereira Rodrigues, 2020). To understand if students are prepared to adopt digital technologies, one article proposes the assessment of the level of **technological readiness** of students as also part of their preparation for entrepreneurship, including skills in **digital marketing** (Harding et al., 2020). This is particularly relevant if we consider that **insufficient knowledge in digital marketing is highlighted as a challenge for women handicraft entrepreneu**rs (Wut et al., 2021).

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Digital pedagogies for creativity are needed across tertiary education. One article emphasizes the embodied liveness, playful interactivity, and generative curiosity in digital learning, and also provides practical strategies for taking risks with imagination and collaboration (Trezise et al., 2023). In another article, the role of **digital and self-reflection learning methodologies** in boosting resilience and belief in the future among **higher education students** is provided through arts-based active learning methodologies and assessment as forms of learning, as the results of the DICO (Digital Career Stories) project attest (Ferrara & Cerquetti, 2023b).

The other articles on digital competences in the context of education **are sector-specific**, namely, in the sector of **the performing arts, fashion, design and craft, heritage** are the ones represented in our corpus. In the sector of performing arts, and in the specific context of **Continuing Professional Development** (CPD), **social media skills** are proposed (Perez, 2021). In the sector of **fashion industry,** it is proposed that, due to technological innovations (e.g.: nanotechnology, bio-engineering, electronics enhanced fabrics and digital design processes, Additive Manufacture, among others), radical change is needed in the training of fashion designers in UK design schools, one that is **practice-based and practice-led** (Postlethwaite, 2022). In **design,** it is acknowledged the need for **integration of traditional and digital media in studio practices**, using the case of hand sketches in the design process, and developing a studio-based pedagogy (Altenburger et al., 2023). In **heritage** teaching, there is the need for the integration of emerging technologies such as augmented reality, 3D modelling, AI, QR coding, and virtual reality (Arteaga et al., 2021). In **game development education** there is a **need to develop the game design process** in the education program, emphasizing **creative thinking skills**, through the Game Design Document Tool (GDD Tool) prototype, to respond to the problem that games designed have a problem in terms of creativity, and there is still no specific method of training creative thinking (Tap et al., 2019, 2021).

Another important topic in education is the need to **provide teachers with digital skills**. One article presents a model of **professional training** course (entitled "Creativity and creative thinking") based on the concept of the creative economy, emphasizing digital skills, that forms a practitioner with professional, technical, digital and creative skills who is able to **transfer the experience to students** (Tytarenko et al., 2021).

Industry

The study of digital skills in the Creative Industries is provided by the work of Van Laar and colleagues (from 2019-2022), who **apply the 21st-Century Digital Skills framework to the Creative Industries**, in the Netherlands. They propose four Integrated Digital Skills for the CCI: 1) **technical skills** supported by the use of ICT, including digital information evaluation and problem-solving skills; 2) **information management**: digital skills related to information management, including information evaluation; 3) **communication and collaboration**: skills related to communication and collaboration supported by the use of ICT; 4) Creativity and Critical Thinking: Digital skills related to creativity and critical thinking, as outlined in the twenty-first-century digital skills framework; 5) Problem-Solving: Digital skills related to problem-

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solving (Van Laar et al., 2019; van Laar et al., 2020). Van Laar and colleagues point to the need to raise awareness and promote initiatives for skill development in the workplace, as well as the need for workers to acquire digital skills beyond mere technical use (van Laar et al., 2022).

Another important aspect for CCI is the shift to **digital financing and funding**, where exploration of innovative modalities is driven by technology, rather than a clear demarcation between public and private interests (Loots et al., 2022). According to the authors, this new funding paradigm is one that embraces **collaborative mechanisms, such as crowdfunding, incubator and accelerator finance, and digital fundraising technologies**.

Other publications on digital skills in the industries are focused specifically on **creative small and medium enterprises** (**SMEs).** One study advocates for the increasing use of ICT, social media engagement, and organizational agility in SMEs operating in the creative sector (Rozak et al., 2021). Another study advocates for the use of digital technologies for customer knowledge management in these creative SMEs (Castagna et al., 2020).

The importance of having a diverse expertise and investments in digital technologies, that enable adaptability, are one of the four factors that promote resilience in Creative Industries in times of crisis, alongside with highly internationalized entrepreneurial teams, export orientation, and diverse customer base (Protogerou et al., 2022).

Another cross-cutting theme is that of ethical considerations related to **the adoption of digital technologies**, such as AI, **in** creative **industries,** including issues of accountability, transparency, and socio-economic equality (Ferrara & Cerquetti, 2023b; Karim Schapals, 2020).

The publications that **are sector-specific** are focused on books and publishing, performing arts, and media and journalism. In the **books and printing sector**, there is a need for **digital transformation skills** to cope with the challenges brought by the digitization on the printing sector (Magadan-Diaz & Rivas-Garcia, 2021) (Magadan-Diaz & Rivas-Garcia, 2021). In the **performing arts**, it is acknowledged the need for digital resources management for actor engagement in the **digital media industry**, given that actor engagement influences business model elements, fostering the development of new offerings, resources, revenue models, etc (Kleer & Kunz, 2021). Technical and creative skills in Journalism are needed, and can be provided by Media labs, hence promoting journalism innovation (Nunes & Mills, 2021).

Policy-making

If a new digital funding paradigm in the CCI is emerging, that paradigm is also being impacted by policy-making. One article analyses the impact of cultural dimensions and **policies** (that are at the cross-roads of welfare state models and EU) **on crowdfunding in CCI**, more specifically, on the adoption of reward-based crowdfunding in cultural and creative industries (CCI) (Cicchiello et al., 2023b). The authors find a moderation effect of EU grants on the relationship between cultural dimensions and crowdfunding adoption (Cicchiello et al., 2023).

Analysis of European policies that shape HEI in Training Cultural and Creative Graduates is also provided (Cerquetti, 2023).

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1.3.2 Entrepreneurial competences

As discussed in the literature review article on arts entrepreneurship (Dobreva & Ivanov, 2020), a more complex proposal of entrepreneurial education by Ruth Bridgstock suggests that entrepreneurial education is not just about “new venture creation” and “being enterprising” (a US-centric approach), but also about the need for developing skills related to “**career self-management**”, related to employability (Dobreva & Ivanov, 2020, p. 31). As the authors explain, Bridgstock’s three-level conceptual proposal was empirically tested among music students in the Netherlands, by Schediwy, Loots and Bhansing (2018), who found positive attitudes of students (Dobreva & Ivanov, 2020, p. 31). Hence, new arts entrepreneurial programmes emerge, but, as the authors argue, there is still **a need for the assessment/evaluation of these programmes**, for truly boosting cultural entrepreneurship (Dobreva & Ivanov, 2020, p. 31)

Education

The literature is consensual in recognizing the need for **entrepreneurial education in the arts and creative** curriculum, in order to integrate the graduate students into the labour market (Abisuga & Muchie, 2021). Arts entrepreneurial education should integrate creative and business aspects in the academic programmes and training of artists and creatives, while emphasizing autonomy in decision-making, innovativeness, and proactiveness in career management – an approach that artists tend to prefer (Alexiou & Wiggins, 2022). In fact, other article highlights the need for **student-centred programmes,** that promote reflection on varied entrepreneurial objectives, when examining the motivations and business ideation processes of arts and creative entrepreneurs (Toscher et al., 2020).

This is particularly relevant to address the **business skills gaps** in artists and designers, due to the old dichotomy between market versus artistic value orientation (Alexiou & Wiggins, 2022), hence challenges arise from a perceived contradiction between sales and creative mindsets (Kaygan et al., 2023a).

Two entrepreneurial skills gaps identified in the Cultural and Creative Industries (CCI) education are **financial literacy** and **strategic thinking** (the ability to think critically and plan for the long-term success of cultural and creative initiatives), namely, understanding art market complexity, funding models, or marketing strategies (Jiménez & Urbano, 2022).

Opportunity recognition was found to be positively related to entrepreneurial career success (Chang & Chen, 2020). However, there are skills gap in **Opportunity Recognition or Identification**, i.e., identifying and capitalizing on opportunities for business growth, recognizing new markets for artistic products, and seizing opportunities for collaboration in the creative sector (Caré, 2019; Jiménez & Urbano, 2022; Josephi, 2019; Singh, 2022) Four key enablers facilitate the development of opportunity recognition competence (Tynan, 2023).

Vecco (2020) introduces the concept of 'artpreneurs,' emphasizing the trend of **increased appreciation of the arts in business and identifying lessons from arts entrepreneurs for traditional entrepreneurship**.

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With the **digital and green** transformation, and the subsequent need for digital and green entrepreneurial skills, this gap widens within **creative education** (Caré, 2019; Cerquetti, 2023; Jiménez & Urbano, 2022; Penaluna & Penaluna, 2019) – e.g.: there is a gap in digital innovation, i.e., the capacity to leverage digital tools, technologies, and strategies to innovate and enhance operations in the CCI (Cerquetti, 2023).

In our corpus, we also found articles describing and assessing **entrepreneurial programs and initiatives**, from courses to incubators, either European funded programs or the result of university-business exchanges. The 4ArtPreneur project aims to develop an entrepreneurship course for CCI schools (Jiménez & Urbano, 2022)**,** and the Made in Italy Tuscany Academy course contributes to nurturing the local entrepreneurial ecosystem (Lazzeretti & Capone, 2020). There is also the example of University Business Incubator (Bis) for tailored support services for entrepreneurs in technology-based and creative-industry ventures (Nicholls-Nixon & Maxheimer, 2022). This is particularly important, as there are challenges in establishing **creative spaces in education for creative entrepreneurs,** that are related not only to its material dimensions, but also to its mental and affective dimensions, shaping the way they are designed, used and understood (Chemi, 2021).

Other articles describing and assessing real world new pedagogies for entrepreneurial education in the CCI, include articles on **Work Integrated Learning** (WIL), and even a journal fully dedicated to the topic (although not specifically dedicated to work integrated learning in the cultural and creative sector, it also contains articles on the sector).

Industry

As for any other business, **financial literacy**, i.e., the understanding and managing of financial aspects in a business context, are skills needs in the CCI, especially in Small Creative Businesses and in Creative Ventures (Purnomo, 2019).

Adding to financial literacy, also **strategic management and planning** skills, i.e., developing long-term plans to achieve business goals and growth, are identified as a need for the success and sustainability of cultural and creative organizations, as studied for Estonian and Belgium CCI (Saleh & Ost, 2022; Sassi et al., 2020). However, the authors identified skills gaps in the CCI at the level of financial management, strategic planning, compliance with laws, analyses and reporting that negatively impact organisational performance in Estonian creative organisations.

Flexibility in entrepreneurial decision-making was found to be successful in creative industries' small and micro firms (Salder, 2022).

Creative Industries' **resilience during economic downturns** was found to be based on internationalization, creative expertise, managerial and marketing skills (Protogerou et al., 2022)

Policy-making

The **impact of cultural policies on "nascent entrepreneurship",** in terms of public budgets for culture, is a matter for study, and its highlighted the indirect impact on nascent cultural and

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creative firms and the mediation through public budgets for culture. (Vecco & Srakar, 2020).

Styhre and Remneland-Wikhamn (2020) apply findings from entrepreneurial success factor research to cultural entrepreneurs**, revealing the positive effects of prior experience, internationalization, legal form, and rural location on revenue.**

In transition processes (e.g.: from contract work to independent business ownership) **entrepreneurial interest** is found to be relevant (Setyadi, 2020)

Networking and collaboration, i.e., Building and maintaining relationships with other professionals to facilitate collaboration and co-creation, are understood as important in establishing effective entrepreneurial strategies, within entrepreneurial ecosystems, as in the case of Craft Entrepreneurship (Ratten, 2022a, 2022b; Ratten et al., 2022) .

The existence of (physical) spaces in entrepreneurial ecosystems that promote interactions between creatives, can foster innovation in the creative industries, as found for **co-working** and collaboration in Creative Spaces (Wijngaarden et al., 2020), and in **creative accelerators**, like The Street Theatre – in enhancing operations, fostering innovation, and creating networks among creatives – (de Klerk & Hodge, 2021).

1.3.3 Entrepreneurial competences at individual-level

Entrepreneurial self-efficacy, is important, as demonstrated in the fashion sector (Lang & Liu, 2023).

Resilience, **adaptability, flexibility,** i.e., being open to change and able to adjust quickly to new circumstances, the ability to **adapt** and recover from setbacks and challenges is also important in every creative entrepreneurship endeavour – as studied at financial level (Caré, 2019), or adapting to changes in the media industry landscape (Kolb, 2020).

One recent example is the way artists-entrepreneurs had to adapt to the identity crisis caused by the Covid-19 pandemic, seeking new forms of activity during crisis (Hanage et al., 2022; Szostak & Sulkowski, 2021). Demonstrating adaptability in *insecure working environments* are also skills needed in creative entrepreneurship, from negotiating self-entrepreneurial projects in project-based work, as in the case of theatre (Naclerio, 2023), or enacting individual ambidexterity to handle design and production tasks (Kaygan et al., 2023b).

Managing or dealing with **uncertainty and ambiguity**, i.e., navigating situations with unclear or multiple meanings in the cultural and creative sector, is a skill needed to succeed, from handling ambiguous project requirements in design, or adapting to evolving trends in the fashion industry, based on market demands (Caré, 2019; Kolb, 2020). To cope with uncertainty, skills in **risk management** are needed, i.e., the ability to evaluate and mitigate potential risks in business endeavours (Caré, 2019; Zoellner & Lee, 2020).

Creativity and innovation are two needed skillsets that we can group as "**creative entrepreneurship**" (Santos et al., 2021). C**reativity,** as the generation of new and valuable ideas, products, or processes. This is studied by Qonatirila et al. (2020) investigate the domain specificity of creativity in young **design entrepreneurs**, particularly in **decision-making during design critiques**, identifying a typology of objective types. Creativity applied to

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problem solving in the specific domain of CCI, is “Creative Problem-Solving, i.e., the skill to creatively address challenges and solve problems unique to the cultural and creative industries (Lang & Liu, 2023; Tynan, 2023)

The other more referred skill is **innovation,** i.e., the introduction of new ideas, solutions, methods, products or processes, and disrupting existing norms and systems (e.g.: Incorporating musical skills in non-music roles (Brook & Young, 2019; Toscher & Morris Bjørnø, 2019); designing solutions for fiscal and brand visibility challenges in museums (Cavalcanti Junqueira & Discua Cruz, 2019), implementing innovative marketing strategies in the creative sector and games development (Caré, 2019; Sotamaa, 2020) or introducing novel business models in the media industry.

One of the competences needed when pursuing one's own business endeavours and projects, is **career self-management** competences, either to set up a music business (Toscher & Morris Bjørnø, 2019), to develop a crowdfunding campaign (Cavalcanti Junqueira & Discua Cruz, 2019), or to build a career in visual arts (Petrides & Fernandes, 2020).

Because **social capital and networks** play a significant role in the successful careers of creative individuals (Preece & Telford, 2020), **Soft Skills for Sustainable Creative Economy**, such as Interpersonal and communication skills, as are needed for fostering sustainable practices in the creative economy (Azcárate & García, 2022)

At individual-level, passion is also an important characteristic of entrepreneurs, and “**passion-driven entrepreneurship**” i.e., a deep-seated commitment and enthusiasm for one's work or business, was studied for rock 'n' roll entrepreneurs (Schulte-Holthaus, 2019), and women handicraft entrepreneurs (Wut et al., 2021).

The enthusiasm for an artform is encapsulated in the form of "consumption-Driven Entrepreneurship”, i.e., transitioning from being a consumer in a field to becoming an entrepreneur, was studied for music (e.g.: Making the transition from indie music consumers to indie music entrepreneurs), in which the entrepreneurs adopt paradoxical logics and ethos of the indie music field (Daskalopoulou & Skandalis, 2019).

Entrepreneurial competences and sociocultural contexts

The uniqueness of the cultural and creative sector includes challenges like income fluctuations and difficulty accessing social protection (Cerquetti, 2023), which might also be a skill need for entrepreneurs (learning how to access the social protection, learning the labour laws).

Integrating social and/or environmental responsibility into the creative business model was found to be a driver of innovation, either at industry level (Pearse & Peterlin, 2019) or at individual level (entrepreneurs), taking as example the unique employment of multiskilled "entreployees" in aquariums, highlighting the performers' exceptional skills and their role in raising awareness about ecological issues (Davis & Strandvad, 2020).

Expertise in craft, which refers to the practical skills of production and the capacities of the maker, is predicated on aesthetic codes and classifications which are historically racialised, gendered and classed, hindering the careers of ethnically diverse women makers (Patel, 2022).

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Digital entrepreneurship competences
Digital technologies transform the ways in which cultural products are created, distributed, and consumed. Hence, there is a very strong digital dimension to entrepreneurship that needs to be promoted.

Digital entrepreneurship, i.e., entrepreneurial activities leveraging digital technologies for visibility, partnerships, and audience engagement, which included Digital marketing skills, tech-savviness, has been studied as a need for musicians (Psomadaki et al., 2022), and for the "emergent economies" (Toghraee et al., 2022)

Networks and collaboration through digital platforms are enhanced at individual-level, but also within an on entrepreneurial ecosystem, in which the virtual community and the collaborative behaviours among virtual entrepreneurial firms plays an important role (Chandna & Salimath, 2020)

Also, digital technologies can be used to promote the increase of audience participation in the production processes. The co-creation with audiences adds value, as studied for music (Saragih, 2019), and reframes creativity beyond individual and team-level, extending it to include audience as one more agent in the creative process (Cortini et al., 2019).

1.3.4 Green competences

The publications found for green, sustainable, or environmental skills are sector-specific, namely for design, fashion, textile and clothing, and the film and audiovisual sector.

Education
Landscape design education and design education publications show a concern with designing a green curriculum (e.g.: in landscape design education eco-friendly design is part of professional skills (Hsueh et al., 2022); and even to move beyond green and sustainable design, to holistic sustainability design (through Craft-Design Collaboration and a rhizomatic approach (Reubens, 2019).

Industry
The publications in the fashion, textile and clothing industry aim to assess the success of tools to upskill and reskill the workforce in these industries, such as Sustainable Design Cards decks or training programs. Regarding the former, the authors (Raebild & Hasling, 2019) propose a tool for activate sustainability competence in actors in the fashion industry, namely Sustainable Design Cards and its decks, that supports both entrance and intermediate level engagement with sustainability, in order to contribute the concern with how to develop a sustainable fashion industry. Regarding the latter, and also to respond to the need for sustainable design and manufacturing to have sustainable creative products, the **personnel involved in the textile and clothing industry needs to upskill**, through a training toolkit,

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containing e-learning courses in six European languages, mainly various sources (books, video) and activities (quizzes and forums), available on the Udemy platform. (Avadanei et al., 2020).

In the sector of audiovisual, film and television, the publication assesses the impact of two of the more important and oldest greening initiatives for the sector, namely the Green Production Guide and Albert (Blas, 2022).

1.4. CONCLUSIONS

The convergence of digitalization and entrepreneurial dynamics within cultural and creative industries creates a complex landscape. By providing a synthesis, this analysis attempts to capture key insights from the original discourse and incorporates additional dimensions that explore individual-level entrepreneurial competences and sociocultural contexts.

The discussion surrounding digital competences highlights the significant influence of digital technologies on creative endeavours, the creative workforce, and creative institutions. Collaboration, encompassing both interdisciplinary and industry-academia partnerships, arises as a prominent factor, highlighting the necessity for synergistic efforts in tackling digital challenges.

Within the domain of education, the advocacy for digital technology integration is accompanied by the stipulation for interdisciplinary approaches and digitalized teaching methodologies.

Entrepreneurial competences at the individual level take centre stage, highlighting attributes like self-belief, perseverance, versatility, and adaptability. The challenges arising from the Covid-19 pandemic emphasize the essential importance of these competences. The skills to handle uncertainty, ambiguity, and risk, alongside a strong emphasis on creativity and innovation, define a resilient framework for entrepreneurial accomplishment.

The recognition of the integration of social and environmental responsibility into the business model extends beyond being a driver of innovation at the industry level, as it is also regarded as an indispensable competence at the individual entrepreneurial level.

The industry's outlook on digital skills revolves around the transition towards digital financing and funding mechanisms, along with the sector-specific challenges and opportunities. The discourse is infused with ethical considerations, particularly in regard to the implementation of digital technologies such as AI. Resilience, adaptability, and diverse expertise have been recognized as key factors that foster the resilience of creative industries.

Policy-making assumes a pivotal role, closely linked to the emerging digital funding paradigm. The regulatory dimensions crucial for preparing individuals for the evolving landscape are illustrated by the impact of European policies on Higher Education Institutions, as well as the influence of cultural dimensions and policies on crowdfunding adoption.

In summary, to navigate the digital and entrepreneurial landscape in cultural and creative industries holistic approaches are needed. The interdependency of digital technologies, educational frameworks, entrepreneurial competences, and sociocultural contexts calls for collaborative initiatives. A nuanced approach, taking into consideration both macro and micro

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dimensions, lays the groundwork for interventions that foster resilience, innovation, and sustainable practices in this dynamic and evolving domain.

1.5. REFERENCES

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2. SKILLS PROVISION - RESEARCH OF UPSKILLING AND RESKILLING ACTIVITIES

2.1. RATIONALE

In the contemporary era characterized by the dynamic evolution of our global landscape, where rapid technological advancements and economic shifts continually redefine societal structures and reshape industries, the imperative of reskilling and upskilling activities assumes paramount significance. Within this transformative milieu, the Cultural & Creative Industries (CCI) emerge as pivotal entities at the nexus of innovation, creativity, and change. The emphasis on reskilling and upskilling within the CCI sector aligns seamlessly with the overarching objective of fostering growth, stimulating innovation, and enhancing competitiveness on a European scale.

Acknowledging the inherent challenges and needs intrinsic to this dynamic environment, the CYANOTYPES initiative presents itself as a proactive response to the imperative for a comprehensive understanding of the present state of skills within the CCI sector and anticipates the landscape of future skills. Navigating the multifaceted challenges inherent in the CCI ecosystem requires a strategic approach that delves into the intricacies of reskilling and upskilling activities. The initiative transcends mere acknowledgment of transformative forces and adopts a forward-thinking perspective characterized by rigorous research, measurement, and mapping of these activities. These endeavours meticulously differentiate between the intensity and quality of reskilling and upskilling activities at various geographical levels – local, regional, and national. This nuanced approach seeks to provide a profound understanding of the diverse needs and challenges faced by the CCI sector, offering a strategic roadmap for interventions aligned with the distinctive characteristics of different geographical contexts.

In a nutshell, through an examination of existing reskilling and upskilling initiatives, CYANOTYPES endeavours to illuminate prevailing skill provisions, discern existing gaps, and pave the way for strategic interventions of both short-term and long-term nature. This formal tone underscores the commitment to a thorough and analytical approach in addressing the evolving skill landscape within the Cultural & Creative Industries.

2.2. OBJECTIVES AND SCOPE

This section serves as a blueprint for the comprehensive mapping methodology of CYANOTYPES project, aiming to delineate a clear and definitive portrait of the current European formative offerings in life-long learning education and training. The CYANOTYPES project extends beyond conventional boundaries by encompassing Higher Education Institutions (HEIs), Vocational Education and Training (VET) in all formal, informal and non-formal learning activities. It takes a holistic approach, mapping not only the existing learning programs offered by Cultural & Creative Industries (CCI) but also delving into the identification

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of good practices and innovations within life-long learning educational programs. Therefore, this rigorous analysis can provide a foundation for informed recommendations in subsequent stages of development, thus ensuring a robust and effective strategy for advancing life-long learning within the European CCI landscape.

2.3. METHODOLOGY

The research methodology employed by CYANOTYPES is designed with the overarching objective of mapping existing lifelong learning programs, thereby yielding valuable insights into gaps, deficiencies, best practices, and potentialities within these programs. The research is meticulously structured to conduct an extensive exploration and data gathering across Europe, forming the basis for a comprehensive comparative-qualitative analysis of European lifelong education. To achieve this, a mixed method approach is adopted, combining an exhaustive literature review, an online survey platform, and piloting activities that involve in-person interviews with a focus group comprising professionals from the design, fashion, video games, and audio-visual sectors.

This methodological synthesis ensures a judicious balance between cost-effectiveness and time efficiency, facilitating the acquisition of valid, objective, and comparable data. This data, in turn, enables a panoramic portrayal of European-level phenomena and furnishes qualitative information critical for understanding the present efficacy of learning programs in generating contemporary and accessible competencies aligned with the demands of the current and future labour market.

Within the purview of this report, the analysis zeroes in on the data gleaned from the **CYANOTYPES | Survey on Skills Needs and Demands**, executed through the Survey Monkey platform. The survey unfolds in two phases encompassing general mapping and a subsequent in-depth analysis of the collected data (see Appendixes B and C). The ensuing overview encapsulates the nuanced findings derived from this rigorous research endeavour.

Phase 1	**General Mapping**	
1.1	Design the survey	Completed
1.2	Design the consent form	Completed
1.3	Design the repository of data	Completed
1.4	Design the survey on Monkey survey	Completed
1.5	Design an email	Completed
1.6	Define a list of partners and network for sharing the survey	Completed
1.7	Define an engagement strategy	Completed
1.8	Define the sample	Completed

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1.9	Sending the survey	Completed
Phase 2	**Analysis of data**	
2.1	Analysis of data: best practices, bias and ranking	Completed
2.2	Visualization of data	Completed
2.3	Design of the Final Report	Completed
Phase 3	**Further Iterations**	
3.1	Rescoping the survey for continuous mapping	Completed
3.2	Relaunching the survey	01/02/2023
3.3	Period of data analysis of the feedback loop of the overall methodology	06/02/2023
3.4	Iterative reporting D2.1.2, D.2.1.3 and D2.1.4	15/09/2024, 15/09/2025, 30/08/2026

This report undertakes a comprehensive analysis of the entire survey, delving into two distinct segments: "Your thoughts on skills provision in general" and "Specific questions for educational providers".

Your thoughts on skills provision in general: This section caters to educational providers, encompassing organizations delivering educational programs and training at various levels, including tertiary levels (higher education), vocational education (VET) and other forms of informal learning.

Specific questions for educational providers: This section is tailored for educational providers, referring to organizations offering educational programs and training across tertiary levels (Higher Education), vocational education (VET) and other informal training providers. Focusing specifically on the learning program, participants are encouraged to concentrate on a singular program within their educational portfolio. It is important to note that a learning program is not synonymous with an individual course; rather, it denotes a structured educational framework with a defined learning objective and target audience. To facilitate comprehensive responses, participants are encouraged to replicate the provided template for each distinct learning program within their portfolio.

As of September 28th, 2023, a total of 177 responses were recorded, and a modest increment led to a cumulative count of 190 responses by November 14th, 2023. However, for alignment with concurrent reports published during the same timeframe, the data incorporated into this report is updated until September 28th, 2023, reflecting the 177 responses. The new database will also be integrated in the next phase of the project when the survey will be revised and relaunched.

Additionally, it is noteworthy that the questionnaire within the "Specific questions for educational providers" segment closely mirrors the **KIC Mapping AP2** survey. The KIC Mapping AP2 survey is a parallel project that maps existing lifelong learning programs offered by both the EIT Culture and Creativity Partners and European Cultural and Creative Industries

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(CCI) more broadly. Currently, there are a total of 141 responses collected from KIC Mapping AP2 survey. Therefore, to enhance the representativeness of the data, the analysis for this section draws upon information extracted from both surveys: **CYANOTYPES | Survey on Skills Needs and Demands** and **KIC Mapping AP2**.

2.4. THE MAIN FINDINGS

2.4.1 Learning Program Characteristics

This section of the report provides a comprehensive overview of the prevailing characteristics inherent in current learning programs. The analysis encompasses a detailed examination of key elements, including the area and category of study of learning programs, credentials, types of participation, educational approach, and the duration of learning programs. Moreover, the assessment extends to practical experiences, incorporating dimensions such as internships, apprenticeships, and job training. Other factors will also be analysed such as seeing if the learning program is designed or developed through a European Program, the inclusion of both academic and non-academic partners, etc. The report systematically explores correlations among these critical factors, delving into the intricate interplay that shapes the contemporary educational landscape within the surveyed institutions. This comprehensive analysis aims to offer nuanced insights into the multifaceted nature of current learning programs, contributing to a holistic understanding of the educational frameworks in place.

In exploring the educational landscape within the realm of Creative and Cultural Industries (CCI), a pivotal starting point is the comprehensive analysis of the "Area of Study of the Learning Programmes" offered by educational providers. This analysis constitutes a foundational exploration into the specialized domains and curriculum focal points that shape the educational experiences within CCI. By examining the diverse areas of study within learning programs, the strategic emphasis placed on fostering expertise and cultivating skills in specific disciplines are expected to be discerned. More details are illustrated in Figure 2 as below:

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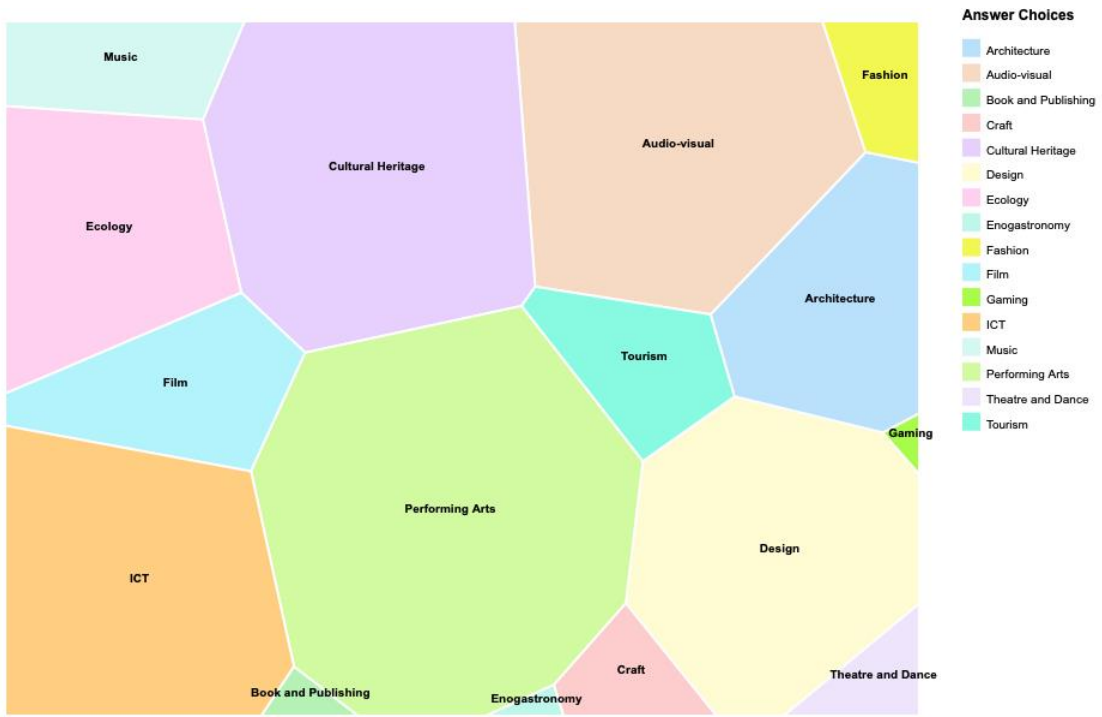

Figure 2. Area of Study of the Learning Programmes

The term "area of study" refers to a curriculum category that organizes course titles, providing a structured framework for concentrated and comprehensive learning. The collected data reveals a diverse array of program offerings, categorizable into distinct clusters based on their shared characteristics and correlations.

A prominent category encompasses domains related to arts and cultural heritage, including Performing Arts, Cultural Heritage, Design, Film, Audio-visual, and Theatre and Dance. These areas collectively constitute a substantial portion of the responses, representing approximately 65% of the surveyed individuals. Notably, Performing Arts emerges as the most prominently featured area, indicating a significant emphasis on arts and culture-related education within the surveyed organizations.

Survey participants also indicate the presence of programs in technology-related domains, such as ICT (Information and Communication Technology) and Architecture. While representing a smaller proportion of responses (approximately 18%), these areas underscore the continued relevance of technology and architecture in the contemporary educational landscape.

Other areas of study, including Ecology, Music, Tourism, Fashion, Craft, Enogastronomy, Book and Publishing, and Gaming, exhibit comparatively lower representation among survey participants, with some areas receiving no responses. Collectively, these domains make up a smaller fraction of the data, accounting for 17% of total responses.

The survey findings highlight a distinct concentration of educational offerings in the domains of arts and cultural heritage, reflecting a substantial commitment to fostering creativity and preserving cultural heritage within the surveyed institutions. The inclusion of technology and

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architecture programs underscores a dedication to engaging with contemporary technological advancements and addressing architectural challenges. While certain areas of study receive comparatively less emphasis, it is crucial to recognize their valuable contributions in enhancing the overall diversity of educational opportunities provided by these organizations.

The exploration of the educational terrain within the realm of CCI is continued, the analytical gaze now shifts to the intricate realm of the "Category of the Learning Programmes". This phase of inquiry marks a transition from the detailed inspection of specific areas of study to a broader examination of the systematic classifications and organizational frameworks defining these educational initiatives. The detailed intensity of the category of learning programmes are shown in Figure 3 as below:

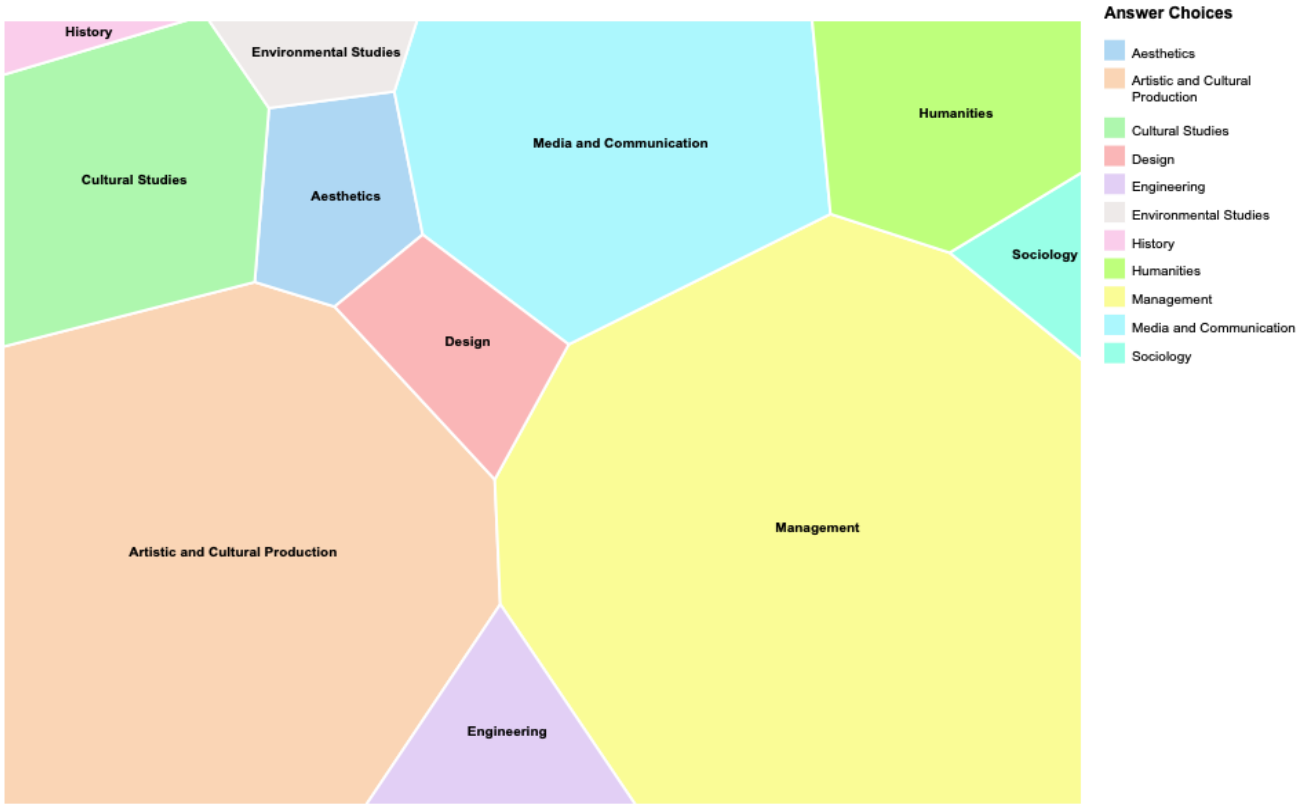

Figure 3. Category of the Learning Programmes

In the context of this study, the term "Category" assumes a critical role as a methodological lens employed to systematically scrutinize distinct educational domains. Specifically, the category of learning programs serves as a foundational framework for the meticulous classification and analysis of educational offerings, affording a nuanced exploration of methodologies, pedagogical approaches, and curricular frameworks intrinsic to each domain.

The educational landscape under examination reveals a multifaceted spectrum of emphases. Foremost among them is the category of Management, representing approximately 34% of total responses. This substantial prevalence underscores a pronounced institutional commitment to cultivating leadership capacities and organizational acumen—an imperative recognition of these competencies as pivotal in navigating the dynamic and competitive professional milieu.

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Similarly significant is the category of Artistic and Cultural Production, capturing around 26% of responses. This prominence signifies a dedicated effort within the surveyed institutions to nurture artistic and cultural talents. The emphasis on creativity and cultural preservation within this category underscores a deliberate educational focus on these foundational aspects.

In a closely related domain, Media and Communication command notable attention, constituting approximately 13% of responses. This distinctive emphasis reflects an institutional commitment to equipping students with the requisite skills for adeptly navigating the information-intensive contemporary landscape. The acknowledgment of the evolving role of media and communication underscores the tailored educational responses to societal shifts.

Additionally, specialized categories such as Cultural Studies and Humanities contribute to the overall diversity of educational opportunities, tailoring offerings to specific interests and career aspirations. While receiving fewer mentions, disciplines like Sociology, History, and Environmental Studies retain significant academic value, offering nuanced perspectives on societal dynamics, historical contexts, and environmental concerns.

This detailed data analysis illuminates the varied landscape of learning program categories within the surveyed institutions. The deliberate focus on leadership development, fostering creativity, cultural awareness, and addressing the evolving landscape of media and communication reflects a strategic commitment to providing a comprehensive and diverse educational experience aligned with contemporary and future demands.

The interrelationship between the area and category of learning programs, while appearing to be inherently connected, necessitates a closer examination to ascertain the nature of their correlation. This inquiry reveals affirmative findings. The analysis of the correlation between the area of study within a learning program and its corresponding category yields valuable insights into the educational framework of the surveyed institutions. This examination elucidates how specific fields of study are systematically classified and organized within the broader context of educational programs. Figure 4 visually represents the diverse correlations between the area of study and the category of learning programs.

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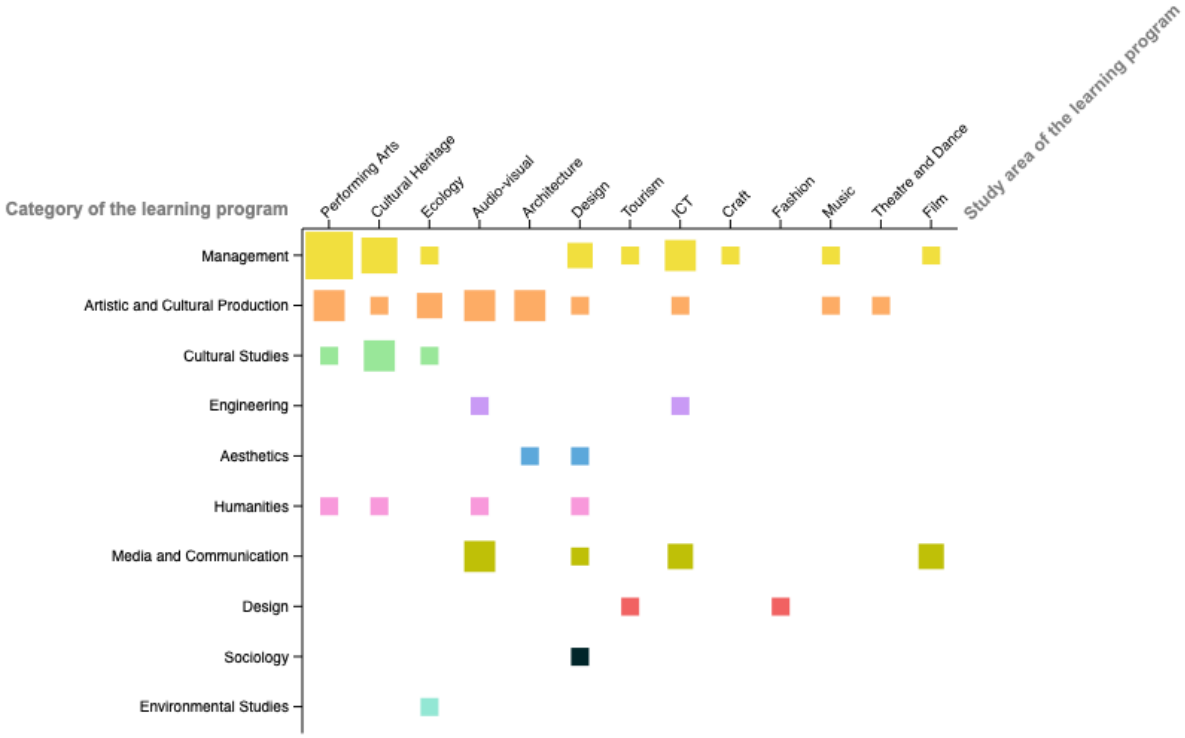

Figure 4. Correlation between Area of Study and Category of Learning Programs

Notably, within the domain of learning programs in Management, a discernible alignment with the study area of Performing Arts is evident. This alignment suggests a deliberate strategy to equip students in the performing arts field with not only artistic skills but also managerial competencies essential for the multifaceted demands of the performing arts industry. Furthermore, Cultural Heritage, ICT, and Design also manifest as prevalent areas of study within the category of Management.

Similarly, the Artistic and Cultural Production category unveils a robust connection with three distinct study areas: Performing Arts, Audio-visual, and Architecture, each exhibiting three correlations. These interconnections underscore the inherently interdisciplinary nature of artistic and cultural production, serving as a bridge across multiple study areas to nurture creative talents and preserve cultural heritage.

In addition, the domain of Media and Communication showcases its dynamic and integrative nature by establishing correlations with four distinct learning program categories. These multifaceted associations underscore the interdisciplinary character of Media and Communication, exemplifying its capacity to seamlessly integrate with and enhance different study areas. This reflects the evolving dynamics of communication in the digital age, where versatility and adaptability are paramount.

Conversely, for other learning program categories, the correlations with areas of study are more nuanced. For instance, in the case of learning programs focused on Cultural Studies, the emphasis is more likely directed towards Cultural Heritage, Performing Arts, and Ecology.

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The observed correlations between areas of study and learning program categories underscore a multidisciplinary approach to education within the surveyed institutions. This emphasizes a commitment to providing students with a holistic and diversified learning experience tailored to their specific academic interests and career aspirations.

Furthermore, in reference to the credentials and types of participation delineated in Figures 5 and 6, an evident trend emerges, highlighting the prevalence of certificates as the most frequently obtained credential. Certificates, comprising 38.7% of the total, serve as tangible indicators of individuals having successfully concluded a specified course or program of study, thereby substantiating their proficiency and competence in a particular subject area. Following closely, Badge and Degree are also noteworthy, constituting 16.1% and 14.5% respectively of the observed data. The License credential is notably less common, reflecting the emphasis on practical skills, creativity and innovation in the CCI sector. Given the dynamic and hands-on nature, the traditional and academically-oriented aspects of a License credential do not seamlessly align with the characteristics of many roles within the CCI sector. The diminished prevalence of the License credential within the CCI sector can be attributed to a strategic alignment of educational pathways with the distinctive demands of this industry, highlighting the importance of practical, creative, and innovative dimensions in professional proficiency.

The prevailing trend in the modality of participation within learning programs in the CCI sector reveals a strategic emphasis on physical engagement, constituting 45.2% of responses. This underscores the recognition of this sector of the value derived from in-person interactions, hands-on experiences and collaborative endeavours inherent to many roles. The closely following hybrid participation, at 38.7%, suggests a receptivity to a blended approach that combines in-person and remote elements, allowing for flexibility without compromising the benefits of face-to-face interactions. Conversely, remote participation, accounting for 16.1%, is the least prevalent, indicative of the preference of this sector for immersive and interactive learning experiences that align with its dynamic and collaborative nature. This observed trend reflects a nuanced approach, acknowledging the importance of physical engagement while remaining open to the advantages offered by hybrid models for adaptability in learning programs within the CCI sector.

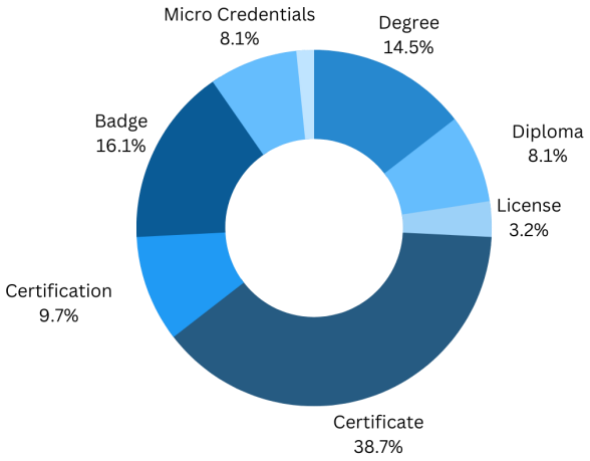

Figure 5. Credentials

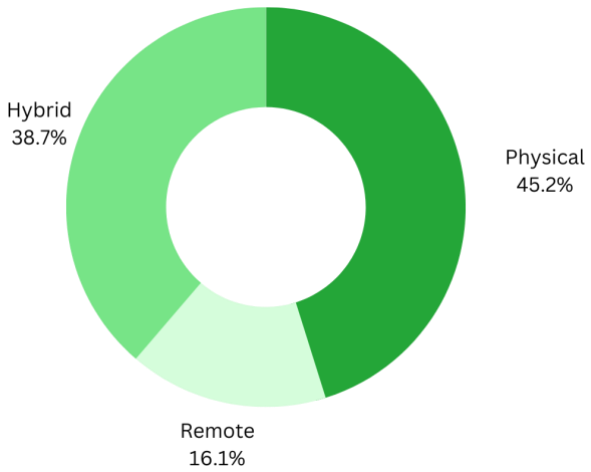

Figure 6. Type of Participation

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Nonetheless, a pertinent inquiry arises concerning the potential correlation between the type of credential and the mode of participation. This line of investigation is deemed crucial due to its potential to yield insights into the interplay between chosen credentials of learners and their corresponding modes of engagement within learning programs. Understanding this relationship is pivotal in discerning patterns that may influence the efficacy of specific credentialing approaches in diverse participation contexts. Figure 7, presented below, provides a comprehensive visual representation of the pertinent data, contributing to a more nuanced comprehension of the intricate dynamics between credential types and modes of participation.

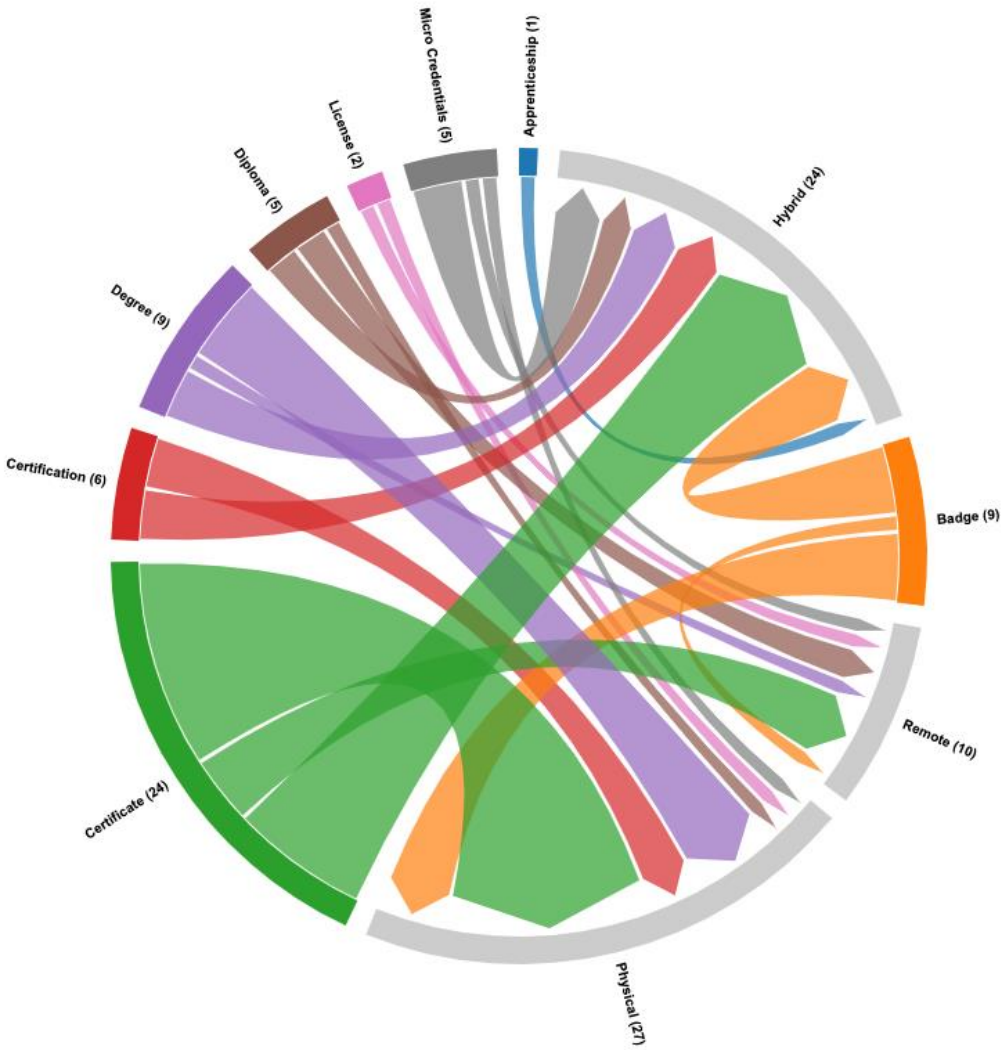

Figure 7. Correlation between Credentials and Type of Participation

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Concerning credentials such as certificates, certifications, degrees and badges, a noteworthy trend emerges wherein physical and hybrid participations assume prominence as the prevailing choices. This observed pattern implies a clear alignment between conventional credentials and engagement modalities characterized by a substantial in-person or blended learning component. In contrast, diploma credentials exhibit a distinct preference for both remote and hybrid participations, suggesting a more adaptable approach to learning modalities associated specifically with this credential type. In a converse manner, micro-credentials exhibit a predilection for hybrid participation, highlighting the adaptability and integrative nature intrinsic to these specialized certifications. This nuanced association between credential types and participation modalities within the realm of learning programs in the CCI sector underscores the diverse educational landscape inherent to the sector. The prevalence of physical and hybrid participations with traditional credentials may mirror the emphasis on experiential learning and collaborative engagements. Simultaneously, the flexibility observed in remote and hybrid approaches for diplomas and micro-credentials could be attributed to an acknowledgment of the varied needs and preferences of learners in this dynamic and innovative industry.

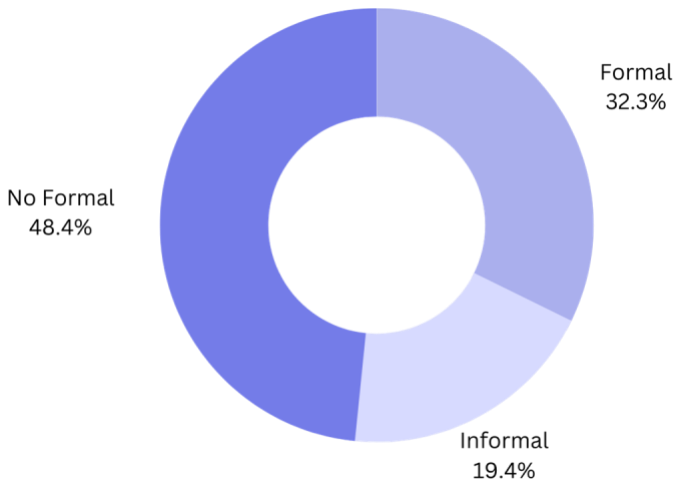

Figure 8. Educational approach

Moreover, the prevailing trend in educational approaches within learning programs in the CCI sector is characterized by a distinct preference for no formal learning, representing 48.4% of responses as delineated in Figure 8. This particular educational approach signifies a deliberate choice made by learners to master specific activities, skills or areas of knowledge outside traditional formal settings but within a structured organizational framework. This intentional effort underscores the commitment to purpose-driven and specialized learning experiences, aligning with the dynamic nature of creative endeavours. To understand better what are the differences among these types of approach, the definitions are extracted from AEGEE Europe (AEGEE Europe, 2014) as follow:

1. *Formal education:* the hierarchically structured, chronologically graded ‘education system’, running from primary school through the university and including, in addition to general academic studies, a variety of specialized programmes and institutions for full-time technical and professional training.

2. *Informal education:* the truly lifelong process whereby every individual acquires attitudes, values, skills and knowledge from educational influences and resources in an informal education environment – from family and neighbours, from work and play, from the marketplace, the library and the mass media.

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3. *Non-formal education:* any organized educational activity outside the established formal system – whether operating separately or as an important feature of some broader activity – that is intended to serve identifiable learning clienteles and learning objectives.

The formal educational approach secures the second position with 32.3%, reflecting a notable but secondary preference for structured, classroom-based learning within the CCI sector. This indicates a balanced recognition of traditional educational methods alongside the intentional, purpose-driven learning ethos prevalent in the sector. Conversely, the informal educational approach ranks as the least common at 19.4%, suggesting a lower prevalence of casual or unstructured learning within the sector, further emphasizing the intentional and purposeful orientation characterizing educational approaches in the CCI domain.

The temporal landscape of learning programs within the CCI sector exhibits a notable spectrum, spanning from durations less than 1 month to those extending beyond 2 years, as delineated in Figure 9. The pre-eminence of programs lasting less than 1 month indicates a prevailing preference for succinct, targeted learning experiences, a proclivity that aligns with the fast-paced and evolving nature of this industry. Following closely are programs ranging from 1 to 6 months, suggesting a demand for moderately intensive and focused educational offerings. This trend correlates with the earlier analysis of credentials, in which certificate and badge are the most popular types of credential. Programs that require learners to be committed with their studying for more than 2 years secure the third position. Logically they provide credentials of Degree which also ranks as the third place in the most common credentials. The relative scarcity of diploma credentials within the array of provided credentials contributes to the discernible trend wherein courses with a duration ranging from 1 to 2 years emerge as less favoured. For enhanced visual insight into the correlation between credentials and the duration of learning programs discussed earlier, kindly consult Figure 10 provided below. This visual representation serves to augment the comprehensive understanding of the nuanced relationship between the types of credentials offered and the varying durations of learning programs within the context of the CCI sector.

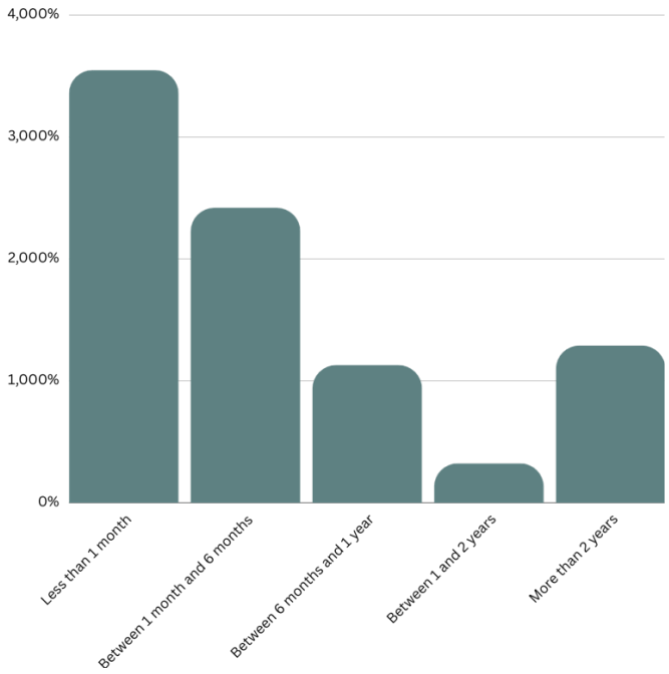

Figure 9. Duration of Learning Programmes

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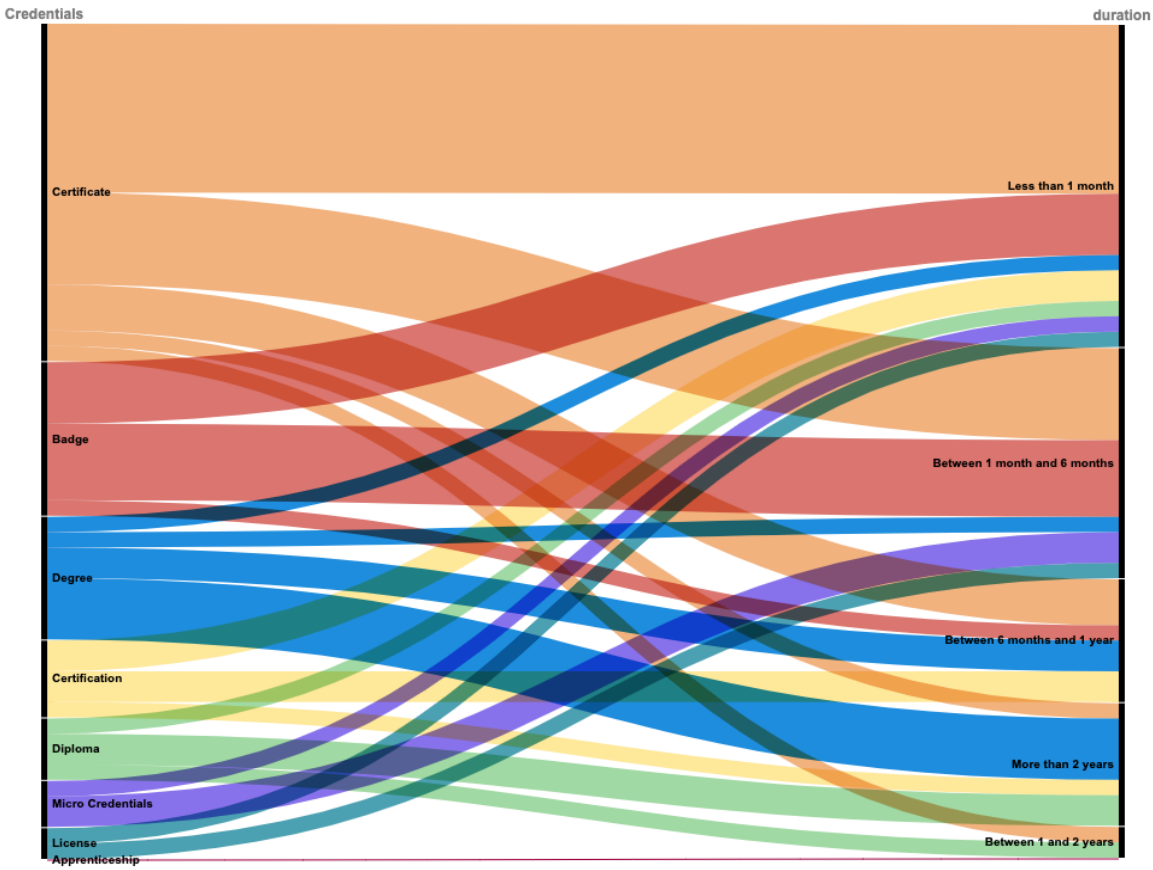

Figure 10. Correlation between Credentials and Duration of Learning Programmes

In the examination of whether contemporary learning programs integrate hands-on experiences such as internships, apprenticeships or on-the-job training, a prevailing trend emerges wherein the majority of these programs do not offer such experiential components, as illustrated in Figure 11. The limited incorporation of practical experiences could be attributed to the observed shorter durations of courses, as detailed in previous analysis. Shorter course durations may present logistical challenges in accommodating extensive hands-on experiences within the curricular framework. It is plausible that the brevity of these programs necessitates a more concentrated focus on theoretical and foundational aspects, leaving limited room for extended practical engagements. However, the significance of hands-on experiences in fostering skill acquisition and real-world applicability cannot be understated. While this trend underscores the prevailing landscape, future considerations for program enhancements might involve exploring innovative methods to integrate practical experiences, even within shorter-duration courses, ensuring a well-rounded educational approach that addresses the industry's evolving needs and expectations.

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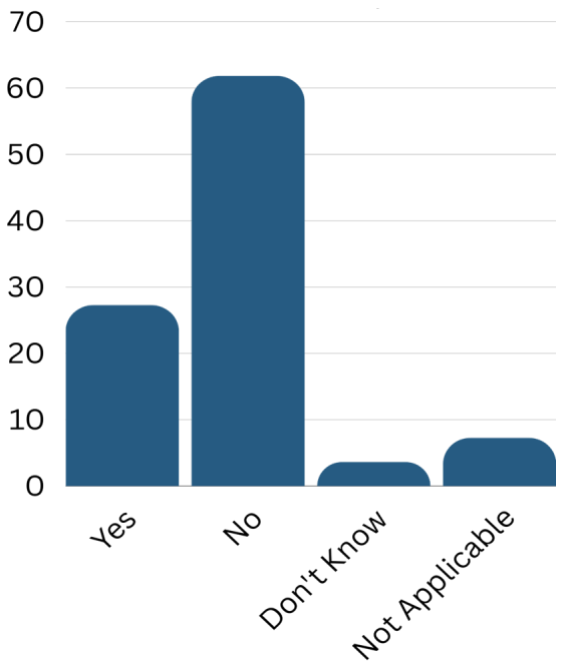

Figure 11. Internship/Apprenticeship/Job Training Experience

Transitioning from considerations of participation, duration, credentials, and approach, the subsequent cluster of characteristics examined in this report centres on the quality of learning programs. Initially, the scrutiny was directed towards assessing the alignment of these programs with prominent European qualitative frameworks in education. Specifically, three frameworks were adopted for this research – EQAVET, EQF, and EntreComp – selected for their pertinence to CCI sector and the research context involving the European Institute of Innovation and Technology (EIT) and the EIT label.

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1. *EQAVET*, grounded in a quality assurance and improvement cycle encompassing planning, implementation, evaluation/assessment, and review/revision, incorporates descriptors and indicators applicable to quality management at both Vocational Education and Training (VET) system and VET provider levels. It proves versatile for VET providers and systems, supporting the quality assurance of diverse learning environments, including school-based provision, work-based learning, apprenticeships, and formal, informal, and non-formal provision across various learning contexts, such as digital, face-to-face, and blended modalities, and applicable to both public and private sector VET providers, as well as VET awards and qualifications at all levels of the European Qualifications Framework (European Commission, n.d.).

2. *The EQF*, an 8-level, learning outcomes-based framework, serves as a translation tool for all types of qualifications, enhancing transparency, comparability, and portability across diverse national qualifications frameworks. This framework facilitates the comparison of qualifications across different countries and institutions, contributing to the harmonization of qualifications (European Union, n.d.).

3. *EntreComp*, on the other hand, stands as a free and flexible reference framework adaptable to support the development and understanding of entrepreneurial competence in any setting, further emphasizing its relevance within the entrepreneurial landscape (European Commission, n.d.).

Figure 12 elucidates a discernible scenario: within the scope of this research, learning programs exhibit a notable deficiency in aligning their contents and services with established frameworks. These frameworks, conversely, remain largely unutilized, resulting in the infrequent integration of their qualitative schemes into educational content. This lack of alignment introduces complexities in evaluating and comparing the competences generated by these programs. Despite the potential for these frameworks to provide a standardized basis for comparison, their practical application encounters challenges. Their immediate applicability is hindered by fixed structures that fall short of encompassing the multifaceted aspects underpinning these learning programs. Furthermore, frameworks frequently manifest a high degree of specialization, necessitating specific competences and processes for internal application within organizations and in relation to the programs.

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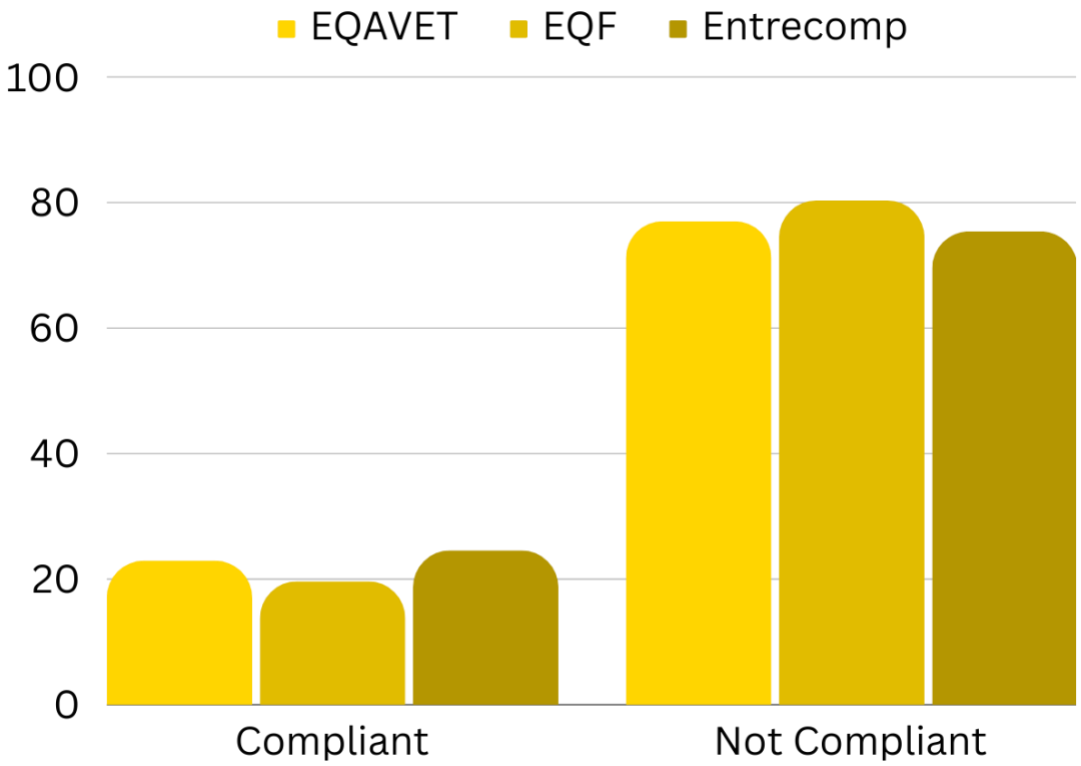

Figure 12. The compliance of Learning Programmes with EQAVET, EQF and EntreComp

Furthermore, inquiries regarding the origins of learning programs within the CCI reveal a noteworthy trend, with over 50% of respondents indicating that their learning programs are not outputs following a European Project, as referred in Figure 13. Conversely, more than 40% affirm that their learning programs have indeed been designed or developed through a European Program, exemplified by initiatives such as Erasmus+ or Horizon Europe. While the proportion of respondents indicating "No" still surpasses those answering "Yes," the substantial percentage of affirmative responses underscores a considerable engagement with European programs in shaping learning initiatives within the CCI sector. This trend suggests a notable recognition and utilization of European frameworks for the development and enhancement of educational offerings in the realm of cultural and creative pursuits. The acknowledgement of programs like Erasmus+ and Horizon Europe as contributors to the genesis of learning programs reflects the commitment to leveraging international collaboration and resources to enrich educational experiences and align them with evolving European standards and priorities.

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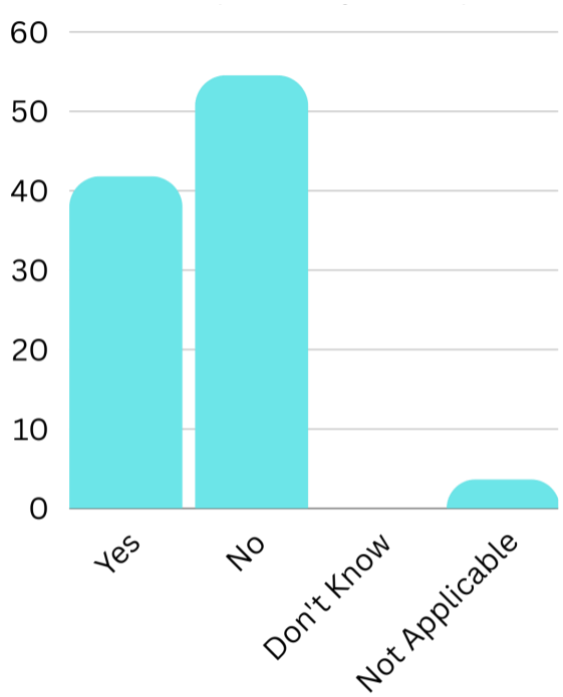

Figure 13. The Development of Learning Programmes through a European Project

Finally, in the examination of collaborative activities involving external partners, encompassing Higher Education Institutions (HEI), Vocational Education and Training (VET) and private organizations, distinctive trends are evident, as depicted in Figure 14. Regarding partnerships with HEIs, approximately 60% of respondents reported a lack of engagement, while 40% affirmed collaboration. This stands in stark contrast to partnerships with VET and private institutions, where over 75% of respondents indicated involvement, while fewer than 25% reported no such collaboration. This disparity underscores a pronounced divergence in engagement levels across academic and non-academic partnerships within the CCI sector.

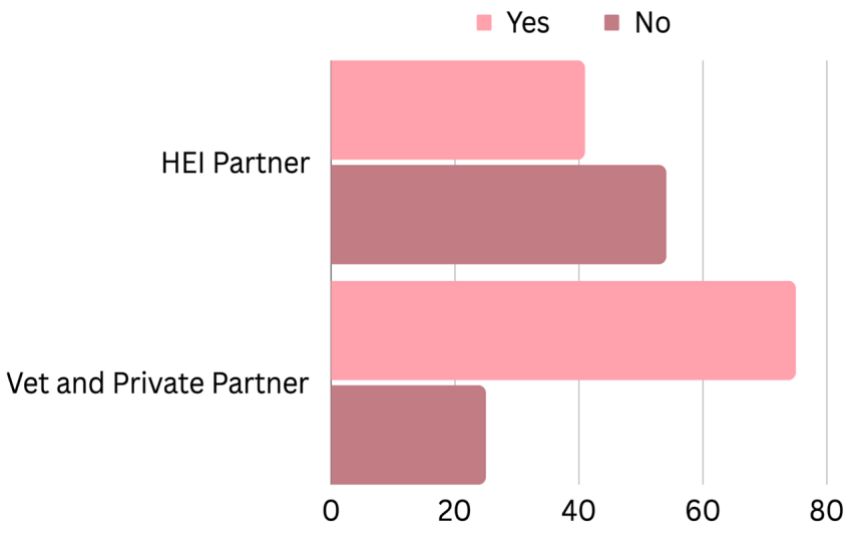

Figure 14. Partnership with HEI, VET and Private Partners

The prevalence of collaborations with VET and private entities suggests a strategic emphasis on interdisciplinary connections and industry integration, aligning learning programs with real-world practices and fostering comprehensive skill development.

Conversely, the comparatively lower

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engagement with HEIs may reflect a distinct focus on non-academic alliances, emphasizing the sector's responsiveness to the diverse needs and dynamics inherent to the CCI landscape.

Within the collaborative framework between learning program providers and both academic and non-academic entities, there exists a nuanced approach. While engagements with Higher Education Institutions (HEIs) predominantly centre on the development of curricula and teaching activities, the partnerships with Vocational Education and Training (VET) and private organizations extend beyond the academic sphere, as referred in Figure 15.

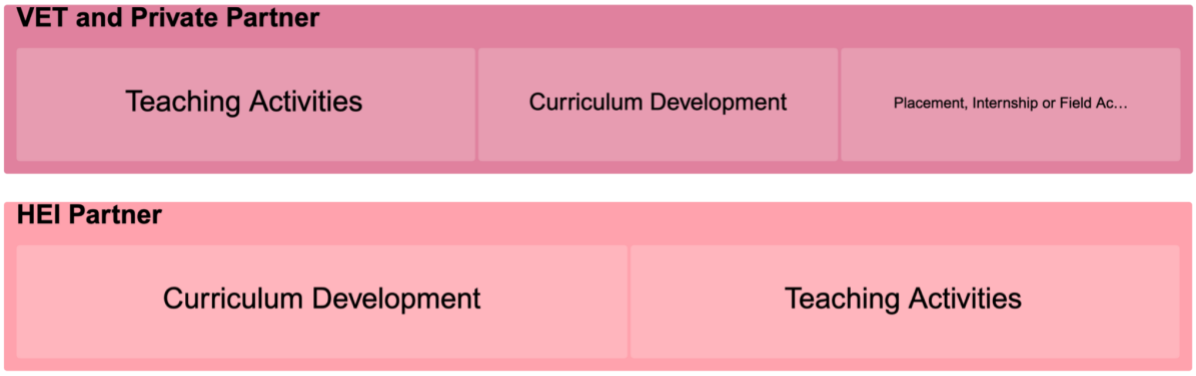

Figure 15. Partnership Activities with HEI, VET and Private Partners

The collaborations with VET and private partners involve additional components such as placements, internships and field activities. This strategic expansion of collaborative activities indicates a comprehensive approach, wherein academic partnerships emphasize curriculum development and teaching methods, while non-academic collaborations extend to practical and experiential components. This multifaceted engagement aligns learning programs within the CCI sector with the broader spectrum of industry practices, ensuring a holistic and integrated educational experience for participants.

2.4.2 Target Audience Examination

Building upon the examination of prevailing learning program provision activities within the CCI, outlined in the preceding chapter on "Learning Program Characteristics," this section embarks on a concentrated analysis of the specific target audience for these educational initiatives. The revelations derived from this scrutiny are encapsulated in Figure 16, offering a visual synthesis that augments our comprehension of the nuanced dynamics governing the target audience of contemporary learning programs in the realm of cultural and creative pursuits.

Furthermore, this section exclusively focuses on the course participants, emphasizing its separation from the broader characterization portion due to the significance of comprehending this data. The rationale behind this isolation is linked to the upcoming analyses in the subsequent report section. These analyses will primarily highlight the interconnection between the skills cultivated and the target audience, ultimately culminating in a multifaceted correlation involving the area of study, categories, skills, and the identified target demographic.

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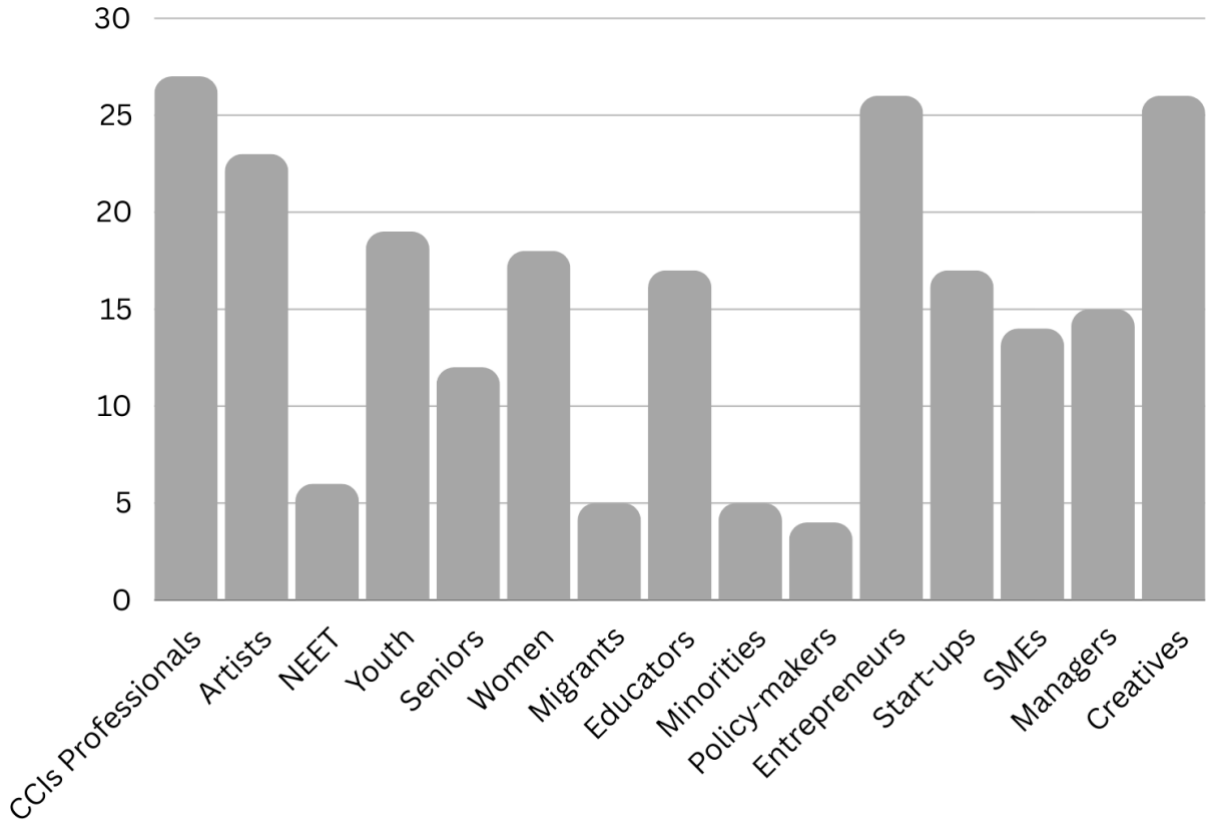

Note: NEET stands for "Not in Education, Employment, or Training".

Figure 16. Targeted Students by the Learning Programmes

It is noteworthy to distinguish between CCI professionals and creatives: the former encompasses a spectrum of professionals working within cultural and creative industries, including technicians, researchers, managers, and communicators, while the latter pertains to professionals who integrate creativity into their daily work, such as art directors, designers, and talents.

As each participant was afforded the opportunity to nominate multiple categories, the cumulative percentage results exceeded 100%. These principal targets encompass CCI professionals (43.55%), creatives (41.94%), artists (37.10%) and youth (30.65%). The first three categories predominantly involve processes of reskilling or upskilling, with the youth category serving as both a characterization of the former three—given that CCI professionals and artists primarily comprise a young demographic—and an independent category, typically oriented toward initial professional education for individuals over 16 years old.

In contrast to these broad and easily targetable categories, a more specific cluster comprises start-ups, SMEs, managers, and entrepreneurs, with engagement percentages of 27.42%, 22.58%, 24.19%, and 41.94%, respectively. Despite being organizational typologies rather than individual designations, start-ups and SMEs are frequently targeted by various systems, grants, and policies as representative entities within a specific professional domain.

Entrepreneurs, managers, SMEs, and start-ups exhibit a convergence of needs in terms of competences, aligning with the findings of this research, as elaborated further in subsequent

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sections. The prevalence of these targets in the sample corresponds with the nature of the examined learning programs and the prominence of management, production, and communication in the identified categories.

Another cluster of targets includes minorities, migrants, NEET (Not in Education, Employment, or Training), and seniors, constituting 8.06%, 8.06%, 9.68%, and 19.35%, respectively. These populations are primarily engaged with the dual objective of acquiring new competences to address social marginalization and exclusion. The learning programs serve as a means to learn new skills for market participation or re-entry, particularly in the case of migrants and seniors. While these targets are proportionally less engaged than others in the sample, they are adequately represented.

Women, while potentially falling into any of the aforementioned categories, are specifically mentioned separately, as many programs and grants allocate resources specifically to address their needs, particularly in the context of upskilling and job placement. This target has been identified 29.03% of the time.

Educators represent a significant portion of the total population at 27.42%, emphasizing the importance of tailored programs to enhance their competences. Such programs are essential as educators play a pivotal role in training other individuals, thereby elevating the overall quality of education within the sector.

Lastly, policy-makers are mentioned only 6.45% of the time, indicating a comparatively lower emphasis on upskilling within this category, at least within the purview of CCI learning programs.

2.4.3 Current Skills Provision

This chapter undertakes an examination of the prevailing skill landscape within the CCI. In light of the continuous evolution of the CCI and their influential role in shaping the global cultural and economic milieu, there is an escalating need for a highly skilled workforce adept at navigating the intricate nuances of this dynamic terrain. The chapter is dedicated to elucidating the present state of skill provision within the CCI sector, strategically delving into the multifaceted aspects of skill development and innovation. Furthermore, it endeavours to map the EU CCI learning program profile, offering a nuanced understanding based on specific areas and categories of learning programs.

Focus on Skills Development and Innovation

This section delves into an in-depth exploration of the intricate skills landscape within the Cultural and Creative Industries (CCI), with a specific and deliberate focus on areas of expertise deemed essential for enhancing professional efficacy and fortifying industry resilience. The identified skills, crucial for navigating the complexities of the dynamic CCI sector, are as follows:

1. Developing sustainable business solutions
2. Financial and business management skills
3. Critical thinking skills

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4. Ecological skills
5. Entrepreneurship skills
6. Creative thinking and problem-solving skills
7. Interpersonal relations and collaborative skills
8. Generating new knowledge, ideas, and technological solutions
9. Evaluation of unintended consequences of innovation and technology

This list serves as a foundational framework for our examination, aiming to unravel the strategic emphasis and nuanced dynamics surrounding these pivotal skills within the contemporary landscape of the CCI.

To expedite analysis and facilitate meaningful comparisons, the graphics with similar shapes have been thoughtfully grouped together. By organizing graphics based on shared shapes, the presentation aims to enhance clarity and comprehension, ensuring a more accessible and insightful exploration of the information presented in this section.

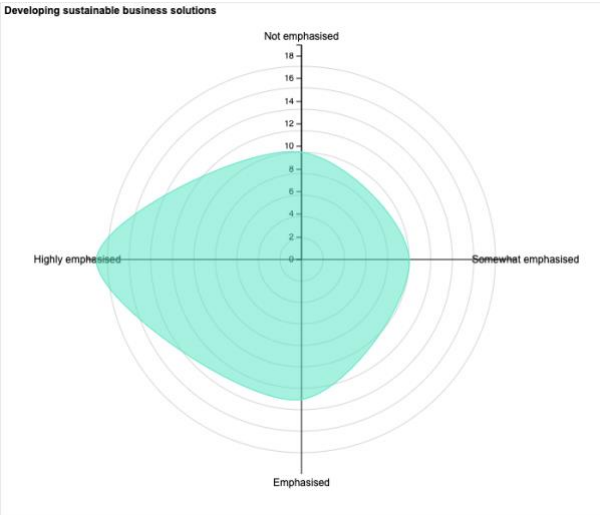

Figure 17. Skill provision on developing sustainable business solutions

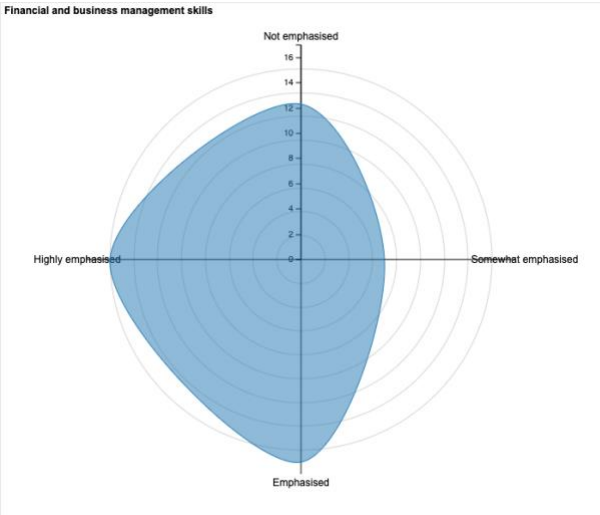

Figure 18. Skill provision on financial and business management skills

In the realm of cultivating sustainable business solutions and fostering financial and business management skills, responses regarding the emphasis placed on these aspects in current learning programs exhibit notable diversity. While a significant portion of respondents indicated that their learning programs either place a high emphasis or emphasize these skills, a noteworthy percentage of responses suggests that these competences are not prioritized during the development of curriculum for their learning programs. This diversity can be attributed to the heterogeneous nature of the CCI sector, encompassing individual artists, creatives, start-ups and larger organizations, each with distinct priorities. For instance, individual creators might prioritize artistic development over financial management, while larger entities recognize the crucial role of sustainable business practices. The evolving

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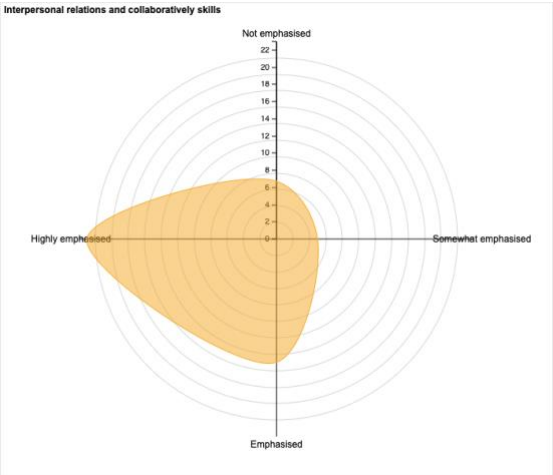
landscape of the CCI sector, shaped by technological advancements and shifting consumer behaviours, further contributes to varied perspectives on the relevance and prioritization of these skills in learning programs.



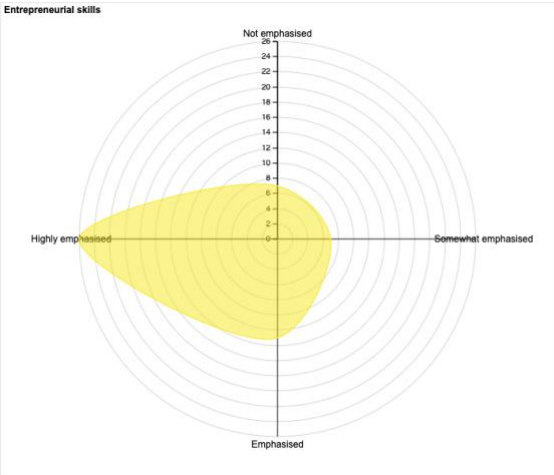
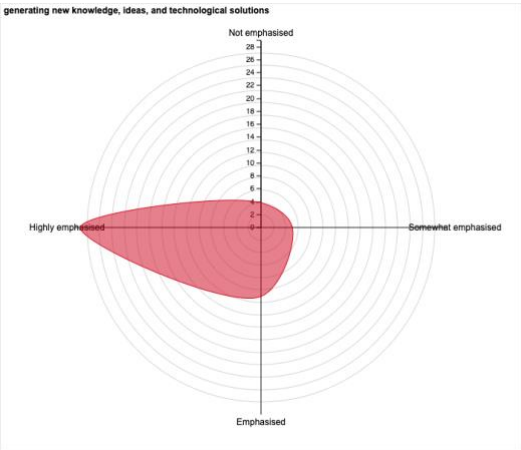


Figure 19. Interpersonal relations and collaborative skills

Figure 20. Entrepreneurial skills



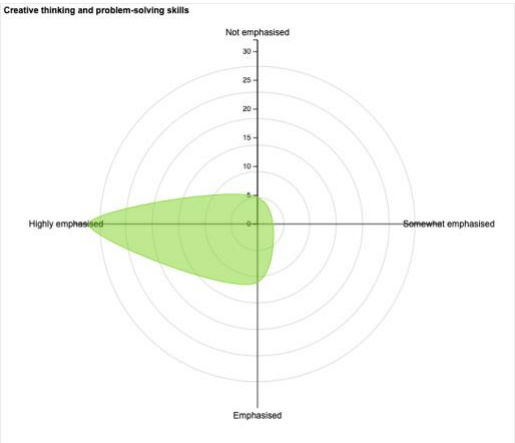


Figure 21. Generating new knowledge, ideas and technological solutions

Figure 22. Creative thinking and problem-solving skills

Furthermore, prevailing educational initiatives in the Cultural and Creative Industries (CCI) sector underscore a significant focus on fostering interpersonal relations, collaborative skills, entrepreneurial competencies, the generation of novel knowledge and ideas, technological solutions, and creative thinking along with problem-solving skills. In contrast, a restricted subset of responses indicated a more measured emphasis or conveyed that these skills are not given priority in their respective learning programs, as depicted in Figure 19, 20, 21, and 22. The emphasis on diverse skills in current Cultural and Creative Industries (CCI) learning programs reflects the dynamic and interdisciplinary nature of the sector. Foundational skills

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such as interpersonal relations and collaboration are pivotal, given the inherent collaborative ethos in CCI endeavours. Entrepreneurial competencies are essential for navigating the business aspects of creative pursuits and ensuring sustainability. The focus on generating new knowledge, ideas, and technological solutions underscores the commitment of the sector to innovation. Nurturing creative thinking and problem-solving skills highlights the importance of adaptability in addressing challenges. The subset of responses indicating a measured emphasis suggests varying priorities or challenges in aligning learning programs with diverse skill sets. This trend underscores the evolving landscape of the CCI sector, emphasizing the need for a balanced approach that combines foundational and innovative skills crucial for the continued success and resilience of professionals and organizations in the field.

Simultaneously, existing learning programs in the Cultural and Creative Industries (CCI) sector exhibit a notable emphasis, either highly or moderately, on the cultivation of critical thinking skills and ecological competencies. Conversely, a minority of responses indicate that these skills are somewhat emphasized in their respective learning programs. Further details are shown in Figure 23 and 24.

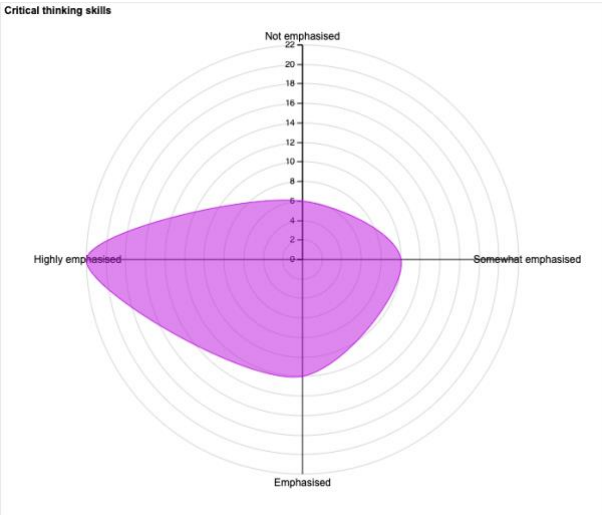

Figure 23. Critical thinking skills

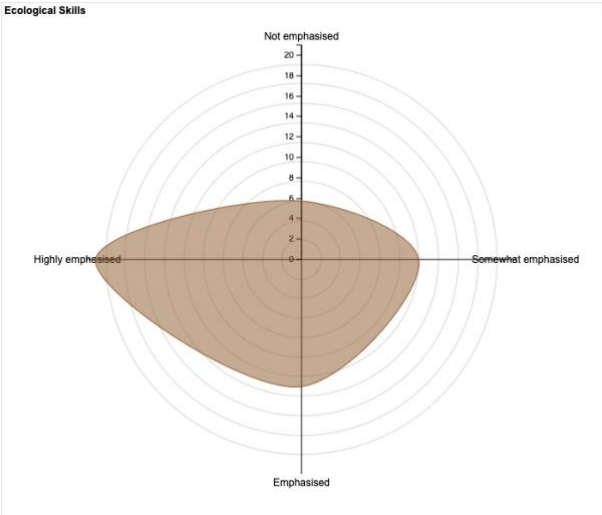

Figure 24. Ecological skills

The observed emphasis on critical thinking skills and ecological competencies in current CCI learning programs can be attributed to the increasing awareness of sustainability and the need for responsible practices. Critical thinking skills are integral for navigating the complex and evolving landscape of creative industries, enabling professionals to analyse, interpret, and respond effectively to challenges. The emphasis on ecological skills aligns with the growing global emphasis on sustainability and environmental considerations within the CCI sector. This trend reflects a broader societal shift toward environmentally conscious practices, influencing the priorities and curriculum development in learning programs. The subset of responses indicating a somewhat measured emphasis suggests potential variations in priorities or challenges faced by programs in aligning with these specific skill sets.

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Finally, the inclusion of skills related to the assessment of unintended consequences of innovation and technology diverges from the prevailing trend observed in other skill categories. A majority of respondents indicate that their learning programmes do not prioritize this specific skill, with only a minority opting for alternative choices.

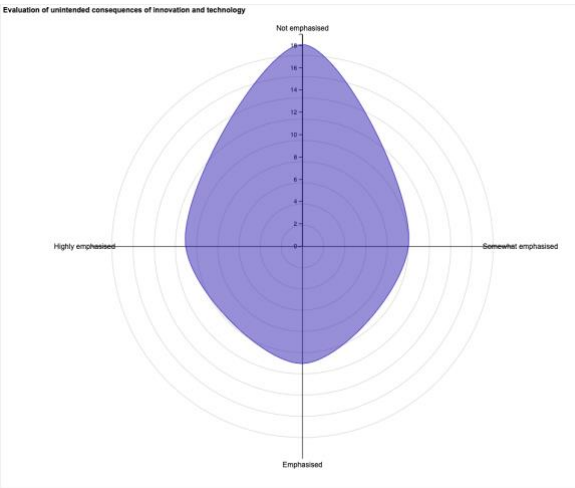

Figure 25. Evaluation of unintended consequences of innovation and technology

The divergence in emphasis on skills pertaining to the evaluation of unintended consequences of innovation and technology in the Cultural and Creative Industries (CCI) sector may stem from several factors. The sector's focus on innovation and technology often places a primary emphasis on creativity, design, and technical proficiency. The evaluation of unintended consequences may not be as overtly integrated into traditional curricula, as the sector traditionally places a strong emphasis on the positive outcomes of innovation. Additionally, the dynamic and rapidly evolving nature of technology in the CCI sector may present challenges in predicting and evaluating unintended consequences. This trend suggests an opportunity for the sector to re-evaluate the incorporation of critical evaluation skills into its educational programs, acknowledging the importance of considering the broader impact of innovation and technology in creative practices.

The earlier analysis exclusively delves into the comparison of responses pertaining to specific skills, yet Figure 26 enriches the perspective by delineating the extent of emphasis across diverse skill domains. Preeminent among these skills are creative thinking and problem-solving, standing as the most intensely underscored, closely followed by the generation of new knowledge, ideas, and technological solutions securing the second position. Entrepreneurship skills clinch the third position in terms of high emphasis. In contrast, interpersonal relations, collaborative skills, critical thinking, ecological proficiency, and the development of sustainable business solutions receive a consistently moderate level of emphasis on average. Notably, financial and business management skills, as well as the assessment of unintended consequences of innovation and technology, occupy a lower rung in terms of the number of learning programs that accord them high emphasis, as discerned from the preceding analysis.

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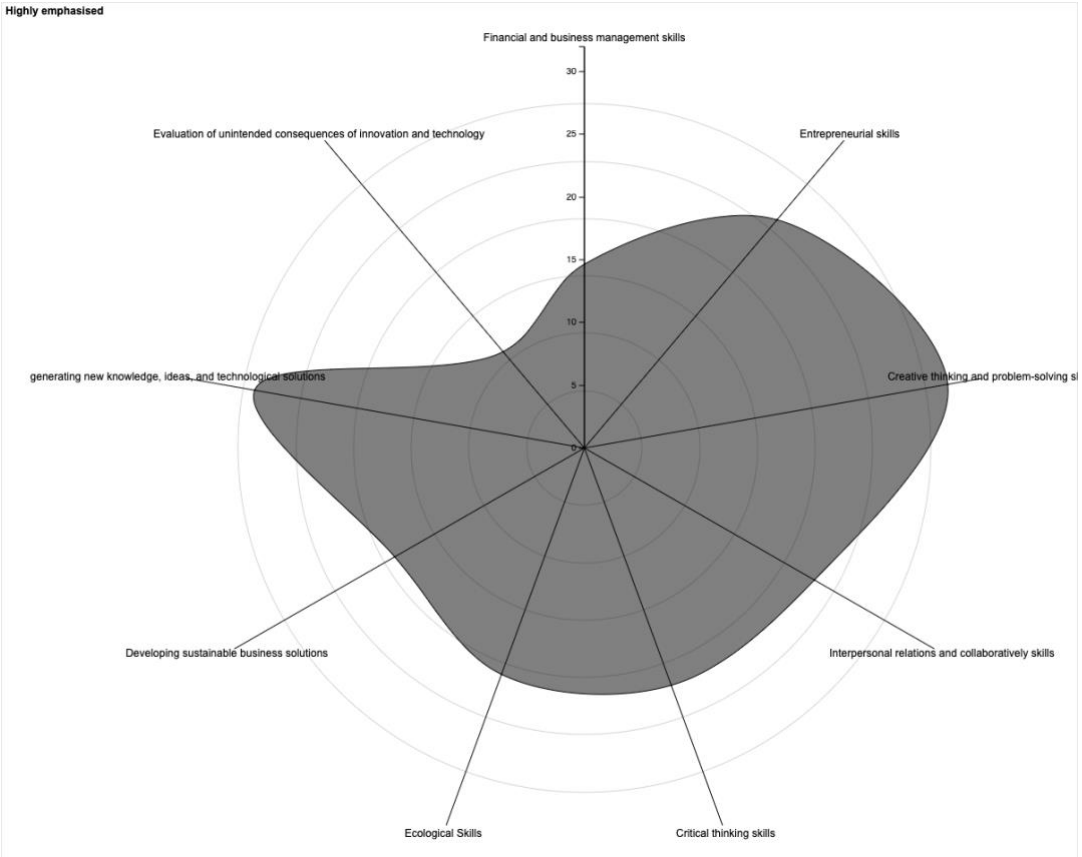

Figure 26. Comparison the level of high emphasis among different skill provisions

The emphasis on specific skills aligns with its inherent characteristics and evolving priorities. The elevated focus on creative thinking and problem-solving underscores the industry's recognition of the crucial role of innovation and adaptability in creative pursuits. The second position accorded to the skill of generating new knowledge, ideas, and technological solutions reflects the sector's commitment to staying at the forefront of technological advancements and fostering a culture of continuous innovation. Entrepreneurship skills securing the third position align with the entrepreneurial nature of many CCI professionals and organizations, acknowledging the need to navigate the business aspects of creative pursuits successfully. The moderate emphasis on interpersonal relations, collaborative skills, critical thinking, ecological proficiency, and sustainable business solutions suggests a balanced approach, recognizing the significance of both foundational and innovative competencies in the multifaceted CCI sector. The lower emphasis on financial and business management skills may stem from the traditional perception of creative industries as primarily driven by artistic endeavours, and the evaluation of unintended consequences of innovation and technology may receive less attention due to the rapid and unpredictable nature of technological advancements in the sector. In summary, these trends highlight the diverse skill set crucial for the continued success and resilience of professionals and organizations within the dynamic CCI sector.

Finally, concerning the subject of innovation, the primary focus of the learning programs revolves around advancing new business and innovation processes, fostering student networks, and implementing a continuous improvement plan for instructors and trainers. There

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is a comparatively lesser emphasis on promoting inter-/transdisciplinary approaches. And the least emphasis is placed on promoting competences related to intellectual property rights (IPR).

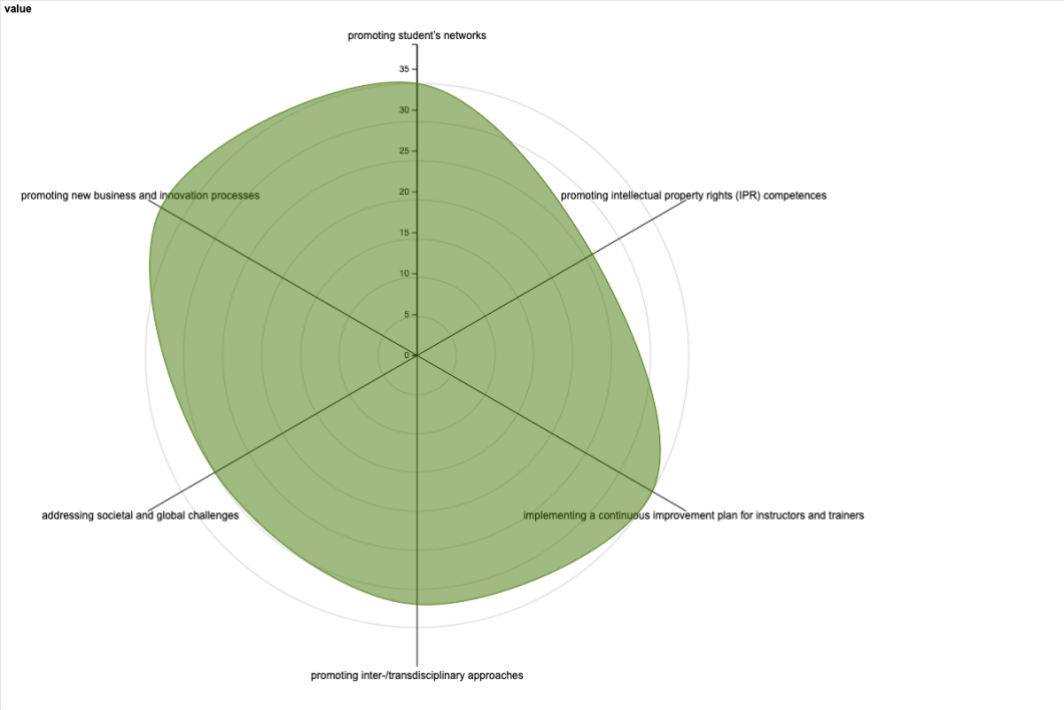

Figure 27. The Focus of Learning Programmes with the Topic of Innovation

The observed trend in the emphasis of learning programs within the context of innovation reflects a strategic orientation toward specific aspects. The primary emphasis on promoting new business and innovation processes underscores a commitment to instilling practical skills that contribute directly to the development and execution of innovative practices within the Cultural and Creative Industries (CCI) sector. Focusing on fostering student networks highlights the recognition of the importance of networking and collaborative relationships in fostering innovation, potentially enhancing opportunities for cross-disciplinary collaboration and knowledge exchange.

The emphasis on implementing a continuous improvement plan for instructors and trainers indicates a commitment to ensuring that the educators themselves possess up-to-date knowledge and pedagogical approaches, thereby enhancing the quality and relevance of the learning experience. However, the relatively lesser focus on promoting inter-/transdisciplinary approaches suggests that while collaboration is acknowledged, it may not be the primary emphasis in these learning programs.

The least emphasis on promoting intellectual property right (IPR) competences might be attributed to a variety of factors. It could reflect a perception that IPR is not as central to the immediate goals of fostering innovation, or it may indicate a need for increased awareness and training in this specific area. In the CCI sector, intellectual property rights are crucial, particularly considering the often intangible and unique nature of creative products, making this trend noteworthy for potential future considerations in program development.

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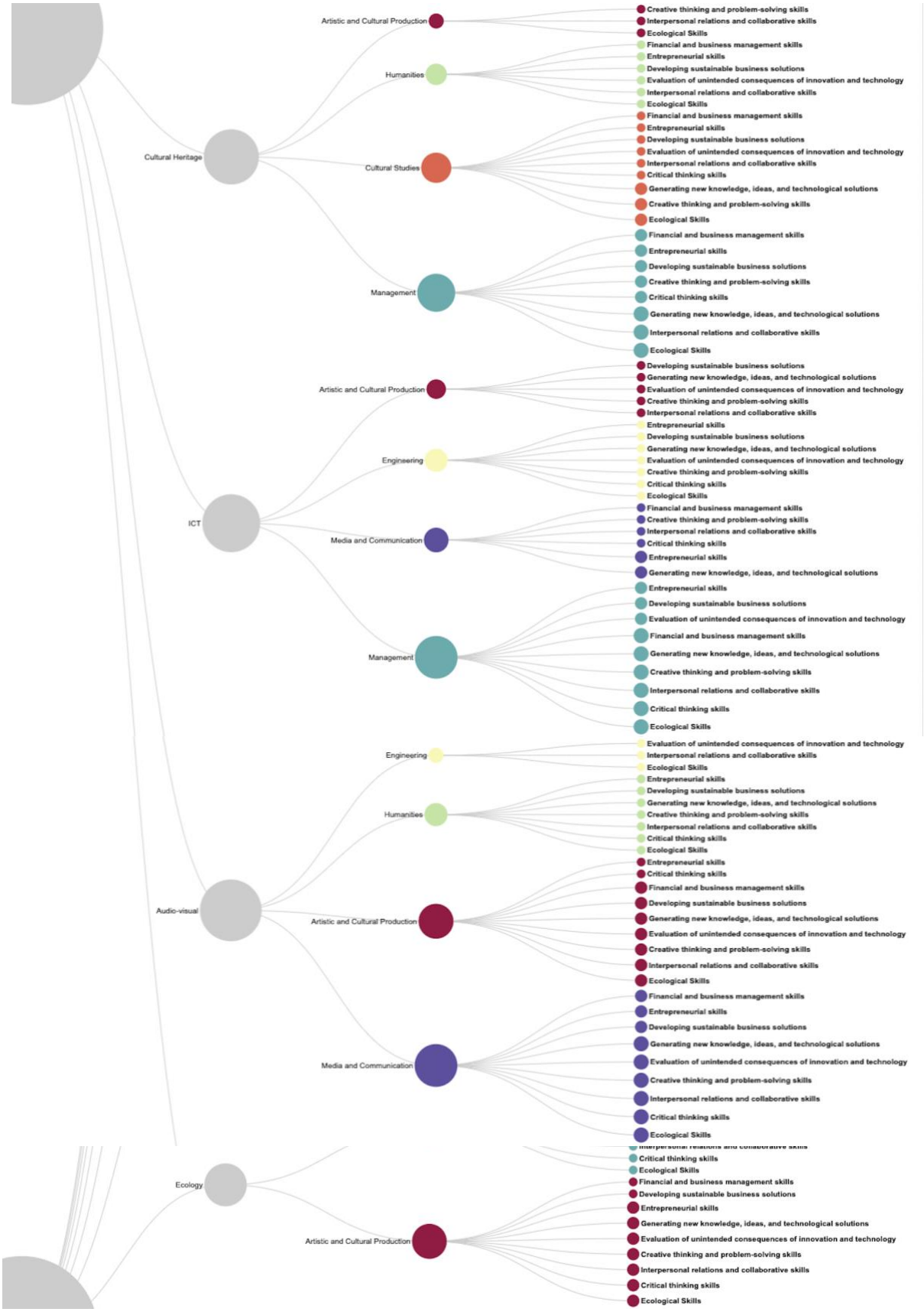
EU CCI Learning Program Profile



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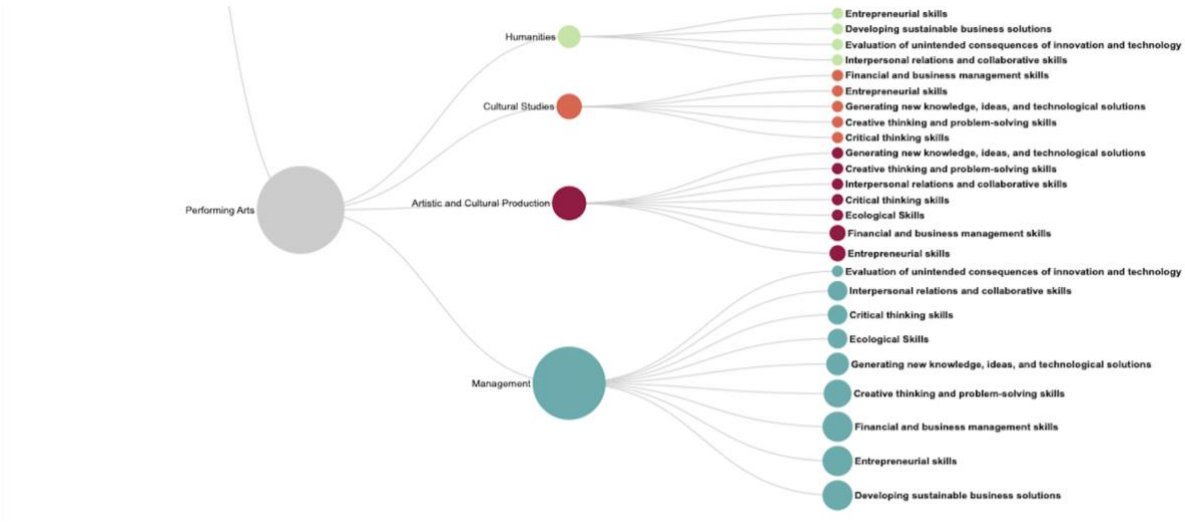

Figure 28. EU CCI Learning Programme Profile

In encapsulating the foregoing sections, which span Learning Program Characteristics, Target Audience Examination and Focus on Skills Development and Innovation, Figure 28 introduces the EU CCI Learning Programme Profile. This comprehensive profile systematically outlines the diverse set of skills that contemporary learning programs provide, meticulously categorized within specific learning categories across distinct areas of study.

This profile serves as a foundation for the future evolution of learning programs, particularly for reskilling and upskilling initiatives aimed at addressing prevailing gaps in skill provision that, while imperative, are presently lacking. Recognizing these gaps underscores the importance of strategic and adaptive measures in shaping the trajectory of learning programs within the Cultural and Creative Industries, ensuring their alignment with the evolving needs of professionals in this dynamic sector.

2.4.5 Gaps and Barriers in Current Skills Provision

Building upon the foundation laid in our exploration of the current state of skills provision within the Creative and Cultural Industries (CCI) sector, this chapter undertakes a focused examination of the Gaps and Barriers prevalent in the existing landscape. Having probed the nuances of current skills provision dynamics, we now turn our attention to the challenges and impediments that hinder the seamless development and delivery of skills within the CCI sector. Through an amalgamation of survey responses and data extracted from specific questions aimed at educational providers this chapter aims to dissect the intricacies of identified gaps. By shedding light on the barriers impeding effective skills provision, we seek to pave the way for informed strategies and transformative solutions to propel the CCI sector towards a more robust and responsive skills ecosystem.

The information derived from two distinct questions including “What would you consider to be the main gaps that you have encountered in the skills provision within learning environments for your sector?” and “What do you think are the most important changes that are needed in delivering skills for your sector?” were meticulously extracted. These questions specifically address the identification of primary gaps encountered in skills provision within sector-specific

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learning environments and the essential changes deemed necessary for skill delivery enhancement. Following a comprehensive qualitative analysis, discernible correlations were identified within responses to these queries. This analytical synthesis has facilitated the delineation of four distinct clusters: Keeping up, Connections, Formats, and Transversal/Transformative Skills. Further elucidation of these clusters is presented in Figure 29 for enhanced clarity and comprehension.

Keeping up	Connections	Formats	Transversal / transformative skills	
Curriculum Agility	Cross-sectoral impact	Pedagogical Revisions	Ethical Education	Growth Mindset
Recognition of value of skills	Collaboration & Partnerships	Online Accessible Learning	Responsible AI	Soft skills
Innovation & Adaptation	Transferability	Individualised Learning	Green skills	Diversity & Inclusion
Awareness of training needs	Financial support		Career self-management	
	Industry Connections			

Note: Blue elements = Needed changes; Yellow elements = Gaps.

Figure 29. Perceived gaps and changes needed on current training provision

Within the provided table, elements rendered in black and white denote the correlation between responses addressing main gaps and those identifying the most pivotal changes requisite in the current training provision within the context of Creative and Cultural Industries (CCI). This grayscale representation signifies the concurrent absence of these factors in the existing training paradigm, emphasizing the imperative for substantial modifications. Factors highlighted in yellow signify the identification of certain main gaps not expressly addressed in responses pertaining to the essential changes required for current learning programs. In contrast, elements presented in blue represent the paramount changes deemed necessary, yet these were not explicitly referenced in responses addressing the identified main gaps.

Analysis of Responses Addressing Main Gaps and Pivotal Changes in Current Training Provision within CCI

Within the corpus of responses addressing both identified main gaps and pivotal changes in the current training provision within CC), a recurrent theme emerges, notably the formidable challenge of maintaining currency with swiftly evolving trends, particularly in curriculum and innovation. The identified deficiencies in innovation are intricately linked to the primary gaps within the cluster of formats, where respondents emphasize the restricted nature of online accessible learning. This recurrent sentiment highlights a critical gap in the capacity to adapt to the dynamic landscape of CCI. For example, in one response mentioning about the rapidly

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changing curriculum, he said *"The fast-paced nature of the AI and technology sectors makes it challenging for learning environments to keep their curriculum up-to-date with the latest advancements. Outdated or less relevant course content may not adequately prepare students for the current job market".* The respondent posits that the rapid pace of technological innovation, specifically in AI, emerges as a prominent concern for educational providers, necessitating a responsive approach to curriculum development that aligns with contemporary trends. This insight underscores the imperative for educational institutions to address the timely integration of advancements in their curricula to adequately prepare students for the dynamic job market landscape.

Simultaneously, even when the curriculum successfully aligns with current trends, educational providers recognize the existence of gaps and imperative changes, particularly in the domain of transversal skills pertaining to responsible AI. Notably, the nascent nature of AI technology, which gained widespread public attention post the release of ChatGPT in November 2022, accentuates the evolving discourse surrounding its ethical implications. The ongoing debates surrounding the ethical utilization of AI underscore the relevance of incorporating responsible AI considerations into educational programs within Creative and Cultural Industries (CCI). As AI continues to be a subject of intense scrutiny, educational providers are compelled to navigate the complexities of responsible AI usage and integrate these considerations into their learning programs. This necessitates a conscientious approach by educational institutions to ensure that students are equipped with the ethical understanding and transversal skills required to responsibly engage with this emerging technology within the context of CCI.

Furthermore, various transversal/transformative skills have been identified as pertinent considerations, encompassing areas such as diversity and inclusion, ethical education, and fostering a growth mindset. The gaps in diversity and inclusion are notably reflected in Figure 16 which elucidates the targeted demographic groups of current learning programs. The distribution of targeted groups is apparently not even. Policy-makers, minorities and migrants are the least targeted cohorts. The limited attention directed toward these groups underscores the challenges in engaging these smaller demographic segments within the sector. The existing gaps in outreach to policy-makers, minorities and migrants, coupled with their relatively diminutive presence in the CCI sector, contribute to the evident issues surrounding diversity and inclusion. Furthermore, of notable significance are the identified gaps in green skills, which also emerge as areas necessitating the most fundamental changes in the current learning programs. Aligned with the contemporary vision articulated in **Towards a green, digital and resilient economy: our European Growth Model** and **The European Green Deal** the Creative and Cultural Industries (CCI) sectors emphasize the imperative for educational providers to seamlessly integrate education on green skills into their training provision activities. Recognizing the pivotal role of CCI in contributing to sustainability and environmental consciousness, this directive underscores the need for a comprehensive and multifaceted approach to skill development, aligning with the broader European objectives of fostering a green, digital and resilient economy.

Within the thematic cluster focused on connections, the discerned deficiencies centre around the absence of collaboration, partnerships, and industry connections. This prevailing gap necessitates contemporary adjustments to address the evolving dynamics of the educational landscape. The analysis of main gaps within this domain consistently illuminates shortcomings

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in cultivating effective collaboration and partnerships, both within the educational ecosystem and in establishing robust connections between educational institutions and industries. These identified gaps underscore the imperative for a paradigm shift towards a more interconnected and collaborative learning environment, transcending traditional academic boundaries. Moreover, the deficit in industry connections signifies a critical gap hindering meaningful engagement between educational programs and the evolving demands of CCI.

Analysis of Responses Addressing Main Gaps in Current Training Provision within CCI

In delineating responses exclusively associated with inquiries about the main gaps in existing learning programs, distinct focus areas emerge, namely transferability, individualized learning formats and career self-management skills. The aspect of transferability underscores a perceived limitation in the application of acquired skills across diverse contexts within Creative and Cultural Industries (CCI). This pertains to the efficacy of learning programs in enabling learners to apply acquired knowledge in cross-sectoral positions, emphasizing a need for enhanced adaptability.

Within the cluster of formats, the identified main gap revolves around individualized learning offers. Respondents emphasize a deficiency in tailoring educational approaches to individual needs, signalling a disjunction between current training provision and the diverse learning preferences and requirements inherent in CCI. This insight advocates for a transformative shift towards more personalized and adaptable learning formats, ensuring resonance with the unique needs of each learner in the dynamic CCI sector.

Lastly, the focal gap in career self-management highlights a perceived dearth of emphasis on equipping individuals with the requisite skills for effective career management within CCI. Respondents articulate a demand for comprehensive training programs that extend beyond technical skills, fostering a proactive and strategic approach to career development. The identified gap underscores the imperative for educational providers to integrate a holistic skill set, empowering individuals to navigate and excel in the multifaceted landscape of CCI. This nuanced analysis provides a granular understanding of the specific gaps identified within each cluster, offering valuable insights for targeted improvements in the current training provision paradigm within CCI.

Analysis of Responses Addressing the Most Important Changes Needed in Current Training Provision within CCI

Within responses underscoring the essential changes required in the current landscape of learning program provision activities, particular emphasis is placed on the thematic clusters of keeping up and connections. The identified pivotal changes within keeping up include the imperative for the recognition of values of skills and heightened awareness of training needs. This underscores the need for a comprehensive understanding and acknowledgment of diverse skill sets as well as a proactive approach to identifying and addressing emerging

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training needs, ensuring the continual alignment of programs with the dynamic demands of the industry.

In the cluster of connection, respondents articulate crucial changes, emphasizing the need for cross-sectoral impact and the provision of financial support. The call for enhanced cross-sectoral impact underscores the necessity for training programs to transcend sectoral boundaries, fostering interdisciplinary collaboration and preparing graduates for diverse professional contexts within Creative and Cultural Industries. Simultaneously, recognition of the importance of financial support signifies the need for sustainable funding mechanisms, fortifying the viability and accessibility of high-quality training within the sector.

Furthermore, within the cluster of formats, a critical change identified is the imperative for pedagogical revisions. This emphasizes the necessity for a transformative overhaul of pedagogical approaches to better align with the dynamic needs of Creative and Cultural Industries. It advocates for innovative and adaptive teaching strategies that resonate with the evolving demands of the industry, ensuring the pedagogical framework remains contemporary and effective. These nuanced insights into the identified imperative changes within each thematic cluster provide a comprehensive and strategic perspective for stakeholders invested in enhancing the efficacy and relevance of learning program provision activities within the contemporary landscap

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3. SKILLS DEMAND FROM THE INDUSTRY

This section complements the knowledge gained in the previous section regarding skills provision, by focusing on the demand side. Data for this analysis was collected via the CYANOTYPES joint survey, as well as through interviews and focus groups with industry agents, and included a deep-dive into four occupational profiles selected from four selected sub-sectors – audiovisual, videogames, fashion and design (16 profiles in total). These data combined allows us to understand the main skills demand from the side of the cultural and creative industries.

3.1. RATIONALE

The examination of skills demand in the cultural and creative industries and sectors is one of the two pillars in the identification of skills gaps from a supply versus demand approach. By focusing on the demand for specific skills within this sector, this research contributes significantly to understanding the demand side of the equation. Recognizing the skills sought after by the industry illuminates the landscape for education, training, and skill development programmes, facilitating the alignment of supply (referring to skills provision and, ultimately, to the available workforce) with the industry's needs. Analysing the skills demanded aids in creating a strategic approach towards education and training initiatives, ensuring that the supply side is adequately equipped with the right skill sets, thereby reducing skill shortages and mismatches. Consequently, this approach fosters a more efficient labour market within the cultural and creative industries and sectors, benefiting both employers seeking skilled workers and individuals seeking employment opportunities by closing the gap between skill supply and industry demand.

3.2. OBJECTIVES AND SCOPE

It is the aim of this CYANOTYPES research to explore the intricacies of skills demanded across diverse cultural and creative sub-sectors is a pivotal lens through which to grasp the nuances, commonalities, and disparities prevailing within the industry. This in-depth exploration unveils shared foundational skills like digital literacy, adaptability, and collaboration essential across sectors, while also illuminating sector-specific requirements; for instance, coding in gaming or storytelling in film. This nuanced comprehension not only reveals potential skill gaps but also forecasts future trends, enabling tailored educational initiatives and targeted professional development. Moreover, it promotes interdisciplinary collaboration, informs educational curricula and policy decisions, empowers individuals in navigating career trajectories, and emphasizes the significance of diversity and inclusion in fostering innovation and addressing global audience needs, thereby propelling the cultural and creative industries towards sustained evolution and competitiveness.

3.3. METHODOLOGY

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Data on the skills demand from the industry were collected via the joint **CYANOTYPES | Survey on Skills Needs and Demands**, as well as through a consultation with industry agents collaboratively conducted by different consortium partners.

3.3.1 Survey

As previously mentioned, the CYANOTYPES survey included different segments. For further information about the respondents and the design and implementation process of the survey, please refer to point 3.3. in this report.

For this specific analysis regarding skills demand, this section of the reports build on the following sections of the survey:

Your thoughts on skills in general: This section is intended for all respondents. 2023 is the European Year of Skills which puts skills centre stage. Helping people get the right skills for quality jobs and helping companies, in particular small and medium enterprises, address skills shortages in the EU is what this Year is all about. CYANOTYPES addresses skills gaps in urgent and future skills in the Cultural and Creative Industries sector.

Your future skills needs: This section is intended for all respondents, who are requested their assistance in identifying any needs or gaps regarding skills and skillsets within the sub-sector of the Cultural and Creative industry in which they operate. If they work across multiple sub-sectors, they are requested to specify any specific needs or gaps for each sector, if applicable, in the open-ended questions.

Your sector's skills needs: As for the previous one, this section is intended for all respondents, who are again requested their assistance in identifying any needs or gaps regarding skills and skillsets within the sub-sector of the Cultural and Creative industry in which they operate. If they work across multiple sub-sectors, they are requested to specify any specific needs or gaps for each sector, if applicable, in the open-ended questions.

A skills deep-dive for the design, fashion, video games, audio-visual sectors: This section is intended for professionals working or knowledgeable in four sub-sectors within the Cultural and Creative Industries: Design, Fashion, Video Games, and Audiovisual. Within this section, we refer to specific occupational profiles defined by ESCO, which is the European Commission's multilingual classification system for European Skills, Competences, Qualifications, and Occupations. The participants' valuable input is requested regarding the essential and optional skills assigned to these occupational profiles.

Two more sections (5. Opinions on skills provisioning in a general sense and 6. Tailored queries for educational providers) constitute the basis of the analysis on the supply side provided on point 3 of this report, focused on the skills provision.

Among the 169 respondents who specified their roles, a predominant 18.24% occupy leadership positions in academic institutions, such as rectors, deans, and heads of departments. The second-largest respondent group, comprising 14.71%, consists of educators. Notably, only six students responded to the survey, encompassing one Ph.D. student and five BA/MA/VET or Diploma students.

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The affiliations of the respondents' organizations are delineated in Appendix D, showing a diverse array of organizational typologies. Higher education institutions constitute over 44% of these affiliations, accompanied by the substantial representation of vocational and training institutions, freelancers, SMEs, creative hubs or cultural centres, sectoral associations or networks, and governmental institutions.

Detailed in Appendix E, the majority of respondent organizations align with the educational sector (44%). In focusing on the subsectors identified by CYANOTYPES as pivotal for the research, notable concentrations include the design sector (nearly 30%), the film sector (over 23%), and the audiovisual sector (over 28%). However, the videogaming and fashion industries exhibit comparatively lower representation, each accounting for approximately 11% of the respondents.

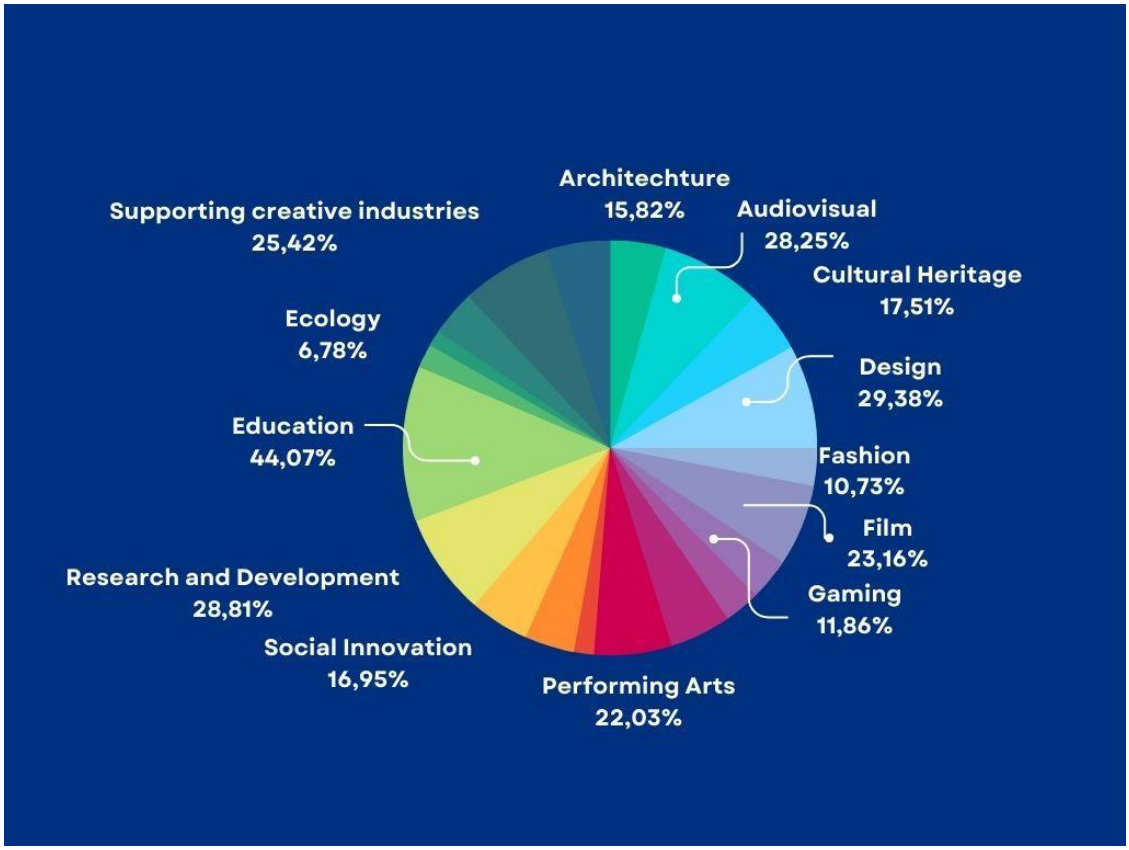

Figure 30. Respondents to the CYANOTYPES survey, per sector

In delineating the geographical distribution of the amassed data, it is noteworthy to highlight our accomplishment in acquiring information from a diverse array of 27 European countries, as detailed in Appendix F. This expansive coverage provides a comprehensive panorama of perspectives on the subject under investigation.

However, it is imperative to delve into a nuanced consideration of the data distribution, as it reveals a discernible imbalance across national ecosystems. Notably, the responses exhibit a pronounced concentration emanating from Austria, Germany, and the Netherlands. These countries contribute significantly to the dataset, thereby exerting a substantial influence on the overall findings.

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Conversely, certain nations, namely Bulgaria, Estonia, and Greece, demonstrate a limited representation, each being represented by a solitary respondent. This observed discrepancy underscores an uneven participation across countries, prompting a reflective examination of potential implications for the generalizability of findings and the need for targeted efforts to enhance inclusivity in future data collection endeavours.

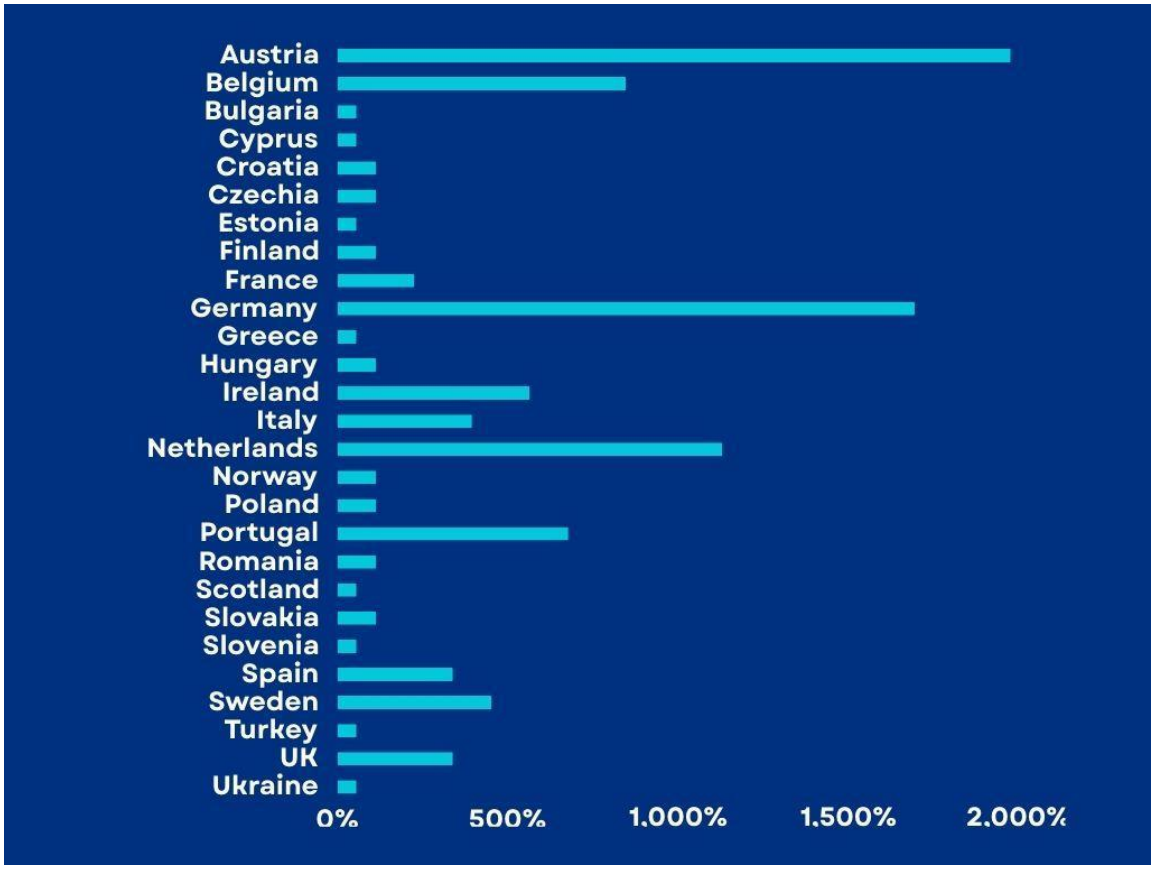

Figure 31. Respondents to the CYANOTYPES survey, per country

3.3.2 Sectoral deep-dive

A part of the data collection of the skills demand from the industry was restricted to the CYANOTYPES pilot sectors only – audio-visual, games, fashion and design – and, more specifically, to 4 specific occupational profiles – as defined by ESCO – for each of those 4 sub-sectors. Therefore, for each of these profiles, the agents consulted were posed questions about the skills required for that specific profile, as well as for their degree of (dis)agreement with the profile definition offered by ESCO.

These were the profiles selected:

Fashion:

- Fashion Designer (2163.1.3)
- Textile Product Developer (2163.4)
- Personal Stylist (5142.9)

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- Textile Quality Technician (3119.16.6)

Audiovisual:

- Producer (2654.3)
- Sound Operator (3521.1.10)
- Broadcast News Editor (2642.1.2)
- Sound Designer (3521.1.7)

Design:

- Industrial Designer (2163.1)
- Interior architect(2161.1.1)
- Illustrator (2166.10)
- Social entrepreneur (1120.6)

Videogames:

- Digital games tester (2519.7.1)
- Digital Games Designer (2166.6)
- Animator (2166.3)
- Digital games Developer (2513.1)

For the consultation with the industry agents, which was conducted via interviews and focus groups, a protocol was developed for all partners involved to follow the same methodological steps (see Appendix G).

This deep-dive in these four sectors and 16 occupational profiles gives us information on the skills demands for the specific profiles selected, but also sparks a more general reflection about ESCO and the way in which the profiles in the cultural and creative sectors are defined in this classification.

For more information about the agents consulted, please refer to Appendix H.

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3.4. MAIN FINDINGS

3.4.1 Preliminary remarks: a note on diversity

The cultural and creative sectors are intrinsically diverse, encompassing a wide range of artistic disciplines, cultural expressions, and individual perspectives. Cultural and creative sectors include a multitude of artistic disciplines such as visual arts, performing arts, literature, music, film, fashion, design, architecture, and more. Each of them has its unique methods, languages, and forms of expression, contributing to the overall diversity of the creative world. Furthermore, creativity thrives on cultural diversity, drawing inspiration from various traditions, belief systems, and customs. Different cultures have their own storytelling, art forms, and aesthetics, equally enriching the global creative landscape. However, even if creatives often have international appeal – enriching the creative tapestry even further – socio-economic conditions differ greatly according to the local and national markets in/from which they operate.

This intrinsic diversity poses a challenge for conducting a skills intelligence gathering at the European level. In a deep-dive exercise as the one described here, the concept of “a [pan-European] cultural and creative sector” is difficult to sustain. The industry agents consulted often felt not entitled to discuss the occupations beyond the sub-sector they directly work in, or even some of the occupational profiles within their own sub-sector. However, data do reveal a common ground across occupational profiles and sub-sectors, when it comes to some types of skillsets. The CYANOTYPES research acknowledges diversity and incorporates its implications when interpreting data, highlighting commonalities and showing relevant particularities.

Another limitation in this research is marked by diversity of the respondents to this consultation with industry agents. It is simply the fact that degree of concretion of skills vary across people, as well as the classification of skills as soft, transversal or even hard. This is not limited to this research. We can see how, across ESCO description of occupational profiles, skills and competences are not described to the same degree of specificity, then equalling some which are certainly not at the same level. This analysis tries to respect the responses, while giving them a uniformizing patina that allows results to be readable and consistent.

3.4.2 General Insights on Skills in the Cultural and Creative Sector

The survey indicates that respondents seek advice and **support for skills development** from various sources. The primary channels include peer-to-peer interactions (66.98%), followed by the organizations they work for (47.17%). Higher educational institutions are also significant contributors, with 38.68% of respondents relying on them. Additionally, sectoral support organizations (22.64%) and training organizations (21.70%) play notable roles in providing guidance. However, a considerable percentage (12.26%) report not receiving any advice or support. Vocational training organizations (15.09%) and other specified sources (15.09%) also contribute to the diverse landscape of skill development support.

Respondents in the "Other" category of the survey cited diverse sources for skills development, including engagement in projects like Erasmus+, foresight and scenario projects on skills, and resources from organizations such as EDEN, EADTU, ICDE, EUA, and UNESCO. Online communities, tutorials, personal digital design networks, and technology

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networks were mentioned. Some rely on personal research, academic papers, and professionals, while others explore beyond their sector, participate in international networks, and leverage social media. Various online platforms, including YouTube, and self-directed learning through free internet resources, guides, and tutorials also contribute to their skill development. The responses underscore a varied and multifaceted approach to obtaining advice and support for skills enhancement.

Respondents highlighted various **gaps and barriers** encountered in addressing their skills needs, presenting a comprehensive view of challenges across different domains.

Regarding the gaps found when addressing skills needs the answers could be summarize as follows:

- **Specific Training Design and Scope:** Respondents expressed a desire for more tailored courses, pointing out that existing programs are often too broad or directed toward unrelated fields. This underscores the importance of curriculum design that aligns closely with the specific needs and objectives of the learners.
- **Funding:** Financial constraints emerged as a substantial gap, hindering individuals and organizations from accessing quality skill development opportunities. This emphasizes the necessity for increased financial support and accessible funding mechanisms to facilitate continuous learning.
- **Technical and Language Skills:** The need for proficiency in technical skills, such as software knowledge, was highlighted. Additionally, the absence of a common language in certain learning environments emerged as a barrier, emphasizing the importance of linguistic inclusivity in educational settings.
- **Communication Knowledge:** Respondents stressed the significance of possessing a range of communication knowledge without over-specialization. This indicates a preference for a well-rounded skill set that facilitates effective communication across various domains rather than a narrow focus on a particular topic.
- **Digital Skills:** Specific digital skills, such as those related to music production, sound design, and marketing, were identified as crucial gaps. This underscores the evolving nature of skills in the digital landscape and the need for targeted programs catering to these specialized domains.
- **Time Constraints:** Time-related challenges, especially those related to childcare responsibilities, were cited as barriers to skill development. Addressing these time constraints is pivotal to ensuring inclusivity in skill-building initiatives.
- **Sector-Specific Skills:** The demand for sector-specific skills, ranging from creative business support occupations to digital expertise for marketing and communication, reflects the nuanced nature of skill requirements across different industries. Tailoring programs to meet these sector-specific needs is imperative for effective skills development.
- **No Adequate Offerings:** Dissatisfaction with the current offerings, particularly concerning the acceptance of open-source software in professional environments,

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suggests a misalignment between existing educational programs and the evolving needs of various industries. Ensuring relevant and up-to-date offerings is crucial.

As for the **barriers** encountered, respondents identified these as the main hindrances for gaining skills that are needed.

- **Cost and Time:** The intertwined challenges of cost and time were consistently highlighted as major barriers. The financial burden associated with skill development, coupled with the time constraints faced by individuals, underscores the need for flexible, affordable, and time-efficient learning solutions.
- **Limited Access to Training:** The challenges in accessing relevant training opportunities point to potential gaps in the availability and accessibility of skill development programs. Bridging this gap requires concerted efforts to enhance the visibility and reach of training initiatives.
- **Digital Capacity:** The acknowledgment of a lack of digital capacity in leadership and processes reveals a potential barrier to the integration of digital skills into various sectors. Overcoming this hurdle involves not only upskilling individuals but also fostering a digital-friendly organizational culture.
- **Workload and Time Constraints:** The fast-paced nature of SMEs, coupled with the associated challenges in finding time for skills development, emphasizes the need for strategies that integrate learning seamlessly into daily workflows, minimizing disruptions.
- **Political Underestimation:** The perceived underestimation of the future relevance of certain skills at the political level highlights the importance of advocacy and awareness campaigns. Efforts to align political perspectives with the evolving demands of the workforce are crucial for informed decision-making.
- **Hierarchies:** The identification of hierarchical structures within organizations as barriers to effective skills development signals a need for organizational reforms. Fostering an environment that encourages skill-sharing and collaboration irrespective of hierarchical positions is essential.
- **Resistance to Change:** Resistance to change, lack of recognition, and the absence of validation underscore organizational cultural challenges. Addressing these barriers involves cultivating a culture that values continuous learning, innovation, and the recognition of individual skill development efforts.
- **Mentorship and Guidance:** The absence of mentorship and guidance highlights the importance of support systems in the learning journey. Establishing mentorship programs and guidance frameworks can significantly contribute to overcoming individual challenges in skill development.

This nuanced exploration of gaps and barriers not only provides a detailed understanding of the challenges faced by respondents but also offers valuable insights for policymakers, educational institutions, and organizations striving to enhance skills development initiatives.

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3.4.3Urgent skills needs in the Cultural and Creative Sector

Respondents had to reflect about the most urgently needed skills in the cultural and creative sector in general. Identified skills have been categorized into four main categories: entrepreneurial, digital, transformative, and green. Some skills, however, may fall into multiple categories as they possess characteristics that align with various aspects of entrepreneurship, digitalization, transformation, and green practices.

Appendix I shows the detailed list of the urgent skills needs categorized in these skill types. Nevertheless, the list below presents a skill ranking derived from the frequency of each category in accordance with the provided responses.

1. **Digital Skills:**

- Technical skills, including software knowledge
- Digital literacy and data analysis
- Digital craft, software skills, and digital presentation
- Learning how the art world works in a sustainable way
- Programming and coding skills
- AI knowledge and software proficiency
- Creative technology, data literacy, and code literacy
- Meta-cognitive skills for digital and green challenges
- Access to production opportunities using digital tools
- Understanding beneficial values in the digital realm
- Entrepreneurial thinking in the digital context

2. **Entrepreneurial Skills:**

- Networking, communication, and self-promotion
- Business insight and budgeting
- Managerial attitudes, including pricing strategies
- Upskilling in new technologies and industry collaboration
- Entrepreneurship, financial competence, and communication
- Strategic management and negotiation
- Usage of AI tools with creativity
- Economic competences for pricing and business modelling
- Skills for financial management and policymaking
- Initiating a culture of learning, feedback, and mentorship

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- Decision-making in rapid changes and advocacy
- Innovation management based on values

3. **Transformative Skills:**

- Emotional intelligence, non-violent communication, and resilience
- System thinking
- Critical use of AI, independence, and direct communication
- Merging creative and scientific thinking in a data-driven environment
- Technical skills with a broader conceptual and theoretical background
- Relaxed originality, reflective skills, and openness to uncertainties
- Transitional skills for managing skill gaps
- Cross-disciplinary research skills
- Critical thinking and making
- Arts-sciences integration and craftsmanship
- An explorative mindset and relational thinking
- Thinking in a more sustainable way
- Sustaining oneself from work and producing sustainably

4. **Green Skills:**

- Cross-cultural competences
- Sustainability skills
- Entrepreneurship, critical voice, and hunger for knowledge
- Circular economy and sustainable business development
- Soft skills for organization, time management, and well-being
- Initiating a culture of learning with a focus on green practices
- Happiness, serenity, and creative skills
- Relational, ecological, and non-anthropocentric thinking
- Initiating a culture of learning with green objectives

3.4.4 Future Skills Needs in the Cultural and Creative Sector

Survey participants were tasked with contemplating a question regarding future skills needs in the cultural and creative sector. The exploration of future skills emerges as a significant focal point for approximately two-thirds of the survey participants, comprising 107 out of 177 individuals. The concept of "future skills" is commonly construed as the "ability to engage with upcoming technologies," with frequent references to artificial intelligence (AI). A subset of

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respondents, around 5%, alludes to skills categorized as "urgent," suggesting a potential overlap or similarity between skills deemed urgent and those anticipated in the future.

It is evident that the language employed in the responses exhibits considerable diversity, revealing an absence of a shared vocabulary for discussing skills. Moreover, there lacks a common foundational narrative that could facilitate a cross-sectoral conversation on this subject. While most interviewees possess a general awareness of how new technologies reshape entire ecosystems and contexts, only a limited number explicitly identify systems design as a distinct area requiring skill development.

Noteworthy are responses emphasizing key yet often overlooked future skilling domains, such as financial literacy. Those acknowledging financial literacy express a heightened awareness of the role of digital finance in transforming business models within the creative sector. Other highlighted areas include consideration of neuro-diversity and special needs, attention to legal contexts and organizational forms, and the cultivation of solidarity among creatives amidst technological transformations in the sector. CYANOTYPES' future skills-related research incorporates these nuanced areas.

It's important to note that the survey lacks the capacity to analyse contextual factors, such as differences in skills related to varying contexts like vocational education and training (VET) versus higher learning. Many respondents blend descriptions of hard or specific skills with soft or transversal skills, resulting in considerable overlap with the European competency frameworks considered by CYANOTYPES as sources of future skills inspiration.

Identified skills have been organized into the four primary categories: entrepreneurial, digital, transformative, and green. The subsequent list offers a skill ranking based on the frequency of each category as per the responses provided:

1. Entrepreneurial Skills:

- How to use AI, prompt writing
- Intellectual Humility, Emotional Intelligence, Non-violent Communication, Conflict Management, Negotiation
- Networking, communication, and self-promotion
- Merging Creative and scientific thinking in a data-driven environment
- Business thinking
- Mastering craft, mastering communication, using data insights
- Lifelong learning and adaptability
- Decision-making in rapid changes, adaptation of priorities
- Governance and accountability of digital technologies
- Navigating complexity with others
- Planning and teamwork
- Entrepreneurial Thinking

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- Closing the gap between Creative Entrepreneurs and Finance
- Supporting out-of-the-box thinking
- Defending the value of creative skills from AI invasion
- E-commerce, keeping up with market trends
- Designing a business plan for virtual products
- Making skills to physically manipulate materials
- Public presentation of the value of the creative sector
- Anticipating, creating scenarios, connecting opportunities, and collaborators
- Fundraising, international networking, advocacy skills
- Horizontal bridge builders, facilitators, and crew
- Inclusive management, sustainable management, horizontal governance management

2. Transformative Skills:

- Teaching sustainable practices
- Resilience, adaptability, cross-sector communication, green skills
- Creativity
- AI and VR skills, green skills (e.g., sustainability experts in creative arts)
- Critical and analytical thinking
- Cross-sectoral knowledge
- Transdisciplinary skills
- Relational, ecological, and non-anthropocentric thinking and acting
- Meta-cognitive skills
- Human interaction and collaboration
- Reflection, trust in own abilities, curiosity
- Emotional Intelligence, Global Thinking
- Sustainability and ethical practices
- Translating creativity into problem-solving
- Skills that enable the CCI to act in an intermediary capacity within innovation ecosystems
- Skills that enable the CCI to take an orchestrating role with regard to societal challenges
- Skills that enable the CCI to reframe notions of value and commensuration

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3. Digital Skills:

- Focus on technology
- Anything with KI, AI, and new digital tools
- Digital literacy, community-building skills
- AI knowledge, software skills
- Understanding AI; knowing how to use new technologies
- Digital networks for constant and immediate exchange
- Coding, social & climate awareness
- Generative AI, digital 2D/3D environments, VR/AR
- Online skills
- Programming
- Technical skills and online skills

4. Green Skills:

- Teaching sustainable practices
- Green skills (e.g., sustainability experts in creative arts)
- Resilience, adaptability, cross-sector communication, green skills
- Sustainability and ethical awareness
- Cross-sectoral knowledge
- Relational, ecological, and non-anthropocentric thinking and acting
- Circular economy and sustainable business development

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3.4.5 Prioritization of Skills and Competences Based on Relevance in the Cultural and Creative Sector

Survey participants were tasked with ranking the importance of skills and competences from a provided list, considering their relevance to their respective occupations and the sectors in which they operate. Appendix J contains all the answers gathered for the prioritization of skills and competences that respondents had to rank based on the relevance of each skill and competence for their occupation within the Cultural and Creative Sector. A total of 52 answers where gathered.

In order to analyse the data and create a shortlist of perceived relevant skills and competences only those deemed highly relevant by over 40% of respondents were included in the list. Therefore, this is the **prioritization of skills and competences** in the cultural and creative sector in order of relevance:

- **Critical Thinking:** Assessing information and arguments, identify assumptions, challenge the status quo, and reflect on how personal, social and cultural backgrounds influence thinking and conclusions.
- **Creativity:** Learners can transform ideas into solutions that create value for others.
- **Adaptability:** To manage transitions and challenges in complex sustainability situations and make decisions related to the future in the face of uncertainty, ambiguity and risk.
- **Crossover Competences**: Competences in cross-disciplinary team working.
- **Working with others:** Learners can improve their abilities to create value by building on their previous experiences and interactions with others.
- **Exploratory Thinking**: To adopt a relational way of thinking by exploring and linking different disciplines, using creativity and experimentation with novel ideas or methods.
- **Collective Action:** To act for change in collaboration with others
- **Understanding Context:** Ability to perceive "context" as active element affecting agency and intelligence. Managing and adapting to contexts. Social Skills in diverse contexts, understanding relationships, etiquette, power.
- **Resilience & Tolerance:** Developing a sense of resilience, tolerance for complexity and ambiguity, and a sense of responsibility towards others.
- **Purposeful Mindsets:** Cultivating a sense of purpose, curiosity and an open **mindset towards new ideas, perspectives and experiences.**
- **Understanding Different Points of View:** Cognitive flexibility and perspective-taking skills so that they can see an issue from different points of view and understand how these differing views result in tensions and dilemmas.
- **Creating Focus & Attention:** Slow thinking, self-reflection, achieving focus, maintaining attention.

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- **T-shaped People:** Supporting trans-sectoral and trans-disciplinarity. T shaped people possess excellent knowledge of and skills in specific areas and are good at working with others in a collaborative way.
- **Futures Literacy:** To envision alternative sustainable futures by imagining and developing alternative scenarios and identifying the steps needed to achieve a preferred sustainable future.
- **Artistic Entrepreneurship**: Art brings different approaches to entrepreneurship. Different understanding of value. Different understanding of collaboration. Relearning entrepreneurship through diversity, equality, ethics.
- **Working in teams:** Urgently needed skills sets involve relational skills, the experience of new ways of working together.
- **Self-awareness**: A sense of self-awareness, self-regulation and reflective thinking
- **The Art of Conversation**: Understanding conversational contexts (informal, formal, artificial).
- **Understanding Ecosystems:** Leading to new ecosystems for value creation
- **Problem Framing:** To formulate current or potential challenges as a sustainability problem in terms of difficulty, people involved, time and geographical scope, in order to identify suitable approaches to anticipating and preventing problems, and to mitigating and adapting to already existing problems.

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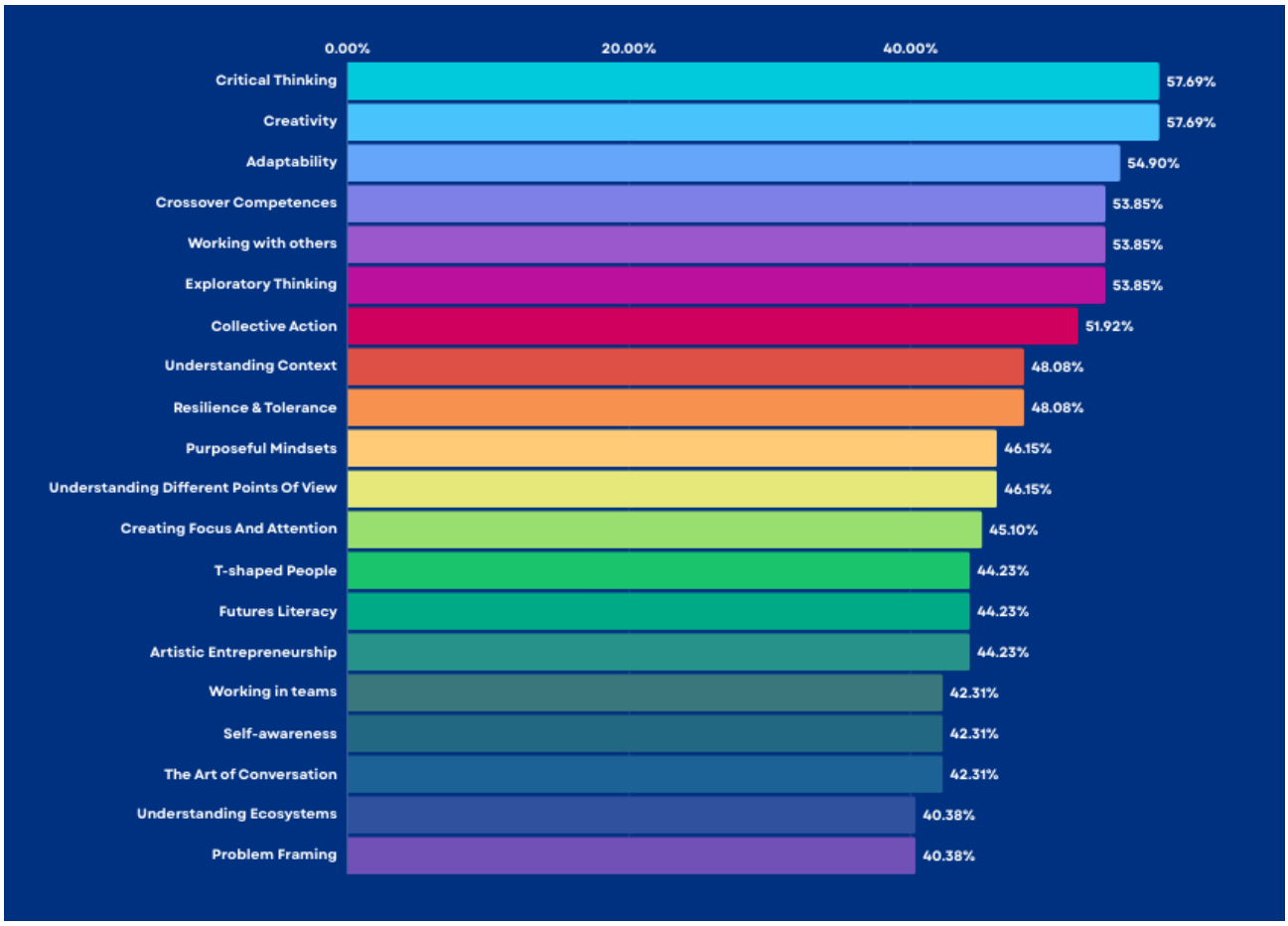

Figure 32. Prioritisation of skills and competences

Upon establishing the prioritization of skills and competences, the survey queries participants about their **perceptions of the importance of various skill types**. The overall response was that every skill type deems important or very important. The scoring difference is minimal although the order of prioritization of skill type is:

1. **'Soft' Skills:** Encompassing critical thinking, self-awareness, network building, communication, and empathy.
2. **Transformative Skills:** These refer to abilities to create new value, reconcile tensions and dilemmas, and assume responsibility.
3. **Sustainability Skills:** Encompassing the knowledge, abilities, and attitudes necessary to comprehend, promote, and implement practices contributing to the long-term well-being of society, the environment, and the economy.
4. **Non-cognitive Skills:** Encompassing teamwork, motivation, and perseverance.
5. **Digital Skills:** Described as confident, critical, and responsible uses of digital technologies for learning, work, and societal participation.

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6. **Entrepreneurial Skills:** Defined as capacities to act on opportunities and ideas, transforming them into value with potential financial, cultural, or social implications.
7. **Technical Skills:** These encompass qualities acquired through expertise in performing physical or digital tasks.

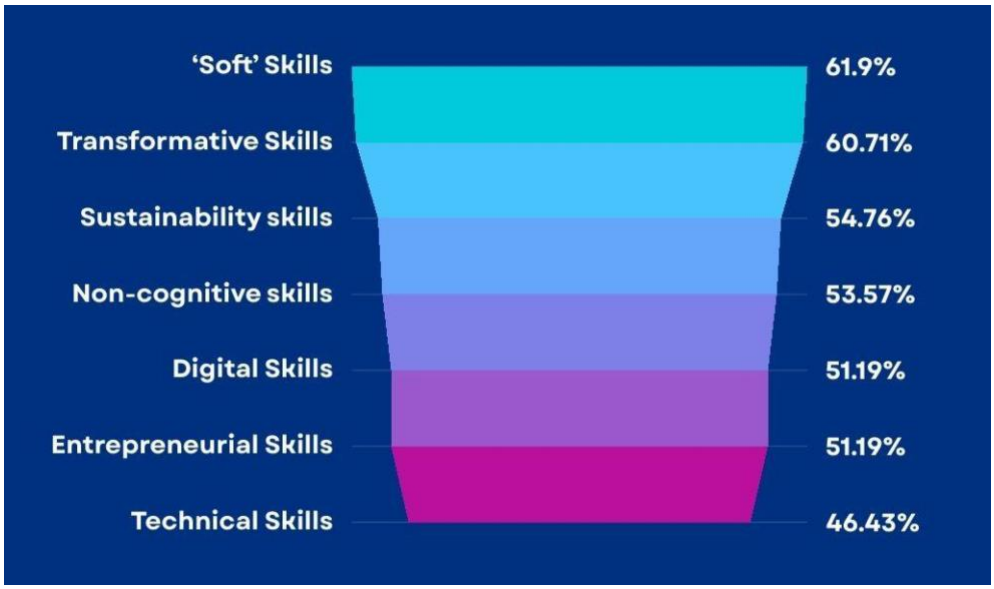

Figure 33. Perceived importance of various skills types

Subsequently, respondents were prompted to provide insights regarding the **provision of specific skill sets** within their respective sectors. Notably, technical and digital skills emerge as the most frequently offered, despite receiving lower scores in the perception of relevance previously in the survey.

Conversely, sustainability and transformative skills are perceived as lacking in provision, yet, these are identified as among the most crucial. Consequently, the data reveals a discernible disjunction between the perceived importance of certain skills and their actual availability, indicating **a notable gap in skills provision**.

3.4.6 Main Skills Gaps in the CCII

The survey inquired of participants a question on perceived primary skills gaps encountered within the cultural and creative sectors.

From the responses received, a compilation has been devised enumerating the principal skills deficiencies as perceived by the 61 respondents. Systematic categorization of the responses has been undertaken, classifying them into four distinct skills domains, namely transformative, digital, green, and entrepreneurial skills. Presented herewith is the resultant inventory engendered from the gathered insights on **skills gaps**.

Transformative Skills:

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- Soft Skills
- Intellectual humility
- Emotional intelligence
- Non-violent communication
- Empathy
- Resilience tools
- Energy management
- Conflict resolution
- Negotiation
- Self-awareness
- Long-term collaborations
- Imagination and courage to change the *status quo*
- Collective communication skills
- Systems Literacy and Systems Thinking
- Experimentation for learning
- Cross-disciplinary research
- Non-cognitive Skills
- Fundraising and Advocacy Skills
- Creative Thinking
- Networking
- Teamwork and collaboration
- Cross-cultural creativity

Digital Skills:

- Transferability of knowledge
- Media competence
- Keeping up with Technology and Trends
- User Experience Design

Green Skills:

- Targeting sustainability
- Ethical thinking
- Sustainability skills

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- Generative technologies for traditional art forms
- Impact assessment

Entrepreneurial Skills:

- Business Skills
- Budgeting of reskilling and upskilling for cultural SME
- Motivational skills
- Converting creative skills into business skills
- Financial skills
- Fundraising skills
- Advocacy skills
- Communication of non-technical requests into technical solutions
- User Experience Design
- Cross-disciplinary research
- Professionalization

3.4.7 Upskilling and Reskilling Activities – Skills Needs

In the course of the survey's exploration of skills needs, particular attention was devoted to delineating the main skills that need attention through the development and design of upskilling and reskilling activities.

The skills highlighted by survey participants as necessitating attention through upskilling and reskilling initiatives have been systematically classified within the framework of the four distinct skill domains outlined in the ongoing analysis.

Survey outcomes reveal a confluence between identified transformative skills gaps and the transformative skills deemed essential for attention through upskilling and reskilling activities. A similar correlation is observed in the context of entrepreneurial skill sets.

Regarding digital skills, survey participants express a demand for diverse elements, encompassing cybersecurity, proficiency in artificial intelligence, data literacy, and programming capabilities.

Green skills identified for refinement through upskilling and reskilling efforts align with the perceived deficiencies in corresponding skills, albeit an imperative for systemic thinking and anticipatory skills is highlighted.

3.4.8 Sectoral Deep-dive: Audiovisual, Videogames, Fashion and Design

Growing importance attributed to soft skills for creatives can be clearly observed. The rise of soft skills reflects a growing awareness of the importance of interpersonal and emotional

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intelligence-related abilities in addition to technical expertise. These soft skills contribute to better collaboration, client satisfaction, and overall success in the ever-evolving landscape of the creative industry.

Audiovisual

Diversity of the audiovisual sector adds a new layer to the complexity of the skills definition of the occupational profiles. As pointed out by some of the agents consulted, the sector "Audiovisual" includes what the CCI internally considers as several industrial sectors. Here film, music, television, etc. are all grouped together. Consequently, the occupational profiles would be very different in each of these industrial sectors – i.e. the work of a producer is significantly different in film or music, just to mention one example – and so would be the needs in terms of skills – e.g. a film producer does not have or need, a creative background, while a music producer has a crucial part in the creative process.

In addition to that, there is a hybridity inherent to the practice in the audiovisual sector, as many professionals do both of the technical and creative work, and many professionals work in the artistic field. This does not seem to be reflected in the ESCO definitions, at least for the selected occupational profiles in this research.

A combination of job-specific, technical skills, on the one hand, and transversal and soft skills, on the other, is needed for professionals in the audiovisual sector.

The transversal skills that the agents consulted referred to as important – and missing from ESCO descriptions and therefore to be added – are mostly management skills – even if not only – and can be synthetized as follows: financial management – including up-to-date technical knowledge to estimate costs, liaise with financers, or perform market research (for Producers), and calculate design costs (for Sound Designers); lead a team and plan teamwork (across profiles); establish a production method, or assuming/abstracting the scale of a project (both for Producers).

A significant number of comments were made regarding economic and legal knowledge needed – rather than skills or competences. This refers mainly to the Producer role and include: knowing the European and local media law and regulations; understanding the utilisation of copyright; knowing the regulation of advertisement; understanding the frequency rules in the broadcasting territory; understanding of share economy, or understanding of new economic trends, among others.

Numerous soft skills were also highlighted, particularly for the Producer and Sound Operator profiles. Among those, the adaptability to operate in different contexts and professional types and learn from them, which relates to versatility, listening skills and cultural sensitivity (all of which referred to for the Producer profile). Along the same lines, adapt existing designs to changed circumstances or, more generally, and - adapt to changing situations are also mentioned (for Sound Operators and Broadcast News Editors, respectively). In addition to that, interpersonal skills and communication skills – including be trustworthy in the work communication – are also important.

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Regarding the latter, communication skills, Ximo Peris Casado, Higher Education Lecturer and Creative Director at CLOCK your Skills, points to them to reach different audiences and for cross-occupations communication: "[he proposed to include] the ability to adapt to the different audiences a producer has to deal with and develop the capacity to communicate and interact with completely different types of professionals avoiding speaking a producer-based language as if he/she works in a personal bubble".

Other soft skills are also mentioned, such as accuracy, punctuality, and the ability to meet deadlines, as well as strategic thinking skills, referred to here in different ways such as keeping big picture in mind or have a vision (both mentioned for the Producer role). Creativity is also mentioned, many profiles in the audiovisual sub-sector being hybrid – technical and artistic, if this dichotomy may be valid at all, but is not given the same importance across profiles.

Regarding technical skills, surprisingly, AI-related skills are mentioned only for the Broadcast News Editor (plus a reference to the wider skills "tech trends overview" for Producers), and were not so central as in the conversations regarding other sub-sectors, such as Videogames (see below).

A total of 56 skills and competences – from the ESCO descriptions, for the four selected profiles combined – were considered to be not relevant by at least one of the agents consulted, and therefore suggested to be removed. This high number is explained, at least partially, by the fact that the list of skills and competences listed in ESCO for these four profiles was quite extensive, as compared to others in the CCI. The majority of them (49, an 83%) were job-specific, technical skills.

However, while many hard skills are not considered relevant, an equally relevant number of hard skills are considered to be missing from the ESCO classification. For producers, these are: analyse more than scripts (excerpts, shortened scripts, field work); carry out interviews to select artistic team members; digital rights management (streaming, KI, etc.); identify music with commercial potential; make film shooting schedule; negotiate exploitation rights; negotiate publishing rights; negotiate with artists; planning activities; record multi-track sound, and select scripts, among others. The list is also long for Sound Designers: monitor mixing in a live situation; knowledge in sound design history; set up basic recording; analyse the need for technical resources; understand the digital compression; be up-to-date with digital file formats and conversions, or be up-to-date with data and media management in the digital environment. The last three would apply also for Sound Operators. Finally, the following hard skills were mentioned as to be added to the ESCO description of Broadcast News Editor: cut raw footage digitally; follow up the stories, specify the news to different media (modify the same info to broadcast, to social media etc.); write text aligned with video; keep text and video balanced; edit no comment clips; use dense language (journalist wording), and AI, among others.

Video Games

In the video games sub-sector, agents consulted refer to a combination of hard, technical skills and transformative and, among those, soft skills.

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As for the other sub-sectors, there was an overall consensus among the videogames industry agents consulted about the growing importance of soft skills. As explained by Dan Thronström, Executive Producer at Amplifier Game Invest, video game development is becoming a larger and more mature industry, and soft skills are in this context becoming central skills for everyone to have. “It is more important now than ever to be able to collaborate, communicate and plan together during the development stages of a game project. The teams grow and, if the communication is poor, the end result will suffer”, he added. Along the same lines, Andreas Halonen, Quality Assurance Manager at Tarsier Studios, when commenting the digital games tester role – which is his expertise, stressed the importance of communication skills, as well as how to be structured and work closely with the other team members. “Tarsier have a very integrated tester role in their studio, which allows them to catch many issues very early in the development process. This is a workflow that is used elsewhere, but can be beneficial to many developers who are not yet working like this”, he explained.

More specifically, among soft skills, communication and collaboration skills are considered to be key. Dan Thronström, Executive Producer at Amplifier Game Invest, explained that “there is a strong belief in the market that AI will assist us in making the games faster (and maybe better), but it is important to stress that without a strong focus on communication and planning within the teams (and with the market) the product will still not become successful when it releases”. Video game studios need to be a well-oiled machine, and team members must be committed to collaboration and kept engaged: “Organizing game studios to allow rapid iteration and prototyping of new features is important for the teams, and each role must remain eager to participate in this process” (Henrik Jonsson, Independent Game Industry Consultant and former game programmer).

Other important soft skills, which are indicated by the agents consulted as to be added or missing from ESCO descriptions of the selected occupational profiles, we can find presentation skills (for Animators); manage cultural adaptions or know or be able to implement cultural characteristics (especially important for Digital Games Designers); critical reflection – also known as critical thinking– (for Digital Games Developers, Digital Games Designers and Digital Games Testers); team and communication skills –including those which allow to mediate between design and development teams, or listening, accepting and providing feedback– (for Digital Games Developers and Digital Games Designers), as well as self-organization skills, including the ability to estimate the duration of work (for Digital Games Developers).

Among the transversal skills to be added, problem-solving is considered to be highly important across occupational profiles in the videogames sub-sector. Management skills are also central and often missed in the ESCO description of the selected occupational profiles; these include project management skills (for Digital Games Developer), team management and production planning and resource estimation (for Digital Games Designer); flexibility (for Digital Games Developer and Digital Games Tester); strategic thinking (impact evaluation and sustainable development) (for Digital Games Developer), and market overview (for Digital Games Developer for Digital Games Designer). As a clearly transversal skill, which proves the inter-profile connection in terms of skills, one of the agents consulted indicated that acting is a competence of use for Animators, as those animators who can act are able to create realistic

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characters more quickly because they can record themselves as reference models in certain situations.

AI-related skills are equally central in the discussion about skills needs for the videogames sector. While new or transformed technical, hard skills emerge by the hand of AI, other (often soft) skills are also needed for a mindful use of AI, that aligns with existing processes for an overall positive impact on the work. Maximilian Schmierer, CEO at b.Rex GmbH, highlighted that “being open minded to use AI tools and an overview over the market is crucial for future developments”, and explained, by way of example, that motion design becomes more important because of easier access to AI-motion design tools, which allows animators in the videogames sub-sector to increase their skillset. Henrik Jonsson, Independent Game Industry Consultant and former videogame programmer, on his turn, stated that “With the advances made in AI over the last years, all roles will have to be aware of how AI can and will impact their field of expertise and stay updated and educated on the progress being made, while also remaining very aware of the limitations and problems that AI adoption can cause for a game studio”.

However, as previously mentioned, hard or technical skills cannot be diminished. The industry agents consulted indicate numerous hard skills to be added, particularly for Digital Games Developers and Designers, among which: source code management; knowledge about game engines; test-driven development; continuous integration and continuous delivery (CI / CD); design user interface; game mechanics design and review; optimize Meshes for real-time use; UI/UX design and user testing, and applied marketing and business skills. To be highlighted that, among the competences listed in the ESCO descriptions which the industry agents considered need to be removed, most of them (almost an 89%) are also hard skills.

Fashion

As seen for the other sub-sectors, there is a growing importance of soft skills in the fashion sub-sector.

There was also an overall consensus among the fashion industry agents consulted that the description of the selected occupational profiles for the fashion sub-sector are quite old fashioned and look at fashion as a consumerism industry. Therefore, the skills and competences listed do not take into account the environmental impact and the importance of research, environmental knowledge and skills. Consequently, it is estimated that knowledge on sustainability and green economy/production will need to be integrated into future education to a much higher degree. It is also remarked that fashion can be a fine art and craft as well, and that creative and artistic skills and competences are largely missing in the ESCO definition of the selected occupational profiles.

Focusing on transversal skills needed for the Fashion sub-sector, missing ones – in the ESCO description – were detected only for the Fashion Designer occupational profile. It must be highlighted that this specific profile’s description was found particularly problematic because some of the skills and competences listed for it are considered to belong rather to the job of tailors or cut makers, or referring to tasks carried out in collaboration with them. This is the case of skills such as produce textile samples, or use textile technique for hand-made

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products. The same happened for the Textile Product Developer, as the testing of physical properties of textiles was said to be often carried out in close collaboration with cut makers and tailors.

This mismatching of the profile and its linked skills and competences, steps into other profiles too. By way of example, to collaborate with a technical staff in artistic productions is rather the responsibility of the art / creative director, if a company has one, otherwise it can be done by one or more fashion designer(s); identify target markets for designs is done in close cooperation with product managers and marketing specialists; and regarding the skills to modify textile designs and produce textile designs, it is noted that it depends, sometimes a company has an own textile designer for this, sometimes it is the same person (a fashion and textile designer). Therefore, the skills and competences are not just optional in the sense of a positive, additional asset – the job can benefit from a fashion designer having more in-depth textile design competencies – , but also strongly linked to other factors such as the working setting, the size of the company, etc.

Similar issues were found in the Personal Stylist profile description. Participants agreed that this is a very old fashion definition. A stylist, they noted is more of an art director and has a critical creative take. It is central to the success of several recesses in fashion. The definition proposed in ESCO is more adaptable to a shopper, which is a different job. The profile Textile Product Developer is found to be, in the ESCO definition, almost the same as for a Textile Designer.

Going back to specific transversal skills – which, as mentioned, were only suggested to be added for Fashion Designers – , the following were mentioned: trend/ design research; sustainability (also referred to as sustainable consideration in the process/materials); digital design and process, and create functional designs. Some other aspects were mentioned as transversal skills, which would fall rather under the category of knowledge, such as: deep understanding on sustainable materials and practices; knowledge and understanding of material (textile, components, etc.); understanding of production system and coordination; knowledge about bodies and movements; cultural heritage knowledge, and understanding impact on different levels.

Regarding soft skills, some were pointed out as to be added to the Fashion Designer profile, which correspond largely to those noted for other sub-sectors: societal Vision; inclusivity; communication; adaptivity; cultural awareness – supporting individuals marginalized by sexism, racism, and ableism; business and marketing; creativity and innovation, and resilience.

As for the other sub-sectors, some job-specific, technical skills were also detected to be missing. For Fashion Designers, those are: collection planning in close collaboration with product managers (and often marketing specialists); fittings participation; co-organisation of fashion shows, presentations, etc. (also for Personal Stylists), and creation of mood boards and/ or concept boards. The following skills and competences were added for Textile Product Developers: monitor developments in technology used for design/ product development; seek innovation in current practices, and expertise in textile supply chain.

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Finally, it is pointed out that the development regarding digital tools and AI needs to be the focus for future education. The awareness that AI will be able to replace a lot of knowledge and work in fashion design, means that the right skillset has to consider the uniqueness of human design.

Design

As it happened for fashion, it was noted that the established ESCO definitions of the design profiles lack a focus on the creative thinking process, which is central to all jobs in design. In other words, ESCO descriptions of occupational profiles generally do not take into consideration that, in the majority of the cases, professionals combine technical and creative skills. Profiles are defined in a rather old-fashioned manner, not representing the reality of today. By way of example, most illustrators work nowadays on digital medias of various kinds, which are not referenced in the description.

In addition to that, and as observed for the design sub-sector, the skills needs really vary depending on the conditions of the jobs, and particularly the size of the company, from self-employed designers to designers within a large company, and everything in between.

Also here, some problematic issues with the titles of the profiles were found. Regarding Industrial Designers, this definition is considered not accurate: as it refers to two different professions, a product designer and an industrial designer. It is also recommended to change the definition and take into consideration not only manufactured products but also systems (e.g. service design). For Interior Architect, it is argued that this needs to be distinguished from Interior Designer, which are two different professions, and it is suggested to use “space” instead or “interior”; the ESCO definition corresponds rather a decorator. Finally, regarding Socially Entrepreneur, it is noted that the majority of the creatives in the design sub-sector are what is called “hybrid artists” or “hybrid creatives”, meaning that they are social entrepreneurs and also designers, and have other professional roles and skills. Therefore, this could be considered to be an overarching role for most professionals in the design sub-sector.

Beyond these underlying ideas, long lists of transversal, soft and job-specific / technical skills were identified as missing for the four selected occupational profiles.

Regarding transversal skills, the ones considered key vary significantly across the selected occupational profiles. For Industrial Designers, these include: digital skills – including those related to new trends and tools; economic and management skills; learn "language" of the clients and use it; design ethnography; critical / speculative thinking; cultures of repair; maintenance; applied design thinking; design for transitions and theories of change; community-led (design) practices; research and (vertical and horizontal) analysis – including primary and field research; consider impact on the world; critical thinking; mapping target groups; think about logistics and transport, ergonomics; quality assurance; unmaking, and adapt to mass production, among others. For Illustrators, on their turn, the transversal skills highlighted are more practical: brand management; prompt engineering, and creative and critical thinking (shared with Industrial Designers). The role of Interior Architects, according to the industry agents consulted, need the following transversal skills to be developed: knowledge of human behaviour; research of space; ecological aspects of design; modular

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thinking; follow up the project in place, supervision and control implementation of all the tasks, and choose materials and workers (linked to human resources and supplier management). Some transversal skills are added for Social Entrepreneurs, not mentioned for the other profiles: organizational development; Corporate Sustainability Reporting Directive (CSRD); strategy and report; communication skills (including marketing but also others such as storytelling); Artistic Research, and speculative design. These lists of skills and competences portray profiles that are strategic, often with a holistic vision of the design process, thoughtful and mindful with the community and the environment.

For the design sub-sector, the industry agents consulted stated that soft skills will become much more important in the near future. Among them, a few were highlighter: empathy towards customers and target groups; the skill to judge AI products and its use, and the skill to differentiate many possible solutions and a large quantity of information for the respective client. More specifically regarding AI, it is considered that new skills for new techniques – like prompting – urgently need to be an integral part of the education of creatives in the design sub-sector.

Beyond those, some other soft skills are mentioned as highly relevant almost across all four selected occupational profiles: design justice considering intersectional and decolonial perspectives; sustainable and regenerative practices and design thinking; communicating ideas verbally, visually, virtually; interdisciplinary collaboration – materialized for Interior Architects, for instance, in the ability to work with technical team and builders; ethics of the designer; empathy / understanding the client; creativity and art direction; contextualise within broader frames (such as SDGs); problem solving / explaining; finding purpose and showing purpose; creating new rules; showing new pathways, and design anthropology, among others.

Finally, as for the other sub-sectors, some hard / technical skills need to be added – according to the people consulted in this research – to the ESCO description, partly reflecting recent changes in the industry, but also referring to basics in the design sub-sector: technical drawings and create texture and structures (for Industrial Designers); create drafts / scribbles / sketches with AI, handmade illustrations/art, digital / physical material techniques, digital context publishing, select the keyframes of a narrative to be illustrated and convert them into an relevant illustration, (desktop publishing [DTP]) prepress, typography or match colours (for Illustrators); mixed Reality; prompting / generative AI; co-design on light and sound wellbeing; world building (in VR); establish the relevant aesthetic style suited for the project in case, based on various requirements and limitations; design of the movement trajectories, space organisation, social interaction; create 3D visualizations or animations, and collaborate with professionals for project documentation (for Interior Architects). No relevant job-specific skills were pointed out as missing from ESCO description for the Social Entrepreneur occupational profile.

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4. FUTURE SKILLS NEEDS

This section integrates the outcomes of the multi-part future skills scenario workshop cycle, complemented by desk research and stakeholder interviews. It is strictly designated for research within the confines of this research project. For a detailed understanding of the methodology and data quality, interested parties are urged to directly contact the specified sources referenced herein, facilitating a comprehensive insight into the underlying processes and standards associated with the outcomes presented in this section.

4.1. DEFINITION - FUTURE SKILLS

Future skills refer to the skills and competencies that individuals will need to thrive in the future - of work, particularly in the context of the rapidly changing technological landscape and shifting societal needs, but also in their everyday lives as creative professionals more generally, acting in a variety of roles in processes of transformation. In the creative sector, future skills are critical for professionals to stay relevant, adaptable, and innovative in their fields. By cultivating these future skills, creative professionals can not only stay relevant in a rapidly evolving industry but also play a leading role in shaping its future and positively influencing the world around them.

“Future creatives” includes a wide range of actors - full-time creative professionals across subsectors, but also people (temporarily) assuming “creative” roles as facilitators of change and cooperation beyond the creative sector. As the interest in collaboration grows (work in teams that reflect the full range of diversity, co-work with generative systems, redesign of business models for circularity), people with such skillsets are likely to be needed wherever the co-creation of (private and public) value is a concern. Given that such **value creation and market design conversations** are integral to processes of transformation and ecosystem design, future creatives are well-positioned to co-facilitate such processes (based on learning approaches that address this role of intermediary). This links future skilling to processes of transformation far beyond existing subsectoral domains of applied creative labour, including organizational development, innovation governance, and systems design.

Our research has shown that the **definition of “future skills” reflects broader societal narratives about the future**: wherever **technological determinism** holds (the assumption that tech innovation drives the future of creative work, and that there is not much we can do to change the direction of this process), the definition of future skills tends to highlight the role of skills required to explore and employ these technologies (the need to focus on adaptation to “close the gap” between tech innovation and its application in creative sector contexts of value creation). Wherever other concerns frame the reflection on skills, especially the future of role of creatives in the “triple transition” of social, ecological, and technological change, a more holistic view of future skilling prevails, where **technology is integrated into a broader dynamic of co-creation** that features **creatives not only as designers of products and services but of processes and systems**.

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This difference reappears in other innovation contexts, such as the OECD innovation facets model[2] (which distinguishes a focus on adaptation and enhancement from a focus on missions and anticipation) or different assessments of the role of disruptive and non-disruptive innovation. Similarly, this diversity is reflected in European initiatives, ranging from the Deep Tech Training Initiative[3] (**focus on technology literacies**) to the New European Bauhaus[4] (**focus on ecological, economic, and social sustainability literacies**).

Our research concludes that especially in the case of the creative sector - generally assumed and expected to inspire new imaginaries, hence alternative futures - future work in the CYANOTYPES project should take this **diversity of future-related innovation narratives** into account as it reflects not only stakeholder diversity but also a range of **(new) socio-technological conflicts**. The general availability of data-driven platforms capable of performing a range of applied research and design processes across creative sector value chains ("generative ai") has upset many established assumptions regarding the role of technology in creative processes, effectively demanding a fundamental reassessment of human-machine relations with wide-ranging economic and legal (authorship / copyright) implications (see below on the creative agency model).

How these conflicts are framed, how they unfold, and which (social) institutions can and will be created to address, structure, and govern these conflicts will have far-reaching implications for the creative sector and the organization of future skills-related initiatives[5].

4.2. RESEARCH FRAMEWORK

4.2.1 Anticipating Future Skills: Framing the Research Process

Building on a long history of research work on anticipation and collective intelligence design, the multi-year CYANOTYPES research project set out to explore and address how people across the creative sector - arts, culture, design in all their manifestations - might organize learning in the (immediate) future[6]. The network brings together educators from art and design

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[2] This schema was introduced in the OECD (2019), Declaration on Public Sector Innovation, https://legalinstruments.oecd.org/en/instruments/oecd-legal-0450, and has since then been operationalized and validated in innovation-governance contexts across Europe. Also see also current (2023) work by the OECD Observatory on Public Sector Innovation on foresight as driver of stakeholder engagement: "Strategic foresight helps to mobilise and mediate stakeholders' participation and co-creation around the exploration and debate about plausible and desirable futures." https://oecd-opsi.org/publications/supporting-decision-making-with-strategic-foresight

[3] https://www.eitdeeptechtalent.eu

[4] https://new-european-bauhaus.europa.eu

[5] See below (section 4.3) on the possible role of the newly-created EIT Culture & Creativity, the EU's innovation agency for the creative sector, as ecosystem builder.

[6] https://cyanotypes.website. Relevant research includes S. Zehle, "Anticipating a Worldmaking Aesthetics: Rereading the Archives of Literary Journalism to Imagine Alternative Futures", in. John S. Bak, Bill Reynolds (2023), *The Routledge Companion to World Literary Journalism* (Abingdon Oxon: Routledge); S. Zehle, R. Kollegala, D. Crombie (2021), "Co-creating Value with the Cooperative Turn: Exploring Human-Machinic Agencies Through a Collective Intelligence Design Canvas", in: T. Ahram, R. Taiar, F. Groff (eds), *Human Interaction, Emerging Technologies and Future Applications IV*, Proceedings of the 4th International Conference on Human Interaction and Emerging Technologies: Future Applications (IHIET – AI 2021), April 28-30, 2021, Strasbourg, France, Advances in Intelligent Systems and Computing book series (AISC, volume 1378); D. Crombie, R. Kollegala, S.

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academies and research organizations, vocational training as well as business support and civil society organizations, all of which agree that new approaches to learning are called for. This includes the very language (and indeed the mental models, the imaginaries) of learning itself. The idea of first identifying, then closing skills gaps is powerful, for example, as is the need to bridge formal and informal learning processes. But somehow, we seem to be running out of time to close gaps, missing the bigger picture of systemic change at a moment when nothing seems more urgent than applied big picturism and organizing new dynamics of peer-to-peer learning.

Supported by a European 'blueprint' funding scheme designed to support the creation of new educational frameworks, the network's first conceptual gesture was to reclaim and reframe the very idea of blueprints. Both 'print' and 'type' locate us firmly in the historical (and technological) transformation of one of our core cultural techniques (writing), which allows us to engage with the current wave of data-driven systems offering glimpses of "ubiquitous pseudocognition" as that which it (also) is - the latest episode in the **history of the automation of creative expression** that also includes the arts-and-technology experiments of avantgardes.[7] Though the term 'blueprint' is commonly used to refer to replicable frameworks, CYANOTYPES shifts from 'blueprints' to 'cyanotypes' as aesthetic practice - calling attention to a pioneering photographic process that tapped into technological advances to usher in a new mode of representation, out of which developed the 'blueprint' we know and widely use in non-artistic contexts today.[8] Easily dismissible as mere play on words, there is nonetheless a key point to be made: naming matters, as does the playful exploration of what the concepts we have at our disposal can and cannot do whenever we set out to frame a research process. And as much as names anchor efforts in archives, contexts, histories, pulling up these anchors too quickly might make a new effort seem to float around with no apparent linkages to what has come before, severing links to an archive full of pasts and possible futures. So even more so than 'blueprint', 'cyanotype' intends to reaffirm the role of the (historical and contemporary) arts-and-technology experiment and, in so doing, refuse to separate reflections on technology from reflections on aesthetic practice to instead encourage us to think them together from the start.

Finally, the idea of 'types' keeps alive the question of how much we actually do have in common (learning types, curricula on skillsets of agreed relevance etc) and how far we still have to go to individualize learning to address the diversity of ways of coming to knowledge.

Zehle (2021), "Performative Practices and States of Play: Exploring the Role of Arts and Culture in the Co-Creation of Anticipatory Governance Dynamics", European Society for Socially Embedded Technologies (EUSSET); D. Crombie, R. Kollegala, S. Zehle (2021), "Rethinking the Stack: New Narratives for an Era of Collective Intelligences", in: M. Teli, C. Bassetti (eds), *Becoming a Platform in Europe: On the Governance of the Collaborative Economy* (Boston-Delft: now publishers), http://dx.doi.org/10.1561/9781680838411; S. Zehle, D. Crombie (2020), "Exploring Co-Agency in Human-Machine Assemblages: Toward a Methodology for Collective Intelligence Design", in: ENOLL (ed), *Proceedings of the Digital Living Lab Days Conference 2020*.

[7] Economist (2023), "How AI could change computing, culture and the course of history", Economist (April 20), https://www.economist.com/essay/2023/04/20/how-ai-could-change-computing-culture-and-the-course-of-history; P. Schoenthaler (2023), *Die Automatisierung des Schreibens & Gegenprogramme der Literatur* (Berlin: Matthes & Seitz); on the spiritualist origins of automatic writing, see T. Wright (1970), *The open door; a case history of automatic writing* (1970), https://archive.org/details/opendoorcasehist0000wrig/page/356/mode/2up

[8] Our discussion was inspired by the work of Anna Atkins (1799-1871), a botanist and illustrator whose cyanotypes made her a pioneer of photography. Her work has recently been made available again, see P. Walther (2023), *Anna Atkins. Cyanotypes* (Taschen).

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In our experience, the arts, design, and culture are as much about common aesthetic conventions as they are about the desire to break whatever rules seem to get in the way of such individuality - of people, contexts, and knowledges. Customizing learning to ensure we have enough in common to live together seems like an attempt to square the circle, but then that is why so many keen learners end up in the creative sector in the first place - hoping to find ways to relate to both self and society, coming up with new ideas on how to negotiate what appears difficult to commensurate.

Which is also why the idea of 'commensuration' - the practice of translating different values into one another - has become a key element of the network's research conversation: which values guide our understanding of learning, our assessments of urgency and futurity, our proposals for the design of learning contexts and processes. Understood as the "wilful elimination of the heterogeneity of values" commensuration is a fundamentally social process: "Commensuration can **change our relations to what we value** and alter how we invest in things and people. Commensuration makes the world more predictable, but at what cost?".[9] Because consideration of 'commensuration costs' - what do we gain, what do we lose when we reframe arts and technology relations - relates to how we reflect and possibly reframe our relationship to a new generation of 'generative' socio-technological systems, such a focus allows us to turn to the 'deeper' tech design conversation that lies at the core of many of the technologies changing creative work, especially since 'generative' systems for creative expression also involve changes in concepts of ownership[10] and systems for the storage of value.[11]

The power we see in such an approach is that this opens up a research conversation capable of involving us in the actual design of socio-technological systems - and in learning what we need to do to make such systems regenerative. Integrating the **question of how we translate values into one another** into our research approach allows us to acknowledge and address a wide range of conflicts involved in the triple loop learning conversation - and help us assess where we might (not) be able to negotiate them - but also the **extent to which we already depend on processes of automation** in organizing our lives individually and collectively.

> "Commensuration can radically transform the world by creating new social categories and backing them with the weight of powerful institutions. Commensuration is political: It reconstructs relations of authority, creates new political entities, and establishes new interpretive frameworks. ... Commensuration presupposes that widely disparate or even idiosyncratic values can be expressed in standardized ways and that these expressions do not alter meanings relevant to decisions. ... When built into large institutions,

[9] W.E. Espeland, M. L. Stevens (1998), "Commensuration as a Social Process", *Annual Review of Sociology*, Vol. 24 (1998), pp. 313-343, 319.

[10] EUIPO (2022), Impact of AI on infringement and the enforcement of copyright and designs, https://euipo.europa.eu/tunnel-web/secure/webdav/guest/document_library/observatory/documents/reports/2022_Impact_AI_on_the_Infringement_and_Enforcement_CR_Designs/2022_Impact_AI_on_the_Infringement_and_Enforcement_CR_Designs_FullR_en.pdf

[11] K. Owocki et al. (2022), *Greenpilled: How Crypto Can Change the World*, Gitcoin, https://store.gitcoin.co/products/green-pill-book-digital-edition

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> **commensurative practices are powerful means for coordinating human action and making possible automated decision-making**. ... Just as commensuration is a considerable social accomplishment, so too the creation of incommensurables requires work. Some party must draw boundaries around the thing whose value is to be kept, or made, distinctive and then defend the boundaries from encroachment"[12].

So, if new forms of triple loop learning can be designed to better imagine and implement educational dynamics addressing urgent and future skills related in turn to the way (just, regenerative, sustainable, etc) in which we wish to co-create value, commensuration - **what can (not) be translated into something else, a recurring question in conversations based on distinctions like analogue/digital, cultural/natural, human/machinic** - is one name we might want to give to the new game.

[12] W.E. Espeland, M. L. Stevens (1998), ibid.

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4.2.2 The Co-Creative Scenario Cycle

Hoping to effectively address 'future skills' is one of the motivations driving our research cooperation. Building on shared pasts in anticipation research, we organized the following five-workshop scenario development cycle to engage our network members in this process.

#	SCENARIO CYCLE STAGES	WORKSHOP FOCUS
0	**SHARE** VISION	• **highlight** common concerns • **design** shared narrative • **initiate** data collection strategy (maps / reviews / surveys)
1	**CO-DESIGN** SKILLSETS	• **introduce** 'skillset design' as its own skilling area • **explore** sustainability competences framework ("GreenComp") • **define** interfaces to complementary curricular frameworks (EU)
2	**BUILD** ECOSYSTEM VIEW	• **engage** with relevant 'Communities of Practice' (AD / DigComp) • **collect** survey data (ongoing) • **build** shared conceptual vocabulary (agency, cognition, values)
3	**INTEGRATE** TRIPLE LOOP LEARNING	• **engage with** art and design academies / universities (ELIA) • **connect** individual / organizational / ecosystemic learning • **feature** "ecosystem builder" (EIT Culture & Creativity)
4	**CO-WORK** WITH GENERATIVE SYSTEMS	• **introduce** collaborative prototyping approach • **co-create** ai agents • **link** to cross-sectoral 'deep tech' innovation narrative
5	**LEARN** IN COMPETENCE ECOSYSTEMS	• **map** skilling partners in competence ecosystems • **design** skilling partner engagement strategy • **prototype** microcredential system
X	**LAUNCH STRATEGIC ROADMAP**	• **make tangible** competence ecosystem as space of learning • **prototype** microcredential system • **initiate** co-implementation of pilot actions / use cases

Each of the five workshops (see below) was co-organized with different partners from across the research network and drew between 25 and 50 participants from the network as well as the events with which workshops were co-located. Network members took turns to co-facilitate the workshops, exploring and expanding the triple loop learning methods narrative documented here.

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4.2.3 Cross-Framework Approach and Skills Strategy Alignment

Coordinated by the EU's Joint Research Center, a series of European frameworks has been developed by multidisciplinary research teams to assist in the definition of curricula and training modules.[13] Coupled with "Communities of Practice" hosted by different creative sector organizations, the existence of these frameworks can facilitate the skilling conversation as **a shared language can be built from these reference curricula** (which is why iterating and improving these frameworks is a key concern of CYANOTYPES research and innovation transfer anticipated in a series of pilots). Linking itself to the momentum generated by these different frameworks, CYANOTYPES can build on existing (validated) approaches and **increase the impact of its own work across the sector (and beyond).**

CYANOTYPES Skilling Strategy	
urgent skills triple loop approach to: triple transition (green, digital, and societal) polycrisis **reframe urgency**	**future skills** triple loop approach to: entrepreneurship (individual) knowledge management / innovation transfer (organization) decision-making / market design (ecosystem) **reframe future value-creation**
European Competence Frameworks	
DigComp GreenComp LifeComp	EntreComp ResearchComp PolicyComp
Innovation Focus	
adaptation / enhancement	anticipation / mission

[13] https://joint-research-centre.ec.europa.eu

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In an effort to **align future skills research with the CYANOTYPES skilling strategy,** our research process has schematized six major frameworks in relation to the distinction between urgent and future tasks as well as the OECD “innovation facets” scheme to link innovation focusing on adaptation and enhancement to urgency, and innovation focusing on anticipation and missions to futurity.

This reflects and builds on common-sense usage of these terms, but it also makes sense in terms of prioritizing the changes called for in how we organize learning across short-, mid-, and long-term timescales.

Such schematization are mainly analytical approaches to focus research, but can facilitate the transfer of research outcomes into a diversity of contexts. While respondents struggle to separate urgent and future skills on the level of individual skillsets, for example, many see (and expect) a **clear distinction and complementarity between responding to urgencies in the short-term vs mid-term adjustments in the area of future skills**.

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4.2.4 Competence Framework Overview

DigComp[14]

COMPETENCE AREA	COMPETENCE
Information and data literacy	1.1. Browsing, searching and filtering data, information and digital content 1.2. Evaluating data, information and digital content 1.3. Managing data, information and digital content
Communication and collaboration	2.1. Interacting through digital technologies 2.2. Sharing through digital technologies 2.3. Engaging in citizenship through digital technologies 2.4. Collaborating through digital technologies 2.5. Netiquette 2.6. Managing digital identity
Digital content creation	3.1. Developing digital content 3.2. Integrating and re-elaborating digital content 3.3. Copyright and licenses 3.4. Programming
Safety	4.1. Protecting devices 4.2. Protecting personal data and privacy 4.3. Protecting health and well-being 4.4. Protecting the environment
Problem solving	5.1. Solving technical problems 5.2. Identifying needs and technological responses 5.3. Creatively using digital technologies 5.4. Identifying digital competence gaps

Figure 34. DigComp

[14] Digital Competence Framework for Citizens (DigComp), https://joint-research-centre.ec.europa.eu/digcomp_en

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GreenComp[15]

COMPETENCE AREA	COMPETENCE
1. Embodying sustainability values	1.1. Valuing sustainability 1.2. Supporting fairness 1.3. Promoting nature
2. Embracing complexity in sustainability	2.1. Systems thinking 2.2. Critical thinking 2.3. Problem framing
3. Envisioning sustainable futures	3.1. Futures literacy 3.2. Adaptability 3.3. Exploratory thinking
4. Acting for sustainability	4.1. Political agency 4.2. Collective action 4.3. Individual initiative

Figure 35. GreenComp

[15] GreenComp: the European sustainability competence framework, https://joint-research-centre.ec.europa.eu/greencomp-european-sustainability-competence-framework_en

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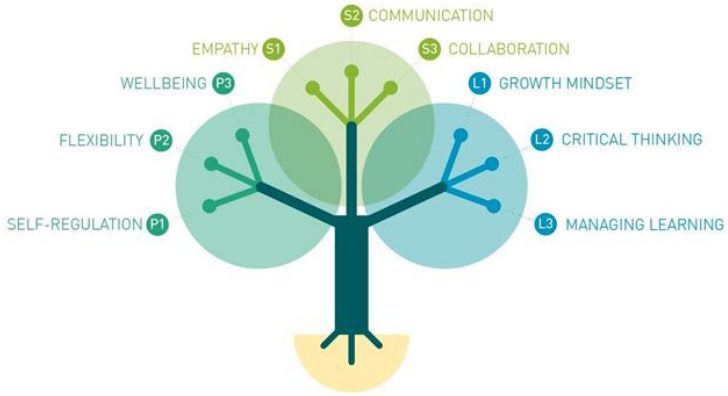
LifeComp[16]



COMPETENCE AREA	COMPETENCE
Personal	P1 self-regulation - awareness and management of emotions, thoughts and behaviour P2 flexibility - ability to manage transitions and uncertainty, and to face challenges P3 wellbeing - pursuit of life satisfaction, care of physical, mental and social health, and adoption of a sustainable lifestyle
Social	S1 empathy - the understanding of another person's emotions, experiences and values, and the provision of appropriate responses S2 communication - use of relevant communication strategies, domain-specific codes and tools depending on the context and the content S3 collaboration - engagement in group activity and teamwork acknowledging and respecting others
Learning to learn	L1 growth mindset - belief in one's and others' potential to continuously learn and progress L2 critical thinking - assessment of information and arguments to support reasoned conclusions and develop innovative solutions L3 managing learning - the planning, organising, monitoring and reviewing of one's own learning

Figure 36. LifeComp

EntreComp[17]

[16] LifeComp: The European framework for the personal, social and learning to learn key competence, https://joint-research-centre.ec.europa.eu/lifecomp_en

[17] EntreComp: The entrepreneurship competence framework, https://joint-research-centre.ec.europa.eu/entrecomp-entrepreneurship-competence-framework_en

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COMPETENCE AREA	COMPETENCE
Ideas and opportunities	1.4. Spotting opportunities 1.5. Creativity 1.6. Vision 1.7. Valuing ideas 1.8. Ethical and sustainable thinking
Resources	2.1. Self-awareness and self-efficacy 2.2. Motivation and perseverance 2.3. Mobilising resources 2.4. Financial and economic literacy 2.5. Mobilising others
Into action	3.1. Taking the initiative 3.2. Planning and management 3.3. Coping with uncertainty, ambiguity, and risk 3.4. Working with others 3.5. Learning through experience

Figure 37. EntreComp

ResearchComp[18]

[18] ResearchComp: The European Competence Framework for Researchers, https://research-and-innovation.ec.europa.eu/jobs-research/researchcomp-european-competence-framework-researchers_en

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COMPETENCE AREA	COMPETENCE
Managing research	1. Mobilise resources 2. Manage projects 3. Negotiate 4. Evaluate research 5. Promote open access publications
Making an Impact	1. Participate in the publication process 2. Disseminate results to the research community 3. Teach in academic or vocational contexts 4. Communicate to the broad public 5. Increase the impact of Science on Policy and Society 6. Promote open innovation 7. Promote the transfer of knowledge
Self-management	1. Manage personal professional development 2. Show entrepreneurial spirit 3. Plan self-organisation 4. Cope with pressure
Cognitive abilities	1. Abstract thinking 2. Critical thinking 3. Analytical thinking 4. Strategic thinking 5. Systemic thinking 6. Problem solving 7. Creativity
Work with others	1. Interact professionally 2. Develop networks 3. Work in teams 4. Ensure wellbeing at work 5. Build mentor-mentee relationships 6. Promote inclusion & diversity
Managing research tools	1. Managing research data 2. Promote citizen science 3. Manage intellectual property rights 4. Operate open-source software
Doing research	1. Have disciplinary expertise 2. Perform scientific research 3. Conduct interdisciplinary research 4. Write research documents 5. Apply research ethics and integrity principles

Figure 38. ResearchComp

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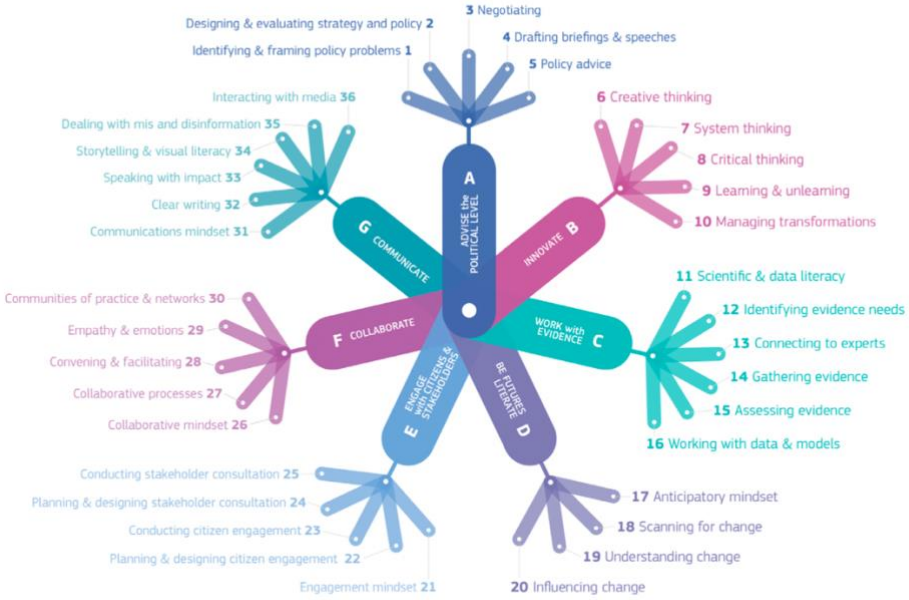
PolicyComp[19]



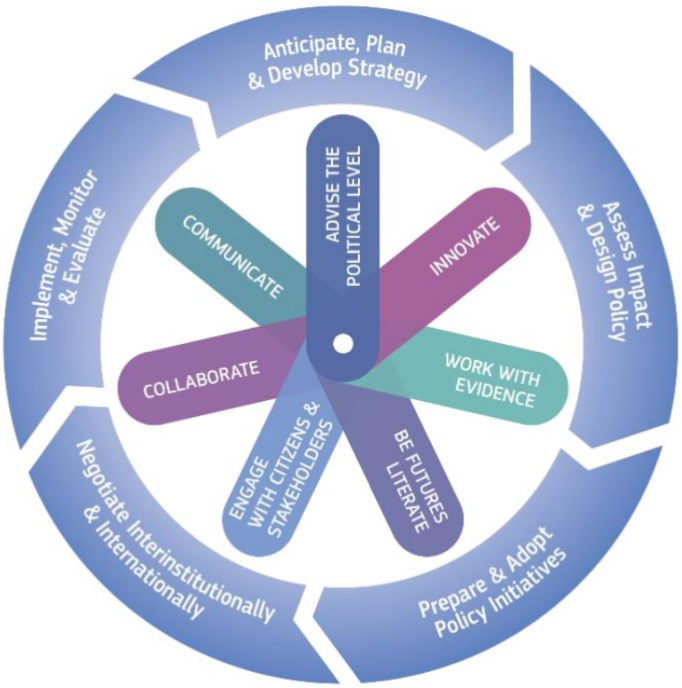


Figure 39. PolicyComp

[19] Competence frameworks for policymakers and researchers, https://knowledge4policy.ec.europa.eu/projects-activities/competence-frameworks-policymakers-researchers_en

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4.2.5 Stakeholder Conversations

During the many small-scale stakeholder conversations throughout the research process, a broad range future skills-related terms and themes entered (and left) the conversation as we discussed observations and outcomes with others - as one would expect from a sector whose self-image includes the creation of ideas as well as imaginaries.

The following three stood out as recurring themes: the logics underlying how we talk about the future, the power of "disruption" over our ability to think about innovation, the new, futures differently, and the wide range of approaches of exploring futures in our sector.

Modes of Reasoning

Our thought on future skills follows a variety of modes of reasoning - reflecting the diversity of stakeholder perspectives across the CYANOTYPES network, but also across the creative sector. Keeping these in mind can help reframe potential conflicts - in styles of research and learning, but also the design of learning processes. Awareness of such diversity is also a key element in the reframing of intelligence - see below on the analysis of why such a reframing is called for especially in response to the central role of technology in creative sector approaches to future skills.

deductive	top-down formal logic to find evidence to prove theory
inductive	bottom-up theory building to explain observations
abductive	best guess in uncertain contexts
backward induction	reverse-engineering from end state
critical thinking	drawing conclusions in objective, informed manner
counterfactual thinking	considering that thought to be impossible
intuitive	judgements made by the mind, perceived by unconscious

Disruptive vs Non-Disruptive Innovation

The terms "disruption" and "innovation" have become coupled to the extent that to many they are interchangeable. Unfortunately, this has often led to a *de facto* framing of "future skills" conversations in ways that assume that such disruption is a must-have-feature of future innovation dynamics and should therefore focus future skilling processes. [20]

[20] For an example of this sentiment, see a report by the Fraunhofer Group on Innovation Research: "The best brains are no longer the exclusive determining factor for the further development of products, services, processes and business models, but also the best machine integration of market requirements and of social and technological developments. In this way, **incremental innovations in which existing solutions undergo gradual further**

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This means that **many other, less-disruptive forms of innovation are not taken into account in the anticipation and assessment of the possible impact of future skilling**. What is more, the expectation of the new to "disrupt" the old can end up disempowering innovation actors willing to act in new roles in transformation processes that call for the alignment of multiple points of leverage to advance systemic change. If future skill is defined in relation to the future impact of skill application, this matters.

> "Nondisruptive creation is not the same as – nor should it be confused with – scientific invention or technological innovation, or new-to-the-world products or services. Nor is it concerned with a specific geographic market or demographic group, such as the bottom of the pyramid, or a certain socioeconomic level, such as the low end. Nondisruptive creation is distinct from existing innovation concepts and can be defined as "the creation of a brand-new market outside or beyond the boundaries of existing industries". It is precisely because the new industry is created outside the bounds of existing industries that there is no existing market or established players to be disrupted and fail, yielding **nondisruptive growth**."[21]

development are now propelled primarily by algorithms that ensure an optimal match between the requirements identified and their conditions of fulfillment. By contrast, **human creativity will continue to be the focus in the future for radical innovations** leading to leaps in performance and based on making connections between solutions beyond the established paths of innovation." *Understanding Change - Shaping the Future: Impulses for the Future of Innovation*, https://www.innovationsforschung.fraunhofer.de/content/dam/iao/innovationsforschung/documents/Fraunhofer-INNOVATION_Innovation2030_EN.pdf

[21] W. C. Kim, R. Mauborgne (2023), "Nondisruptive Creation: An Alternative Path to Innovation and Growth?, INSEAD, https://knowledge.insead.edu/strategy/nondisruptive-creation-alternative-path-innovation-and-growth

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Multiple Futures

The European conversation on skills is itself framed by a series of strategic foresighting approaches, and it has been sobering to realize how much the future of artists and designers - how and what they (need to) learn, how such learning can be organized - is enmeshed with broader geopolitical objectives about Europe as a whole, the future of its economy, and the conflicts that arise when the three vectors of the "triple transition" - a transformation that is digital, green, and social - don't align with each other.[22]

The diversity of views on innovation is being documented in innovation research. The Gartner "Hype Cycle for Innovation Practices" offers an overview of the "rise and fall" of innovation narratives.[23] According "speculative design" the role of an "innovation trigger", it suggests that even mainstream innovation research is (finally) coming to terms with the central role of arts and culture methods in our efforts to anticipate what is next.

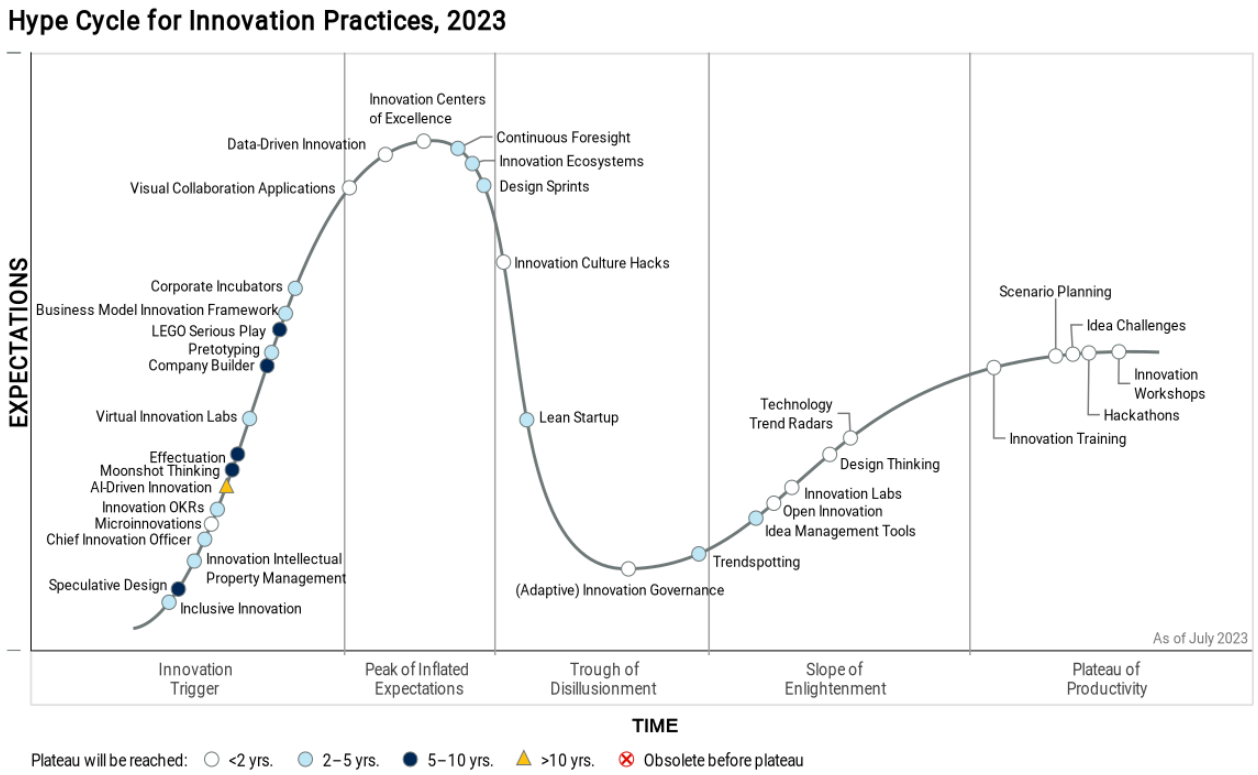

Figure 40. Hype Cycle for Innovation Practices

[22] https://commission.europa.eu/strategy-and-policy/strategic-planning/strategic-foresight_en

[23] P. Skyttegaard, D. Cearley, T. Fujiwara, G. Mundeja, C. Stephan (2023), Hype Cycle for Innovation Practices, (Gartner), https://www.gartner.com/doc/reprints?id=1-2EMHH16L&ct=230803; also see https://www.vinnova.se/en/m/emerging-innovations for an overview of innovation research centers

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4.3. SCENARIO DEVELOPMENT

In this section, we briefly summarize the design process for our “future skills scenarios” stakeholder workshop series and their outcomes.

4.3.1 Create a Shared Vision

CYANOTYPES is all about future skillsets - to bring everyone on board, we introduced how across the workshops series we explore key developments driving the need for new skillsets. We then engaged (via a shared online document) with a short survey (to be used for in-depth interviews later), focusing on the what (how do you - as individual and/or organization - define a “future” skill), when (what is your timeframe for future skilling), and who (who are your skilling partners / co-agents) of skilling processes. Participants explored one of the competence frameworks (GreenComp, reflecting a broad interest in the role of sustainability in the future skills conversation) to assess how this “reference curriculum” could possibly help describe what they do in their own contexts in ways that allow for comparative analysis across contexts. The idea of the “competence ecosystems”, and the need to focus on the many processes of learning outside educational institutions introduced as part of this overview, resonated across stakeholders - some of which were familiar with regenerative economics frameworks from their work in urban and regional development but had not yet linked it to the creative sector future skills conversation.

The visual below shows the shared (and for many surprising) collaborative assessment that arts and culture are central to all of the skilling areas identified in the sample framework explored - opening the way for a more confident involvement of creatives in a European conversation on skills that has tended to highlight technological expertise.

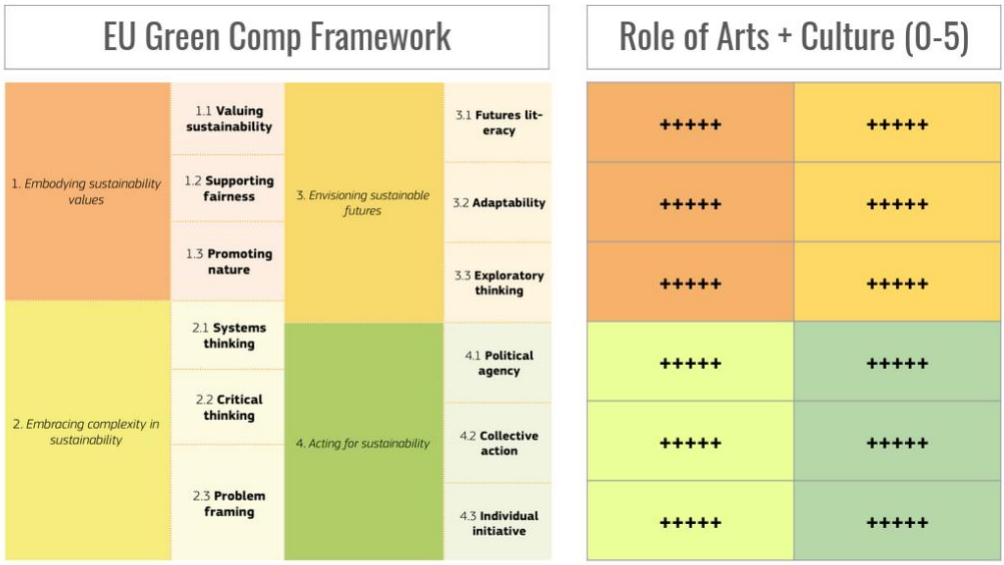

Figure 41. The Role of Arts and Culture in EU Green Comp Framework

4.3.2 Co-Design Skill Sets with Cross-Competence Frameworks

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To frame the future skills conversation in ways that are both pragmatic and reflective of the diversity of learning contexts, we selected six out of the major competence frameworks (see above). The implementation (and iterative development) of these frameworks is hosted by "communities of practice" (CoPs) that include several hundred members from across the sector and beyond, offering CYANOTYPES (whose organizational members coordinate some of these CoPs) unique opportunities to share outcomes.

4.3.3 Build Ecosystem Vision

The third stage in our scenario development focused on triple loop learning in an ecosystem context. Designed as a 1-5 sequence as well, we had prepared and then shared with participants the following story:

Design Competence Ecosystems
While we refer to 'futures literacies' all the time in our research conversation, the very idea of 'future skills' seems overwhelming to many educators in our network, the existence of other comprehensive frameworks notwithstanding.[24] We have found that one way to structure the sprawling sense of what counts as a 'future skill' is to begin by outlining the competence ecosystem around our own organization: who is in it, who is a potential skilling partner?

Knowing that we are not alone in having to offer the full range of future skills helps focus on our respective strength and complementarities as we define what it is we should focus on. It also calls attention to the relationship between how our different organizational contexts affect how we imagine the future of learning and the range of future skills. We here have taken inspiration from SITRA, the Finnish innovation agency, whose report on "competence ecosystems" highlights the need to un-learn mental models as a key element of skilling processes, and gives workplace-based learning a central role as "**new competence is gained outside the education system"**.[25]

This changes the conventional focus of the skilling conversation - in our view: the relationship between learner and organization in the organizational context in which we ourselves act - and shifts it to processes with which we are a lot less comfortable: **what is happening outside our own organizational contexts, beyond the institutional and methodological boundaries of learning as we know it**. Our research therefore has followed a 'transcontextual' approach, focusing on the relationships between overlapping (individual, organizational, ecosystemic) contexts of learning.[26] In this approach, triple loop learning

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[24] R. Miller, ed. (2018), *Transforming the future: anticipation in the 21st century* (Paris: UNESCO), https://unesdoc.unesco.org/ark:/48223/pf0000264644; U.-D. Ehlers, S. A. Kellermann (2019), *Future Skills - The Future of Learning and Higher education*. Results of the International Future Skills Delphi Survey, Karlsruhe, https://nextskills.org. Also see A. Kotsiou, D. Fajardo-Tovar, T. Cowhitt, L. Major, R. Wegerif (2022), "A scoping review of Future Skills frameworks," *Irish Educational Studies,*41:1, 171-186, DOI: 10.1080/03323315.2021.2022522
Given the availability of a range of relevant European frameworks with existing and often vibrant communities of practice, we have chosen to consult these other frameworks but focus on European-level reference frameworks to facilitate our stakeholder exchanges (see below).

[25] SITRA (2022), *Future skills are created in ecosystems: Description of the new skills system*, 6, https://www.sitra.fi/en/publications/future-skills-are-created-in-ecosystems-summary/

[26] "The term "Transcontextual" refers to the ways in which multiple contexts come together to form complex systems. It allows for a concentration on the interdependency between contexts that give resilience to both living and non-living systems. Transcontextual description offers insights into where contextual overlap is reinforcing the

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becomes a way of moving across such a space of possibility to better comprehend how we may 'commensurate' different spaces of learning and the logics and values that are relevant in these spaces.

Build a Shared Language

As such a 'space of possibility', what happens across the competence ecosystem is framed by stories (narratives) that anticipate the roles we can play and the scripts we have available for our (inter)actions. Most fundamentally, however, it needs a shared conceptual idiom: beyond invocations of 'learning' and 'skilling' or 'competencies' and 'capabilities', how do we frame the conversation, if the goal of framing is to turn the space of possibility into a space of engagement in which everyone has a role and a voice? The workshop introduced a first set of terms to be integrated into the research network's evolving glossary, including agency, intelligence, contexts, impact, values, cognition, knowledge, innovation, and design.[27] Quite an ambitious list, but these are terms that have come up again and again in our multi-disciplinary research network conversations. And if the 'competence ecosystem' is not subject to a single logic of governance, but a dynamic space of possibility, it makes sense to keep track of the state of play by naming the initial elements of a conceptual constellation likely to expand in the process.[28]

The analytical scope of every one of the terms on the list is affected by the triple loop learning context in which it is used - individual, organizational, ecosystemic. This is how the research method strives to link work in the network to the current moment of transformation: the soul-searching across the creative actor following the introduction of new 'generative' socio-technological systems has involved renewed attention to definitions of cognition and intelligence, but also the value of creative expression and the possible impact of automating such creative expression. If the language we share is in flux, and we attempt to follow and facilitate change, the best we can do is to create a dynamic map of the terms at play to accompany our collective learning journey.

Explore the Matrix

What emerges is a matrix of terms that suggests pathways across the competence ecosystem - the learning journeys we organize to acquire skills in whatever sequence our needs assessments and resource planning suggests.

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status quo and where it is loose enough to initiate shifts." In her usage of the term, Nora Bateson (2022) references her father's work on the "transcontextual" in his essay collection Steps to an Ecology of Mind.

[27] One outcome of the workshop cycle has been the **co-development of an FAQ section to document and expand this shared vocabulary** (made available at cyanotypes.website for a wider audience).

[28] Our usage of the term "constellations" owes much to the writings of Walter Benjamin. See for an introduction also Gilloch 2002: "The notion of the constellation captures both the potential deceptiveness of any scheme - points which seem nearest to one another may prove to be those furthest apart - and their contingency. Each constellation must be recognized as only one permutation among an infinite number of possible configura-tions, conjunctions and correspondences" (ibid. 25).

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#	Agency	Intelligence	Contexts	Impact	Values	Cognition	Knowledge	Innovation	Design
1	individual	multiple	skills	self	private	embodied	seeing / hearing (all senses)	adaptive / enhancing	for interaction
2	organizational	collective	curricula	institution	community	embedded	doing	mission / aggregative	for governance
3	ecosystemic	systems	competence ecosystem	society	public	extended	imagining	anticipatory / disruptive	for evolution

Figure 42. CYANOTYPES Matrix of terms used in the conversation on future skills

And while time for skilling is scarce in all learning contexts with which we are familiar, the process of triple loop learning is less about efficiently connecting all of the dots to accelerate skilling than a skillset of its own: the **self-organization of learning journeys based on individual needs and values.**

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Enter the Third Loop

Theories of triple loop learning come from a range of disciplinary perspectives, but they usually cover actions ('are we doing things right'), assumptions ('are we doing the right things'), and values ('how do we choose / decide / know'); we use the three loops also to refer to different levels of agency (individual, organizational, ecosystemic) as part of our interest in facilitating a transcontextual approach in which a competence ecosystem includes a diversity of learning contexts.

When the term 'triple loop learning' appeared "contemporaneous with the emergence of the 'learning organization' theme" in the 1990s, it expanded the focus of analysis: "since double-loop learning involves correction of governing variables, it would appear that **triple-loop learning should be concerned with change in whatever governs those governing variables**" be it to change paradigms or build reflexivity into learning systems.[29] In their review of cybernernetics pioneer Gregory Bateson's levels of learning that are often referenced in such research, they note that "a central feature of Bateson's conceptualization is that higher order learning entails risk, and calls into question the wisdom of the apparent hunger for transformational learning in organizations." [30] Comparing the focus of paradigmatic changes (A) and reflexivity (B) to these levels of learning, they conclude that "[f]undamentally, Bateson's conceptualization is about wisdom rather than rational knowledge. It involves a change of epistemology - that is, a **change in the form of knowing and learning - not merely a change in subject matter** (as from operations to strategy in conceptualization A) or a reflexivity about the process of learning, as in conceptualization B".[31] They also note that "Instead of inductive generalization, Bateson favoured abduction, where he used empirical data to illustrate the operationalization of his concepts, not to provide empirical proof."[32] We find great use in such a **differentiation between three vectors of triple loop learning that in turn reflect different priorities - paradigm change, reflexivity, and risk** - as we, too, are not (yet) conducting empirical work comparing differently-looped learning processes but are still at the stage of framing our research conversation.

At this stage, **being able to take into consideration these three vectors allows us to address a wide range of stakeholders across the creative sector**, throwing into relief how their respective priorities influence the roles they play in the process of defining and designing learning systems - and what it is they can do to address whatever learning needs arise for individual, organizational, and ecosystemic actors.

In our workshops, we have therefore schematized the "triple loop" to refer to these three types of contexts in terms of the kinds of agency we associate with them - individual, organizational, ecosystemic - to simplify what we expect to evolve into a much more complex systems design process. We asked workshop participants to imagine the kinds of interactions they might have as individuals and organizations with such an ecosystemic actor, since the third 'ecosystemic'

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[29] P. Tosey, M. Visser, M. NK. Saunders (2011), "The origins and conceptualizations of 'triple-loop' learning: A critical review", *Management Learning* 43.3, https://doi.org/10.1177/13505076114262, 239, 294

[30] ibid. 300

[31] ibid. 301

[32] ibid.

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loop seems furthest removed from well-known individual and organizational, often urgent needs. Which is why the workshop introduced the new **EIT Culture and Creativity** as example of an ecosystemic actor.

The European Union organizes innovation support through different instruments, and the European Institute of Technology (EIT) is one of the largest, including different sectoral (and increasingly cross-sectoral) innovation agencies.[33] Acting as an 'ecosystem builder' across the creative sector, the EIT Culture and Creativity was created in 2023, covers 5 strategic objectives (Education, Innovation, Creation, Society, Systems), and involves creative sector organizations as (voting) members of the EIT as well as in 'Strategic Topic Groups' in which they cooperate on key innovation trends.[34] Future skills, future markets, future wellbeing: **redesigning the conditions under which creative activity occur require a degree of anticipation that is not yet the norm in policy making**. The EIT can do much to change this, tapping into the sector's potential for imagination to inspire regenerative futures.[35] The EIT can partner with those (inside and outside the EIT system) who already translate such scenarios into innovation governance strategies[36] and impact-driven investment.[37]

While the workshop triggered interest in how a sectoral agency such as the new EIT Culture & Creativity might facilitate the self-positioning in a wider competence ecosystem through its various innovation support instruments, the conversation quickly returned to individual and organizational contexts - suggesting to us that **the third loop remains the biggest challenge** as we re-design the triple loop learning conversation space.

Prototype Futures

The conversation spaces offered by the workshop only allowed us to imagine rather than initiate interactions with the (innovation) ecosystem around arts and culture organizations, but there was a widely shared **sense of urgency in addressing the shifts occasioned by new socio-technological systems** such as the 'generative' platforms powered by large language models. As we look back at and assess the workshop conversation (and related conversations across the CYANOTYPES network on urgent and future skills), it has become clear that we are less prepared to engage with this dynamic than we had expected (see separate analysis of "deep tech" below).

[33] https://eit.europa.eu

[34] https://eit-culture-creativity.eu. The STG "Virtual Worlds and Immersive Realities" explicitly deals with deep tech developments, especially as they relate to the design of interactive and immersive experiences. Also see Hupont Torres et al 2023. As the EIT C&C continues to iterate its approach, these strategic areas have been revised to reflect stakeholder priorities as well as shift in innovation policy.

[35] See the key role accorded to anticipatory / speculative design methods in the 2023 Gartner Hype Cycle for Innovation Practices, https://www.gartner.com/doc/reprints?id=1-2EMHH16L&ct=230803

[36] See OECD (2023), A governance approach for anticipatory innovation ecosystems, in: The Public Governance of Anticipatory Innovation Ecosystems in Latvia: Exploring Applications in Key Sectors, OECD Public Governance Reviews (Jan 17), https://www.oecd-ilibrary.org/sites/5c8c42c8-en/index.html?itemId=/content/component/5c8c42c8-en

[37] https://www.evpa.ngo

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4.3.4 Integrate Triple Loop Learning

If wider involvement in systemic design is the challenge, moving beyond feedback loops toward the co-creation of new mental models capable of inspiring and informing new forms of action, the triple loop is the message. With historical and methodological roots in the cross-disciplinary traditions of arts-and-technology experimentation, the CYANOTYPES research network has adopted a triple-loop-learning approach to frame its analysis as well as the implementation of new learning processes.

Our usage of triple loop learning has been pragmatic, reflecting our interest in bringing together the individual, organizational, and ecosystemic dimensions of learning across the creative sector's existing and emerging competence ecosystems. We are convinced that a triple loop learning approach is a useful way to frame our co-creative engagement with a new generation of socio-technological systems, and that it is high time to take seriously the **challenge of organizing triple loop learning across the diversity of learning contexts** we are involved in.

Since dealing with technological objects, infrastructures, and systems involves questions of technology as much as the (cultural) techniques informing their design and use, we decided not to frame our thoughts in terms of social innovation, sometimes suggesting a (misleading) dichotomy between the technological and the non-technological. Instead, we hope to re-frame such schematizations through an emphasis on 'triple loop learning' (involving both social and technological innovations) to focus on the dynamic interplay between individual, organizational, and ecosystemic layers of change - and how we might learn from each other how to approach these changes in our respective contexts across the creative sector.

4.3.5 Co-Work with Generative Systems

Facilitated by CYANOTYPES partner MyData Global, the workshop adopted a persona-based approach, encouraging to work with different platforms to explore the role of generative ai in a variety of ideation and implementation contexts. Through a series of exercises, the practice-oriented collaboration exploration focused on the role of (software) agents in assisting us in the completion of a wide range of design-related tasks. Because of the (current) human-machine interaction paradigm - creating textual prompts to initiate, then iterate generative ai responses and outcomes refinements - such exercises **make explicit implicit knowledges** (following a process possibly without being fully aware of all of the assumptions that structure it). Such **awareness of how both human and non-human agency is distributed across processes and systems** is key if creatives are to play a larger role in the design of the socio-technological systems likely to play an ever-larger role in their work.

4.3.6 Learn in Competence Ecosystems

At the Vienna consortium conference, participants engaged in a rich discussion about the future of creatives in the context of evolving technologies and societal demands. A key focus was on the **autonomy of creatives in defining their identities**, emphasizing the need for individual self-expression beyond rigid frameworks. The European context was recognized as significantly influencing creative skills development, with local challenges and the interplay of

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technology reshaping the creative landscape. The '**Slow Movement,**' favouring tangible, traditional creativity, emerged as a notable counterbalance to the rapid technological advancements, suggesting a dynamic interplay between old and new forms of creativity.

The discussion also highlighted the divide between formally trained and informal creatives, stressing the importance of **valuing diverse learning paths** in the creative sector. Participants explored holistic approaches to creativity beyond a sole focus on technology, addressing concerns about the rapid evolution of creative styles and the potential loss of traditional skills. The impact of digital transition was another critical topic, with examples from various regions illustrating the tension between traditional creative roles and new digital demands. The role of analogue versus digital methods in documentation was debated, considering the unique skills each approach brings and the broader social contract needed for success in the creative sector.

Overall, the deliberations at the Vienna conference shed light on the multifaceted challenges and opportunities facing the creative sector. From the importance of self-definition for creatives to the impact of digital technologies, the conversation underscored the sector's complexity in an era of rapid change. As technology and societal attitudes towards creativity continue to evolve, these discussions provide valuable insights into the future pathways for creatives, balancing traditional practices with the demands of a digital world.

4.3.7 Launch Strategic Roadmap

Survey Responses

When we compare our “scenario cycle” outcomes to other surveys conducted by Cyanotype researchers, several shared concerns emerge as the reappear across contexts. The topic of future skills seems an important area for 2/3 of survey participants (107 out of 177), and “future skills” is generally understood to mean “ability to work with future technologies” (AI receives frequent mention). Some respondents (about 5%) refer to “urgent” skills (so assumption of overlap / similarities between urgent and future skills). The language used in responses varies greatly - there is not yet a shared language to talk about skills, nor is there a shared foundational narrative that would facilitate a cross-sectoral conversation. Most interviewees share a general awareness of how new technologies transforms entire ecosystem / contexts, but the “big picture” of systems design is mentioned as a skilling area of its own only by a few respondents. Noticeable are a few responses as they highlight key but generally neglected future skilling areas: financial literacy (among those who mention it, there is great awareness of role of digital finance in transforming creative sector business models); neuro-diversity / special needs; attention to legal contexts / organizational forms (how does the type of organization affect skilling); solidarity among creatives as technology transforms the sector. These areas are taken into account by CYANOTYPES future skills-related research. The survey doesn’t allow for analysis of contexts (skills related to skilling context, possible differences VET / higher learning etc). Many respondents mix hard / specific and soft / transversal skills in their description, and there is lots of overlap with the European competency frameworks that have been taken into account by CYANOTYPES as source of future skills.

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Framework Overlap and the Rise of Transformation Agency

Not all stakeholders have embraced the approach to align CYANOTYPES so closely with European competence frameworks, mainly because their **soft-skill focus has led to a lot of overlap among frameworks**. In our research perspective, this can also be seen as a source of strength - highlighting the centrality of transversal skillsets to all learning contexts. In this view, **framework overlap anchors transversal skills in all fields and highlights its central role**. This aligns with another research outcome - that across the sector, the ambivalence regarding the role of technology has led to more holistic assessments of how future skills can and need to be approached.[38]

In the case of future skills, we would like to stress especially the **overlap between ResearchComp and the Policy Framework for Policymaking** as well as the complementary aspects between EntreComp and another framework not yet presented, the OECD/INFE Core Competences Framework on **financial literacy** for MSMEs (2018).[39]

The use of ResearchComp is relevant to us as we are a high education institution, doing research and training, which has the potential to directly inform policymaking, establishing therefore a direct link with the second framework of the Policy Framework for Policymaking: 'Science for Policy'. In the case of EntreComp we are specifically addressing competencies in the area 'resources' and in the thread 'Financial and Economic Literacy'. The OECD/INFE Core Competences Framework on financial literacy for MSMEs, even if not directed to all types of entrepreneurial context, is valued as an **extended approach to finance in all levels of entrepreneurial action** and it opens way to think about digital finance - though not as thoroughly exploited as we foresee necessary.

Finally, we have witnessed a *de facto* **renaissance of LifeComp** as core element of a broader transformation agenda in which the value of human labour will need to be affirmed in new ways, including the role of creatives as sensemakers and co-creators of new modes of relation among a much wider range of human and non-human actors and agencies.

Beyond CYANOTYPES: Alternative Skilling Frameworks

Across the world, creative sector organizations are eager to adapt to change and anticipate what forms of learning might best sustain creatives in the future. We are convinced that there is an opening now that Europe has prioritized skills -to combine a focus on urgency and addressing the challenges arising from the polycrisis with a mid- and long-term focus on organizational and ecosystem development - hence operationalizing the triple loop learning framework design to address individual, organizational, and ecosystemic dynamics of change. This opening offers many opportunities to link what we do across Europe to efforts beyond our geographical and cultural boundaries.

[38] See, for example, Stifterverband (2021), *Future skills: 21 Kompetenzen für eine Welt im Wandel*, https://www.stifterverband.org/medien/future-skills-2021, which expands an originally digital literacy-focused future skills framework through a set of transversal skills related to transformation in a process that exemplifies the shift addressed in our research - from a technology-centric approach to a broader process- and systems-design approach.

[39] https://www.oecd.org/finance/OECD-INFE-core-competencies-framework-on-financial-literacy-for-MSMEs.pdf

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4.4. VALIDATION AND TRANSFER POTENTIAL

4.4.1 Expanding Competence Frameworks

Our interest in more interaction with the systems design community as the identification of skills gaps and future skills will have to be followed by a range of activities related not only to curricular (re)design but also organizational and competence ecosystem development. To foster such an expansion of the future skills conversation (and the transfer into diverse learning contexts), CYANOTYPES will continue to work with the **triple loop learning** model that integrates the individual, organizational, and ecosystemic registers of change (not least because this offers a way **to build "communities of change"** - many stakeholders have responded throughout the research process that they feel left alone in their efforts and welcome new forms of networking and mutual support.

CYANOTYPES will activate framework expansion approaches as people already familiar with a framework don't need to be "onboarded" into a new conversation, and dynamic Community of Practices already exist. The same holds for All Digital (for EntreComp, CYANOTYPES partner Materahub is the coordinator, Materahub is involved in DigComp). Pilots in which such framework expansion structure work are under development, one specifically that links new developments in digital finance to EntreComp. In this way CYANOTYPES seeks to build upon the valuable work already done and also to provide an extra dimension that is both comprehensible and usable by existing communities as well as within the CCI specifically.

4.4.2 Expanding Agency and Intelligence with Deep Tech

The shift to an "ecology of technology" makes more sense than a continuation of tech-centrism vs holism. James Bridle may be right when he suggests that the distributions of technology offer us new opportunities to approach and comprehend the distributions of agency and intelligence more generally. Given the tremendous impact generative AI has already had on creative work, we aim to work towards building on integrating generative ai into the research and transfer process, effectively adding a powerful feedback loop that demonstrates a new type of "more-than-human" cooperation[40].

4.4.3 Expanding the Skills Conversation beyond CYANOTYPES

Pilot "Generative Systems in Alternative Entrepreneurship Training" CYANOTYPES already cooperates with other projects. One that HBKS would like to pursue specifically links the interest in future skills, a focus on diversity and female entrepreneurship, and the integration of such educational concerns into sample "future skilling" modules at CYANOTYPES partners HBKsaar as well as (stakeholder) Mondragon Team Academy, the entrepreneurship training organization of Mondragon University (MU, Europe's largest university with a focus on the organizational culture of cooperatives). Concretely: HBKS and MU will a) share their existing

[40] See Esko Reinikainen, *CCI Skills Project Overview*, https://chat.openai.com/share/bac92dc0-12ed-4e15-867d-9cdc29dd37f5

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entrepreneurship training modules, b) explore CYANOTYPES research outcomes related to future skilling and the role of generative (artificial intelligence) systems in creative education, and c) develop pilot training modules that address the role of generative systems in entrepreneurship training for students in the creative sector and beyond.

4.4.4 Peer Review Publications

Our research on future skills has already been validate through peer-review research. Two publications are currently in publication, one follow-up paper to the systems design conference RSD12 and another to the design culture journal DIID published by the University of Bologna.

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4.5. WORKSHOPS (OVERVIEW)

Activity	Activity Title and Content	Results	Participants
Workshop (Helsinki) 22-11-22	**"Future Skilling: Toward a Playbook for Anticipating Creative Futures"** presentation of research framework, scenario development cycle, comparative competence frameworks approach I	input for comparative competence framework analysis, agency model, selection of future skillsets	50, for org names see ELIA list
Workshop (Umea 23-02-14)	**"Generative Systems - How Intelligent Machines Transform Creative Labor"** presentation of research framework, scenario development cycle, comparative competence frameworks approach II	see above	50, see above
Workshop (Brussels) 23-03-24	**"Co-Design Skillsets: Toward a Playbook for Anticipating Creative Futures"** collaborative research on Green Comp framework	see above	50, see above
Workshop (Evora) 23-05-10	**"Integrate Triple Loop Learning"** collaborative research on triple loop learning methodology for future skills	see above	50, see above
Workshop (Helsingborg) 23-05-23	**"Generative Systems - How Intelligent Machines Transform Creative Labor"** collaborative research on generative systems	see above, hands-on exploration of state-of-the-art generative systems	50, see above
Workshop (All Digital Week)23-05-02	"**Build an Ecosystem View"** collaborative research on DigComp	see above	33, see above
Workshop (Materahub) 23-09-12	**"Entrecomp Futures"** collaborative research on Life Comp / EntreComp	see above	5, Materahub, HBKS
Workshop (Zagreb) 23-09-27	**"Our Creative Nature: Future Skilling Research in Times of Transition"** collaborative research on multi-sided agency model	see above, validation of outcomes with stakeholders (digital education professionals from across Europe)	50
Workshop (Stuttgart) 23-09-28	**"Our Creative Nature: Future Skilling Research in Times of Transition"** collaborative research on multi-sided agency model	see above, validation of outcomes with stakeholders (creative professionals from across a CYANOTYPES partner region)	140
Workshop (Vienna) 23-10-11	**"Our Creative Nature: Future Skilling Research in Times of Transition"** collaborative research on cross-sectoral value creation	see above, validation of outcomes with stakeholders (workshop with CYANOTYPES	250

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		stakeholders from across Europe)	
Workshop (Manchester) 23-10-18	**"Our Creative Nature: Future Skilling Research in Times of Transition"** future skilling and organizational development, competence ecosystem design	see above, validation of outcomes with stakeholders (higher education leaders from across Europe)	50
Workshop (Berlin) 23-12-11	**"Our Creative Nature: Future Skilling Research in Times of Transition"** future skilling and organizational development, competence ecosystem design, cooperation across regional innovation ecosystems (here: Saar / Basque country)	see above, validation of outcomes with stakeholders (trainers in entrepreneurship program), transfer of validated outcomes into WP3 / cross-regional pilot	10

4.6. PROVISIONAL OUTCOMES: FUTURE SKILLS

While the creative sector is itself an exemplary dynamic of cross-sectoral value creation, certain skillsets apply across all subsectors and can be considered transversal - mainly those related to the exercise of creativity itself (ideation, design, prototyping, etc). The acquisition and application of transversal skillsets changes as the conditions of skilling and application change. At this stage of research, the focus has been on making "transversal" tangible, finding an agency/empowerment-oriented approach that can assisting in the development and design of curricula. Across interviews, workshops, and skills research, the following 55 skilling areas have been highlighted and reflect a shared sense of what future skilling should focus on.

	Competence	**Skills**
1	Creativity and Ideation	The ability to generate innovative ideas and solutions that meet future needs and challenges, approach problems from multiple perspectives, and find novel solutions to complex problems, using techniques such as brainstorming, prototyping, and design thinking. As automation increasingly takes over routine tasks, human creativity and imagination become even more valuable
2	Collaboration and Communication	Effective collaboration and communication skills are crucial for creatives working on projects that involve diverse teams, stakeholders, and clients. This includes active listening, empathy, and negotiation abilities, managing conflicts in a productive manner, communicate clearly, and foster

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		meaningful partnerships across disciplines, industries, and cultures
3	Digital Literacy and Technical Skills	Proficiency in software applications and in using cutting-edge tools, and platforms commonly used in the creative industry, such as Adobe Creative Suite, Sketch, Figma, or Blender, and that enhance creativity, efficiency, and collaboration such as coding, 3D printing, and virtual reality. Additionally, understanding basic coding principles, to create and deliver digital content, data analysis, and digital security practices can enhance one's skillset
4	Critical Thinking and Problem-Solving	The capacity to analyse complex information, identify patterns, and develop strategic responses to address complex challenges. This involves evaluating data, identifying (data) biases, and making informed decisions
5	Emotional Intelligence and Empathy	Understanding and managing one's own emotions, as well as being able to relate to others, read and respond appropriately to their emotions, and design products and experiences that resonate with diverse users, is critical for building strong relationships within creative teams and with clients
6	Adaptability and Resilience	The ability to pivot quickly in response to changes in technology, trends, and client needs is essential for creative professionals, as well as bouncing back from setbacks, and maintain a positive attitude in the face of uncertainty. This requires a growth mindset, flexibility, and an openness to learning from failures
7	Data Analysis and Interpretation	The capability to collect, process, and interpret data to inform design decisions, optimize workflows, and measure success, drawing on skills in data science, machine learning, and statistics
8	Project Management and Time Management	The ability to prioritize tasks, manage time effectively, and meet deadlines, and coordinate multiple projects simultaneously
9	Project Management and Leadership	Strong organizational and leadership abilities to oversee multidisciplinary projects, prioritize tasks, manage timelines, and ensure effective communication among team members

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10	Sustainability and Ethics	Knowledge of sustainable practices, ethical principles, and social responsibility, and the ability to integrate these considerations into creative decision-making, reflecting the United Nations' Sustainable Development Goals (SDGs) and the principles of the circular economy
11	Sustainability and social Impact Awareness	The knowledge and skills required to create sustainable and socially responsible artistic works, products, and services that contribute positively to society and minimize harm to the environment
12	Eco-Design and sustainable Production	Developing environmentally conscious designs, materials, and manufacturing processes that minimize waste, reduce carbon footprints, and promote sustainable consumption, echoing the principles of circular economy frameworks
13	Climate Action and Environmental Design	Appreciation for environmental concerns and the ability to incorporate sustainable thinking into creative problem-solving, production methods, and brand storytelling
14	Storytelling and Narrative Design	Harnessing the power of narrative to convey compelling messages, engage audiences, and create memorable experiences, acknowledging the importance of storytelling in human communication and creative expression
15	Service Design and User Experience	Delivering seamless, intuitive, and satisfying interactions that meet users' needs, desires, and expectations, building on best practices in service design, UX, and UI
16	Immersive Experience Design	Creating immersive experiences that combine physical and digital elements to captivate audiences, considering the rise of virtual, augmented, and mixed reality technologies, and the increasing demand for experiential entertainment, retail, and events
17	Artificial Intelligence and	Basic knowledge of AI and ML concepts, including natural language processing, computer vision, and predictive

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	Machine Learning	analytics, and how they can aid creative professionals in generating novel ideas, streamlining processes, and improving user experience
18	Blockchain and Intellectual Property	Understanding blockchain technology's role in protecting intellectual property rights and ensuring authenticity in creative industries like music, art, and fashion
19	Entrepreneurship and Risk-Taking	The willingness to take calculated risks, develop business plans, and market oneself and one's ideas to potential clients or investors
20	Entrepreneurship and Business Acumen	An understanding of business fundamentals, market trends, and revenue models, enabling creatives to commercialize their talents, build successful start-ups, and navigate the gig economy
21	Social Impact and Community Engagement:	Using creativity to drive positive social change, engaging with local communities, and promoting social justice, diversity, and inclusion, aligning with UNESCO's commitment to fostering peace, tolerance, and human dignity
22	Global Citizenship and Cross-Cultural Competence	Understanding the global context, appreciating cultural differences, and recognizing the impact of creative work on local and international communities, aligning with UNESCO's emphasis on intercultural dialogue and exchange
23	Strategic Foresight and Futures Thinking	Anticipating future trends, scenarios, and opportunities, and developing strategies to capitalize on them, informed by forecasting methodologies and futures studies, and cognizant of the potential implications of emerging technologies and societal shifts
24	Continuous Learning and Adaptability	Embracing lifelong learning, staying up-to-date with emerging trends and technologies, and adapting quickly to changes in the industry, inspired by the OECD's focus on continuous professional development
25	Risk Tolerance and Resilience	Accepting calculated risks, learning from failures, and persevering through challenges, reflecting the entrepreneurial spirit and mindset encouraged by creative industry associations.

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The lists define a range for action to be operationalized across a diversity of contexts. Above and beyond the specificity of the skill in question, future skilling therefore has to address these dynamics: the contingency and context-dependency of skillsets (what is futural depends on context). The following section introduces a creative agency model that relates these competences and skills to the frameworks and integrates them into a holistic model of how we (may) want to act in processes of transformation.

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4.7. TOOLKIT: CREATIVE AGENCY CIRCLE MODEL

"How can we encourage a way of learning that is able to grasp general, fundamental problems and insert partial. circumscribed knowledge within them?"

Edgar Morin[41]

To facilitate the design of curricula as well as individual skilling modules, research has reframed these skills in relationship to existing competency frameworks and a holistic creative agency model (see below):

Agency Focus	Framework Focus	◤ Capabilities Focus	◤ Competencies + Skills Focus
collective	relations (Life Comp / OECD)	◤ triple loop / learning to (un) learn ◤ context-awareness ◤ ecosystem / wellness mindset	◤ identify sites of change / transformation ◤ cultivate a sense of purpose, curiosity and an open mindset ◤ adopt cognitive flexibility and perspective-taking ◤ reframe / recontextualize experiences ◤ design cultures of cooperation / conversation spaces
public	decision (Policy Comp)	◤ collaborative decision-making ◤ translate / recontextualize ◤ innovation governance	◤ create and use innovation narratives to link actors ◤ design decision-making processes (effective, participatory, transparent) ◤ anticipate impact of decisions across contexts ◤ negotiate agendas across (cultural / geopolitical) contexts ◤ amplify innovation dynamics (procurement)
data-driven	technology (Dig Comp)	◤ data ecosystem design ◤ co-work with generative systems / trust ◤ verification processes	◤ engineer prompts ◤ address conceptual problems / situations in digital environments ◤ custom train generative system ◤ make data ecosystems interoperable ◤ develop (open / cooperative / participatory) data governance strategies
value-creating	value (Entre Comp)	◤ multiple utility / value model ◤ design / measure / assess impact ◤ digital finance / tokenomics	◤ define value propositions ◤ anticipate, define, and assess risk ◤ address / encourage / diversity of founders / funders ◤ plan / assess financial sustainability of value-creating activity ◤ identify / integrate market design strategies
regenerative	sustainability (Green Comp)	◤ 4-pillar model / culture ◤ anticipation / scenario development ◤ design for resilience	◤ use methods of foresighting / scenario development ◤ become aware of conditions of viability ◤ define role of human and non-human (ecosystemic, technological) agency ◤ employ sustainability metrics ◤ integrate active resilience (learn from experience, adjust action)

Figure 43. The Creative Agency Model

As educators in the cultural and creative sector, we tend to assume that education offers a useful response to change. In the case of future skills, we need to anticipate, extrapolate, speculate - the question of how exactly we make sense of what has not yet happened becomes a central research concern. So, research about the future of skilling must explore a range of possible, plausible, and preferable futures. Additionally, assumptions about the power of education to empower future creatives are currently being challenged by a new generation of intelligent systems that appear to allow the automation of creative expression. If machines can create, what comprehension of human creative agency should inform the design of educational processes?

[41] E. Morin (1999), *Seven complex lessons in education for the future* (Paris: UNESCO),, 1, https://unesdoc.unesco.org/ark:/48223/pf0000117740

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Building on our preliminary research on future skills, we introduce **a creative agency model designed to facilitate and focus future debate on the design of curricula and training modules**, contending that especially in the context of the growing role of intelligent systems in the creative process, a focus on creative agency makes sense to frame analysis as well as the design of learning processes. Like all models, it must limit the number of parameters taken into account. The model we present here focuses on five dimensions of creative agency: collective, public, data-driven, value-creating, and regenerative. The essay introduces all five and closes with an outlook on the role such a model might play in a future skills conversation.

The Creative Agency Model

The name of the CYANOTYPES research project, designed to explore possible futures of creative education, was inspired by an artistic practice, the work of Anna Atkins. A botanist and photography pioneer born in the late 18th century, Atkins' use of what was then a new technology (cyanotyping) to document algae in (literally) blue prints made sense in many ways: as a journey back to the arts-and-technology origins of the term blueprint we use today to refer to roadmaps and other foundational documents meant to inform strategic action, as an example of the combination of art and technology to improve our comprehension of the ecosystems and non-human agencies that sustain us, as a reminder of the diversity of creative innovation whose technology-centric narratives have come to be dominated by male actors.

Our research links this interest in broadening the scope of agency even before focusing on "creative" agency with another critical interest, the broadening of the scope of what is considered a site of learning. We are convinced that learning occurs in ecosystems - the multiplicity of material contexts in and across which we learn - that are capable of renewing themselves. Such use of the metaphor of the "ecosystems" is not an attempt to "ecologize" a conversation about learning but an acknowledgment that **we can no longer afford to separate our thinking about education from questions about the sustainability of what we do**. To ensure that such ecosystemic concerns are part of our conversation, we have adopted a "triple loop learning" framework that combines individual, organizational, and ecosystemic contexts of agency and expression in an effort to facilitate our reflection on future skilling and agency across these contexts.

Like all models, the creative agency model must limit the number of parameters taken into account. The model we present here focuses on **five dimensions of creative agency: collective, public, data-driven, value-creating, and regenerative.** This essay introduces all five and closes with an outlook on the role such a model might play in a future skills conversation.

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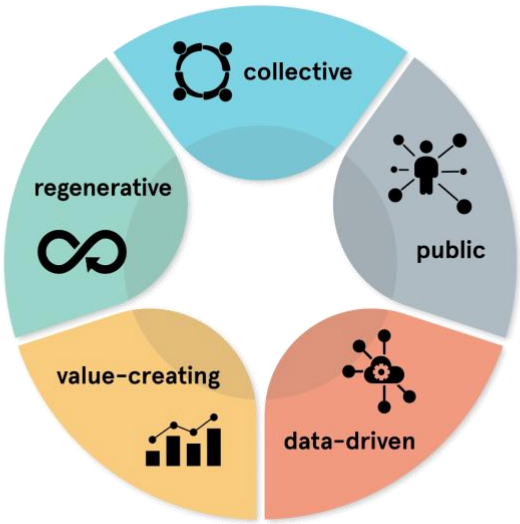

Figure 44. The Creative Agency Model. Source: Elburn, Zehle & Alves, 2023

4.7.1 Collective Agency

Collective agency refers to our ability to act-in-common - in new forms of cooperation, beyond existing actor constellations and organizational boundaries, and in new roles to assume new responsibilities, shape collective ideation, decision-making and participation processes. The collective extends beyond the human: what “we” can do depends on how we as human beings relate to the many forms of non-human agency around us.

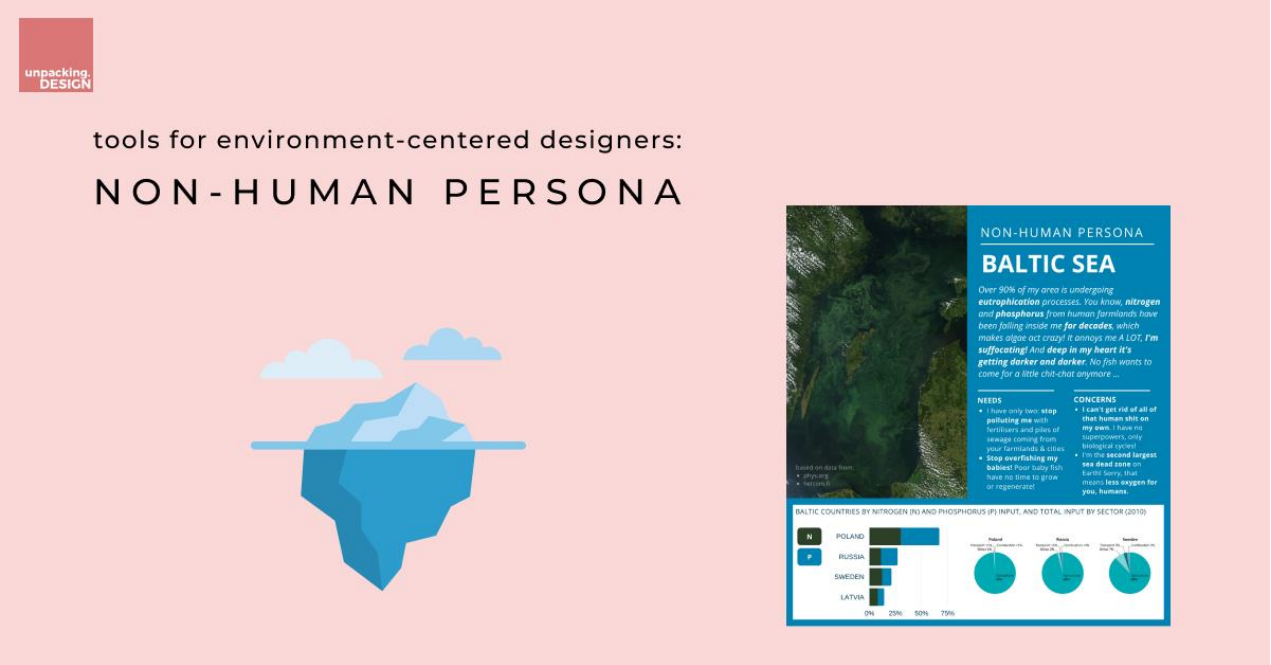

Figure 45. Example: Non-Human Personas

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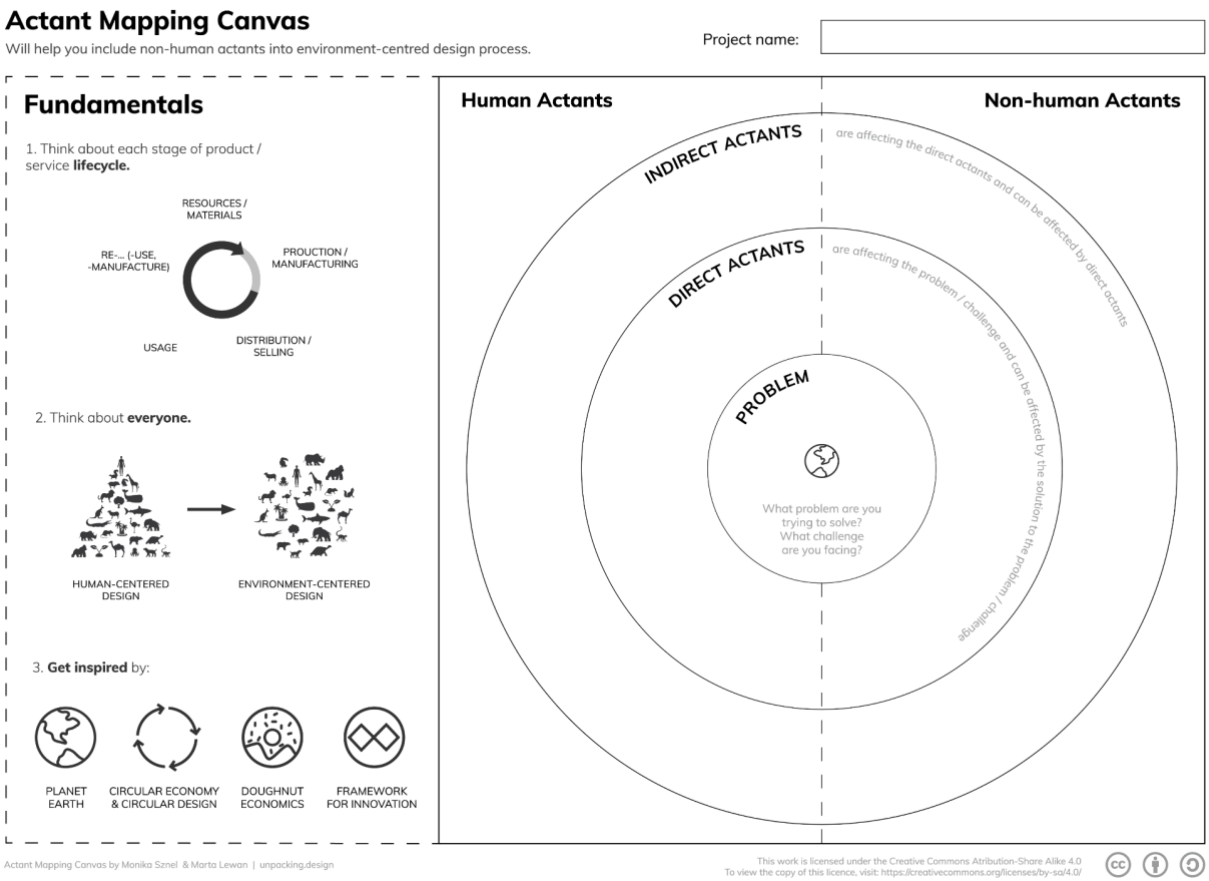

Figure 46. Actant Mapping Canvas. Source: Sznel, 2020[42]

The integration of non-human agency into creative work is not only a consequence of powerful software machines that appear to be able to automate creative expression. (and have already begun to radically change work and workflows across the creative sector). The question of how we can identify, make visible, and integrate into our decisions the agency of animals, bacteria, plants, and ecosystems has become another growing concern across the creative sector - reflecting the need to think these two dynamics together and highlight the interdependencies of the digital and the green transition[43].

[42] Monika Sznel, "The time for Environment-Centered Design has come", *UX Collective* (May 5), https://uxdesign.cc/the-time-for-environment-centered-design-has-come-770123c8cc61

[43] Our creative agency model here links with research into new imaginaries (such as the "holobiont") that might facilitate such an expanded understanding of agency. See, for example, Bruce Clarke (2017), "Planetary Immunity: Biopolitics, Gaia Theory, the Holobiont, and the Systems Counterculture," in Erich Hörl and James Burton, eds. *General Ecology: The New Ecological Paradigm* (London: Bloomsbury Academic).

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4.7.2 Public Agency

Across the creative sector, public actors play a central role in the development and implementation of regional transformation processes - from an “agile” state that reorganizes its processes to the (creative, artistic) interactive and immersive presentation of ideas in public spaces. Many educational institutions are part of the public sector, linking them more closely to the dynamic of public sector innovation than is often acknowledged by creatives eager to insist on the autonomy of their respective organizations.[44] We have found throughout the research process that the conversation on “public sector innovation” offers rich and varied resources for organizational development process across the (largely) public educational organizations in the creative sector.[45] Perhaps more importantly, the creative sector depends on the existence of public life in spaces of appearance and shared experience. The recent experience of a pandemic demanding public health responses that ended up restricting public life have served as a reminder of the fragility of public life, as have the difficulties in governing social media once expected to provide transparent infrastructures to build such public life in the digital sphere.

Figure 47. Example: The Innovation Facets Model

[44] Also see C. Boeninger, A. Diefenthaler, F. Frenkler, R. Spitz, eds. (2023), *Design Education in Germany 2023: Contribution to Public Value*, https://www.if-designfoundation.org/en/designstudium-deutschland-2023-beitrag-zum-public-value

[45] See IPPO (2023), Systems Mapping: Best Approaches and What Works for Policy Design, https://theippo.co.uk/mapping-systems-for-policy-impact-introducing-ippos-seppa-method/.

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Reflecting concern over changed conditions of change - the acceleration of transformation processes, the mutual amplification of disruptions in a polycrisis -, this model accords anticipatory innovation a key role in public sector innovation.[46] Here, "public agency" includes the full range of exploratory, radical practices - many of which originate in and across the creative sector or are amplified in its aesthetic practices.[47]

As highlighted in the skilling strategy schematic, this innovation facets models offers another (useful) way to facilitate analysis of and reflections on urgent and future skills : whereas **urgent skills** may be seen as related to an innovation **focus on adaptation and enhancement**, **future skills** may be seen as related to a **focus on anticipation and missions**.

4.7.3 Data-Driven Agency

Data collection and analysis create a wide array of opportunities for intelligent processes and systems, from the development of data competencies to the design of data spaces as contexts for new forms of communication, organization and value creation. Enabled by a range of innovation infrastructures (currently referred to as "deep tech" in innovation and policy narratives), data allows us to interact with systems and is therefore key to any aspiration to socio-technological systems design.

Example: Framers

Data analysis needs models: "We're always told that humans make bad decisions and that more data is better. But this is backwards: people are actually good at decisions because we use mental models and can envision new realities outside of data. Great outcomes don't depend so much on the final moment of choosing but on generating better alternatives to choose between. That's framing."[48] By "data-driven agency" we do not simply refer to the need for a range of technology-related literacies, but to our capacity to frame - the need to create models that inform how (we want) these technologies (to) function.

4.7.4 Value-Creating Agency

The relationship between "the arts" and "the creative sector" has been fraught in no small part because of concern over the entrepreneurialization of aesthetic practice, the (undue) influence of markets, and the integration of creative labour into the dynamics of a global platform economy.[49] Cutting across (and reframing) this conflict is a shared concern with the scope of

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[46] This schema was introduced in the OECD (2019), Declaration on Public Sector Innovation, https://legalinstruments.oecd.org/en/instruments/oecd-legal-0450, and has since then been operationalized and validated in innovation-governance contexts across Europe.

[47] For a critical assessment of the popular self-image of arts and design as disruptive drivers of transformation, see Geoff Mulgan (2023), *Prophets at a Tangent: How Art Shapes Social Imagination* (Cambridge: Cambridge University Press), https://www.cambridge.org/core/elements/abs/prophets-at-a-tangent/D1EC6C944ACFAD6789D99F2AE2FEA71C.

[48] See Kenneth Cukier, Viktor Mayer-Schonberger, Francis de Véricourt, (2021), *Framers: Human Advantage in an Age of Technology and Turmoi*l (London: Dutton).

[49] While any analysis of the effects of dynamics of the platform economyon the future of creative labor (and agency) are far beyond the scope of this essay, current research highlights the extent to which this platform economy does

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what we mean by value and the processes of value creation. So beyond entrepreneurial action (start-up / succession / financing), an emphasis on value-creating agency broadens the view to dynamics of value creation to better understand the interplay of different actors and (cultural, social, technological) innovation dynamics so they reinforce each other.

Example: Donut Economies

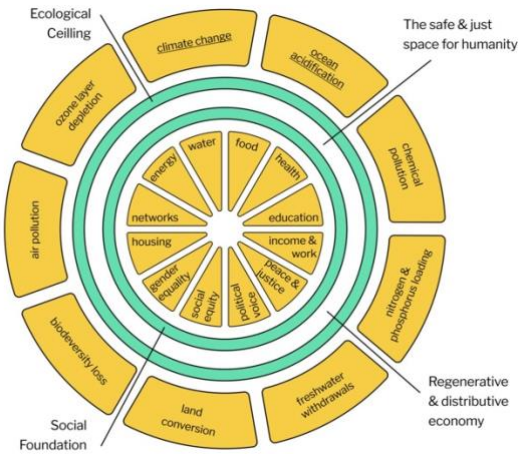

Figure 48. Example: Donut Economies

For the creators of the "donut economy" model - we must find new ways to organize the creation of value: "The Doughnut offers a vision of what it means for humanity to thrive in the 21st century - and Doughnut Economics explores the mindset and ways of thinking needed to get us there. ... The Doughnut's holistic scope and visual simplicity, coupled with its scientific grounding, has turned it into a convening space for big conversations about reimagining and remaking the future."[50] A more comprehensive understanding of how we (co)create value can empower creative actors across the different stages of such a process.

4.7.5 Regenerative Agency

Adding culture to the triple model of sustainability is a first step: ecological, social, economic - and cultural; without a change of perspective, there is no discovery of potential, without a change of perceptions, there is no creation of new spaces of action, without shared narratives, there is neither individual freedom nor social cohesion. As we write this in late 2023, there is a shared sense that it might be too late for action that is merely sustainable. Instead, we need to find ways of acting that allow us to repair the damage already done: hence a shift to regenerative agency as a core field of current and future creative work.

Example: From Algae to Competence Ecosytems (and back)

Coming full circle, Anna Atkins' interest in algae - invoked by us to approach the question of non-human agency more generally - resonates powerfully with the current interest in regeneration. Non-human actors are likely to play a major role (algae might be able to metabolize micro-plastics, for example). Like her pioneering work, regenerative agency calls for new alliances not only across the creative sector but across fields of knowledge - natural-scientific, technological, etc. - so creative actors can fully embrace the possibilities of acting as drivers and designers of change across the sector and beyond. And finally, the focus on

not operate according to the logics of markets but the logics of rent. See T. O'Reilly, I. Strauss, M.Mazzucato (2023), Algorithmic Attention Rents: A theory of digital platform market power, UCL Institute for Innovation and Public Purpose, Working Paper Series (IIPP WP 2023-10). Available at: https://www.ucl.ac.uk/bartlett/public-purpose/wp2023-10

[50] https://doughnuteconomics.org

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regeneration is at the heart of the competence ecosystem approach: "**Future skills are created in ecosystems that have the capacity to renew themselves.**"[51]As we organize learning, we co-create the worlds we (wish to) live in.

4.7.6 Sharing a Language: Triple Loop Learning for Creative Agency

When asked about future skill needs, many respondents to our research survey responded with references to current technological innovations, mainly artificial intelligence. To us, such responses highlight that the future is essentially thought of in terms of the role of technology as the main driver of transformation: technology is integral to the creative process, so future skilling is mainly about our ability to explore and employ the technologies of the future. Only a few respondents emphasized the role creatives might play in the design and governance of such technologies, or in the reframing of the role of technology in the creative process. We concluded that - based on these responses, but also the discomfort with the pace of technological change and its seeming inevitability we sensed in all of our workshops - that our research should also address the lack of awareness (and possibly imagination) of what alternative futures might look like.

Our research has shown that educators use a wide range of different terms to talk about learning. There is not yet a common, shared language to talk about skills, nor is there a shared foundational narrative. Maybe there is no need for that, and the diversity of ways of speaking about learning simply reflects the diversity of backgrounds and skilling contexts. It should, after all, not come as a surprise that practice-oriented vocational education and research-oriented academic learning do not always speak the same language. What we have found, however, is that the interest in impact - what is the role for creatives in addressing the challenges of our time - has shifted the learning conversation across contexts: from having knowledge to being able to act on such knowledge and make a (measurable) difference.[52]

How we design curricula, define competences, identify skills and organize learning is based on what we know about the contexts in which the outcomes of such learning are expected to be used to create a wide range of possible values - cultural, economic, social. How we approach the different domains of value creation is itself subject to change and a matter of contestation. The growing awareness and appreciation of the value of care labour, a hard-fought victory of feminist activism and research, is a case in point, as care work was (and still is) long marginalized - in analysis as well as in practice - by the assumption that labour in sites of production was more important than labour in sites of reproduction. In some sense, the type of value creation occurring across the creative sector cuts across such distinctions, since the creation of experiences combines the creation of concrete products and services with the creation of future experiences to be made in the course of their use. We are therefore

[51] SITRA (2022), ibid.

[52] This is reflected in policy analysis concerned with strategic foresight: "The transitions will require strong European education and training systems, placing a premium on adaptability. **Our education and training systems are not yet fit for the magnitude and speed of the transformations**. Skills are becoming increasingly important on top of formal qualifications. This is coupled with shifts in values and aspirations of new generations towards work-life balance and meaningful jobs." JRC (2023), *2023 Strategic Foresight Repot. Sustainability and people's wellbeing at the heart of Europe's Open Strategic Autonomy* (European Commission: Brussels), 9.

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convinced that reflections on future skilling in the creative sector will also be relevant to the reimagination of value-creation in other areas.

And finally, we know that we are not alone in exploring the future of creative agency; our interest in models aligns with research efforts such as the Berlin Institute for Cultural Inquiry program on models: “A model ... can elicit desire, provide understanding, guide action or thought. Despite the polysemy of the term, models across disciplines and fields share a fundamental characteristic: their effect depends on a specific relational quality. ... They can indeed be considered as intermediaries between the theories and worlds they help constitute — as creative, partially autonomous tools for understanding and as media of theorizing and worlding”.[53] It is our hope that the creative agency model can play such a role in the conversation on future skills. As Ursula le Guin put it: “I could learn. We all can learn. That’s the neat thing about technologies. They’re what we can learn to do.” What a wonderfully optimistic definition of technology: as all there is to learn.

4.7.7 Conversation Space Design

Our research effort resonates with many of the conversations conducted in individual contexts across the creative sector. The example of our future skills scenario cycle is meant to highlight how we are trying to create the conversation space for the systems design conversation around triple loop learning we want to have - as we have had to accept that this conversation space does not yet exist.

One way in which we now wish to advance our inquiry into ‘future’ skills is to explore the role of shared pasts in such conversation space design: what do we find in the archive of art, design, and explorations of creative expression more generally that we might usefully retrieve into our current conversation? This turn to history is motivated in part by the acknowledgment that - had we organized our learning differently - we could have seen much of what is disrupting the creative sector today.

The automation of creative expression, for example, has been a feature of many avantgardes, the Surrealist dream of ‘automatic writing’ arguably the best-known. So why didn’t we see this coming, ‘this’ being the arrival of technologies that (once trained on various data sets and widely available through low-threshold use-as-service models) need only small sets of data to create synthetic content? In the CYANOTYPES research conversation, we see part of the current conflict as being rooted in past decisions to separate arts and technology first in curricular and then organizational design processes. Max Bense, post-WWII-pioneer of what he called ‘information aesthetics’, had still considered the integration of the natural sciences, mathematics, technology, architecture, and the humanities an essential foundation of any course of study (Sieber 2000), similar arguments are made by wide-ranging current studies of the creative sector linking the arts to emerging and future dynamics of innovation (CHANGEIST 2023) even though the historical record suggest a more modest approach (Mulgan 2023). We read this to mean that **any curricular or organizational re-ordering of the relationship between art and technology, or more specifically between aesthetic**

[53] https://www.ici-berlin.org/projects/models

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practice and the design of socio-technological systems, needs to bring into view such shared histories, including the conflicts about the (in)commensurability of these domains and the practices that define them. It makes no sense to ignore that the art-and-technology relationship has always been a site of contesting the overwhelming power of technology and technology-centric narratives of societal progress.[54] At the same time, their separation has allowed the rich archive of exciting experimental engagements across these domains to fall out of memory, no longer tethered to our present practices by the curricular framing our work as educators - to the extent that the rise of creativity machines has apparently caught us off-guard.

And indeed, many people across the creative sector have not been actively involved in general conversations about the future of automation, the potential for de- and upskilling, and the design of new value chains involving reimagined human-machine relations. This has changed, fears of displacement of creatives by ai-based platforms abound, as do activist and legal actions protesting the unauthorised use of creative digital assets as training data in processes of machine learning. And while AI enthusiasts worry that if we rush to create new rules machines may no longer be allowed to learn, we are contending that this conflict calls for a triple loop learning conversation - especially now that the spectre of machines capable of learning has already come to change how we imagine and implement educational processes.

4.7.8 Deeper Tech: The Triple Loop is the Message

Reflecting on these contexts of education with members of art and design academies from across Europe, it became clear that we have to cooperate in new ways to link what we may need and want to learn as individuals to processes of organizational design and ultimately to the (competence) ecosystems which provide the contexts in which we operate. What we also noted is that we cannot take for granted that the space to have such conversations - across the organizations involved in such a competence ecosystem, but also across the competence frameworks that provide context for specific and transversal sets of competencies and capabilities - but will have to create it. Fortunately, we found ourselves in agreement with most people involved in the workshop conversation that the time has come to do so.

All around, questions of value are in flux as people struggle with a polycrisis of overlapping conflicts, as are models of agency that fail to attend to non-human as well as human agency. To better identify the leverage points for systemic change (beyond our involvement in feedback loops across the creative sector but also between arts and culture organizations and policy-making and regulatory bodies such as the EU, OECD, and UNESCO), one of the innovation narratives to which we want to link our conversation on skilling across European arts and culture organizations more closely revolves around ‘deep tech’. Used as a meta-term describing a variety of technological innovation dynamics (ai, blockchain, quantum, etc.) capable of transforming the co-creation of value across all sectors, deep tech has emerged as a policy area of its own. Most importantly for the creative sector: deep tech offers core

[54] And in fact of the reframing and reappropriation of avantgarde discourses, see R.Anderson, C. E. Jones, eds. (2016), *Afrofuturism 2.0: The Rise of Astro-Blackness*(London: Lexington Books) on the afro-futurist reframing of futurist narratives and imaginaries.

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infrastructures sustaining culture and creativity. As a design metaphor, it invokes not (only) the 'high tech' of expertise and excellence, but a technological layer deeply embedded in our daily existence. This is the power of metaphor we would like to harness for our systems design conversation: repurposing an expert term from the world of policy and innovation ("deep tech") to convey a straightforward sense of how "deep" our entanglement is with technologies that underlie and quite literally operate as infra-structures of much of what we do across the creative sector. And given our interest in the complexity of this entanglement, we couple this use of 'deep tech' with an understanding of collective agency and intelligence that is based on the interplay of the human and the non-human (be the latter machinic or ecological).

Current proposals of a "planetary intelligence" bring together such an interest in deep tech as that which underlies much of our activity with an expanded (human and non-human) sense of collective agency and intelligence in **an ecology of technology that allows us to reframe the future skills conversation**.

> "**Technology, understood as our interface with the material world, is that human practice which most closely ties us to our context and our environment.** It exemplifies and performs the most central characteristics of ecology: complexity, interrelatedness, interdependence, distribution of control and agency, even a closeness to the earth and the sky; on, under, and out of which we fashion our tools. An **ecology of technology**, then, is concerned with the interrelationships between technology and the world, its meaning and materiality, its impact and uses, beyond the everyday, deterministic fact of its own existence. ... If we do ... not wish to render ourselves alone and abject on the face of the earth, we must rethink every aspect of our technological society and the ideas it is founded on, and we must do it fast."[55]

Given the centrality of technology in the future skills conversation, it makes less and less sense to lament the "tech-centricity" of this conversation (as it adequately reflects the concern of many across the creative sector that tech has been and is likely to continue to be a major driver of change). Instead, such an ecology of technology expands the central role of technology and technological imaginaries into **an ethos of learning and living in a more-than-human world** that can help **frame and facilitate how we organize future skilling in and across the contexts** we are in.[56]

In the end, the link between culture and deep tech is about acknowledging how profound are the changes technological systems bring to our lives, how we imagine and institute relations between self and world (we already highlighted the current mix of anxiety and excitement regarding the potential of 'generative systems'). Where many sectors might think of reconnecting innovations to society and nature after the fact, culture thinks from relations, always already in the world. In addressing any of our societal challenges, this makes much

[55] James Bridle (2022), *Ways of Being - Animals, Plants, Machines: The Search for a Planetary Intelligence* (New York: Farrar, Strauss, Giroux).

[56] "If we leave behind the anthropomorphic conception of intelligence and acknowledge that intelligence is distributed across all biotic flows, across all plant, animal, fungal and bacterial species, then social and political compositions will change radically." https://www.makery.info/en/2023/11/02/devenir-non-alien-manifeste-provisoire-pour-un-laboratoire-des-communs-recombinants/

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more sense: imagine, design, and create value from within our embeddedness, our interdependencies. To mobilize this power of culture to reimagine the co-creation of value in the context of new socio-technological systems, **new forms of learning will be needed that link individual, organizational, and ecosystemic forms of agency and intelligence** - hence our conviction that the triple loop is the (right) message.

In this view, triple loop learning - leaving room and time to reflect on how we (un)learn - powerfully resonates with the culture of collaboration we envision more generally, adjusting ways and means as we go. Are we comfortable honestly assessing what it is exactly that we bring to the table of the future skilling feast? Could it be that some of the skills we think we teach are more effectively and usefully acquired (and verified) in other contexts outside our organizations? Will we even be the ones inviting and hosting the process? Or will we be sidelined by advances in learning platforms that offer a degree of customization we have only been able to achieve in comparatively resource-strong settings (i.e. either very wealthy or very small organizations, allowing for good educator-learner ratios)? And how can we ensure that today's learners are not only equipped with skills designed to address today's but also tomorrow's needs?

The rise of 'deep tech' innovation dynamics such as the already vastly popular 'generative' systems that appear to automate creative expression coincides with such soul-searching, and it has come as no surprise that many observers aim to find historical analogies, struggling to choose between the disruptive benevolence of the bicycle (democratizing a core cultural technique) and the dystopian disruption of the nuclear bomb (wreaking destruction on an ecosystemic scale). In the CYANOTYPES research process, we aim to "stay with the trouble" (Donna Haraway), not least because we are convinced that it makes no sense to reimagine human-machine relations without also exploring the relationship between human and non-human agency and intelligence in ways capable of addressing the climate catastrophe.

This, in turn, has led us to acknowledge and (re)appropriate concepts of 'machine' and 'technology' that integrate their cultural, social, and ecological dimensions, facilitating a 'deeper' engagement with technologies to better explore their ecosystemic implications - literally, the many ways in which these systems are folded into each other, and the ways in which that in turn affects how and where we co-create value. At a time when creative expression becomes imaginable as a form of machinic agency, radically changing the future role of artists and designers, a research cooperation on urgent and future skills and the consequences of such shifts for curricular and organizational design must find ways to frame and reframe the 'deeper' tech conversation. We invite you to enter the triple loop so we can build the forms of collective agency and intelligence we need to do so.

4.8. COMMUNITIES OF CHANGE: WORK ON THE GROUND

To facilitate the application of future skills (approached in our research not in terms of knowledge but applied knowledge, i.e. the capacity to act in and across contexts), existing competency frameworks have been explored and assessed. So, what now? What needs to happen for these outcomes to be "operationalized" as future skillsets? There are both urgent and future skills in all competence frameworks - in fact, reframing urgency (so it can be

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effectively addressed) and reframing the co-creation of value (so the creative sector becomes ecologically, economically, and socially sustainable) complement and amplify each other. In the practical contexts, “urgent” has come to mean “what we can do under **existing** conditions”, whereas “future” has come to mean “what can we do under **emergent** conditions”. In the end, the main differences are (hence the creative agency model to reframe the conversation of learning and future skills) the conditions of our individual and collective agency and what we can do to enhance it in and across given and new contexts of learning. Similarly, the idea of a competence ecosystems that includes but is not limited to the individual learning contexts we are in now is a reminder that such **ecosystems do not simply exist, but that we (can) build them as we go** - strengthening our ties, share learning resources learners have access to, involve others in the processes of training and verification.

And what we are (re)learning is that non-human agency will play a large role in such ecosystems. As we explore whether (and if so where) we want machines to relieve us from the burden of labour, we are reminded that **the question of technology is also the question of labour**. Across our research process, the **call for new forms of solidarity and collective mobilization and the inclusion of such competences in the future skilling conversation** has been raised, but it is a marginal conversation sidelined by the rush to adapt to existing and emerging technologies.

Technological innovation continues to lower the threshold for the co-creation of creative content. And indeed, following the introduction of so-called generative systems, the spectre of automation haunts the creative sector. For the future skilling research of CYANOTYPES, this has meant that even more attention should be paid to the **interdependence of re- (new skillsets) and de-skilling** (normally called up-skilling but which we understand as the separation of existing skillsets and their current application contexts) and its ambivalence (some skillsets need to be actively un-learned so creative agency to be effectively applied in and across new contexts). The design of curricula and the competence ecosystems across which future skilling can be organized have to take this - **the contingency and contextuality of skills and their applicability** - into account.

The acquisition and application of transversal skillsets **changes** as the conditions of skilling and application change. Beyond **technological** transformation (data ecosystems / deep tech), these include **social** (new creative actors through expansion of creative education) and **ecological** (attention to regeneration, resilience, sustainability) skillsets. This expanded view of future skills also calls for a cross-framework approach. Future skilling must take the contingency of transversal skills into account: new contexts change the application of **existing** transversal skillsets (example: generative systems change ideation) and call for **new** transversal skillsets (example: sustainability requires knowledges regarding ecological impact of design choices).

Future skilling therefore has to address these dynamics: the contingency and context-dependency of skillsets (what is futural depends on context). By definition, this links the identification and implementation of future skilling areas to questions of transformation. While the triple transition model usefully emphasizes the interdependence of technological, ecological, and social processes of change, it does not offer a model of creative agency to guide future skilling efforts. In the transversal model adopted to frame our analysis,

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transformation is understood as **a combination of 5 fields of action**. Each field of action can become the lead dimension (depending on the skilling context and the context's location in the wider competence ecosystem), and the other focal points can then be used to identify concrete options for action. Because they focus on different social contexts, these fields of action also refer to **complementary dimensions of social impact.** At the centre of all transformation processes are people acting individually and collectively. We have therefore explored and develop ed complementary forms of collective, public, data-based, value-creating and sustainable action - **a multi-sided model of the agency (and intelligence)** of individuals and collectives.

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5. FINAL REMARKS AND UPCOMING STEPS

The findings presented in this section provide an overview on the existing work regarding skills intelligence in the CCI (literature review), offer a panorama of the current skills provision, reflect on the skills demand from the industry, and observe the future skills needs, the latter resulting on the proposal of a new model – the Creative Agency Circle – that can guide the skills developments for CCI in the future.

These findings will be now processed by the CYANOTYPES consortium for the identification of priorities and the development of the CYANOTYPES training to address the skills gaps for CCI to better face the challenges posed by the triple transition – green, digital and societal. For this purpose, these findings will be translated into a **Playbook** that can ensure its optimal use in subsequent phases of the project.

Parallel to this, the skills intelligence gathering process will continue over the course of the project, to fill in the research gaps and conduct new research iterations – in accordance with the triple loop approach guiding the CYANOTYPES project, to complement and update the current data. The results will be presented in annual iterative deliverables D2.1.2, D2.1.3 and D2.1.4

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7. LIST OF ABBREVIATIONS

Abbreviation	Description
CCI	Cultural and Creative Industries
CCII	Cultural & Creative Sectors and Industries
EC	European Commission
EIT	European Institute of Innovation and Technology
EQF	European Qualification Framework
ESG	European Standard and Guidelines
EU	European Union
HEI	Higher education institution
KIC	Knowledge and Innovation Community
NGOs	Non-Governmental Organization
NQF	National Qualification Framework
SDGs	Sustainable Development Goals
UN	United Nations

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APPENDIX A: List of Publications in the Corpus for the Academic Literature Review

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APPENDIX B: Survey - Your Thoughts on Skills Provision in General

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CYANOTYPES | Survey on Skills Needs and Demands

Your thoughts on skills provision in general

This section is intended for educational providers, any organisation providing educational programmes and training, including vocational education (VET) and tertiary levels (higher education). Please help us identify strengths, challenges and gaps in the teaching and learning provision.

Additional notes on the terminology used:
CCI is the acronym used for referring to the Cultural and Creative Industries Sectors.
Micro-credentials certify the learning outcomes of short-term learning experiences, also called micro learnings, as for example, a short course or training.

Would you like to answer this section?

◯ Yes

◯ No

* What would you consider to be the main strengths of the skills provision within learning environments for your sector?

* What would you consider to be the main gaps that you have encountered in the skills provision within learning environments for your sector?

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* What do you think are the most important changes that are needed in delivering skills for your sector?

To what extent do you agree with the following statements?

	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
In order to support the CCI sector in adapting to constantly changing living and working environments, a broad range of skills and competences need to be updated and further developed.	○	○	○	○	○
There is a need for new Occupational Profiles for the CCI that are not currently described in existing initiatives.	○	○	○	○	○
Skills for making use of new technologies in terms of products or services are essential. We also need skills in terms of understanding the social-technological contexts within which we must operate.	○	○	○	○	○

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In my organisation/sector the development of skills is not a priority.	○	○	○	○	○
The challenges around sustainability and the green transition present new opportunities to foreground the work of the CCI sector.	○	○	○	○	○
Entrepreneurial and communication skills remain critically important.	○	○	○	○	○
My organisation/sector is already well-served by the Vocational Education & Training courses that are currently available	○	○	○	○	○
My organisation/sector is already well-served by the Higher Education courses that are currently available	○	○	○	○	○

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There is a growing recognition of so-called 'soft skills' that are often missing from learning and training but are crucial to support people to perform in shifting environments and contexts and are often a key aspect for career development and reskilling.	○	○	○	○	○
Many skills around critical thinking, systems thinking, problem solving and question-framing are ever-more in demand but are not always the focus of learning initiatives.	○	○	○	○	○
A renewed focus on meta-cognitive skills and transformative skills may be					
required to support the development of the CCI sector *Meta-cognitive skills refers to 'thinking about thinking' in order to improve learning.*	○	○	○	○	○

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Skills should be available at different educational levels and as part of lifelong learning trajectories that are provided in a wide variety of different settings.	○	○	○	○	○
More focus is needed for creating personalised skills development pathways.	○	○	○	○	○

In which ways do you think access to micro-learning and micro-credentials could help your organisation/sector?

*__Micro-learning__ includes short bursts of content for learners to study at their convenience.

__Micro-credentials__ certify the learning outcomes of short-term learning experiences, also called micro learnings, as for example, a short course or training

- ☐ Enhance employee training and development
- ☐ Improve knowledge retention and skills acquisition
- ☐ Foster a culture of continuous learning
- ☐ Increase employee engagement and motivation
- ☐ Enable personalized and flexible learning experiences
- ☐ Provide just-in-time learning support
- ☐ Streamline onboarding and upskilling processes
- ☐ Support talent management and career progression
- ☐ Enhance organizational agility and adaptability
- ☐ Improve compliance training and regulatory knowledge
- ☐ I don't know

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Do you have examples of studies, initiatives or good practices that you think are interesting for the CCI sector in the area of learning ecosystems, occupational profiles and implementing micro-learning based approaches?

- ◯ Yes
- ◯ No

Please provide us with short descriptions of these interesting studies, initiatives or good practices.

For which sectors are these studies, initiatives or good practices relevant to?

- ☐ Architecture
- ☐ Audio-visual
- ☐ Cultural Heritage
- ☐ Design
- ☐ Fashion
- ☐ Film
- ☐ Gaming
- ☐ Book and Publishing
- ☐ Music
- ☐ Performing Arts
- ☐ ICT
- ☐ Craft
- ☐ Social Innovation
- ☐ Research and Development
- ☐ Education
- ☐ Ecology
- ☐ VET
- ☐ Consultancy
- ☐ Supporting creative industries
- ☐ Communication
- ☐ All of the above
- ☐ Other (please specify)

Link to further information (If available)

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APPENDIX C: Specific Questions for Educational Providers

CYANOTYPES | Survey on Skills Needs and Demands

Specific questions for educational providers

This section is intended for educational providers, being any organisation providing educational programmes and training, including vocational education (VET) and tertiary levels (higher education).

This part of the survey is dedicated to the learning program. In order to fill it up, please focus on a specific program among your portfolio of educational offers. If you have more than one learning program, please feel free to copy this board many times as required, in order to have one sheet per learning program. Please take into consideration that a learning program is not a single course, but a purposed articulated educational structure, with a specific learning goal and target.

The survey is divided in order to firstly gather general information about the program, and secondly explore some qualitative information regarding the quality of the educational offer, and its compliance with the labour market and with the EIT (European Institute of Innovation and Technology). The latter required a vertical analysis of the innovation and entrepreneurship mindset developed by the program.

Would you like to answer this section?

- ◯ Yes
- ◯ No

Name of the Learning Program

[ ]

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Please describe briefly the Learning Program, its objectives and contents.

Please indicate which area of study the Learning Program refers to.
Area of study means a curriculum area under which course titles can be grouped.

Please define the educational topic declined in the learning program.

Please indicate which category the Learning Program refers to.
Category means the research perspective used to study the specific areas.

Credentials

Credentials refers to the documentation which verifies the successful completion of the training or learning program.

In case you are a High Educational Institution, please specify which kind of degree is the learning program

- ◯ Bachelor Degree
- ◯ Master Degree
- ◯ Doctoral Degree

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Please indicate the language used to provide the learning program.

Target students

Please indicate the type of participation elected to provide the learning program, indicating so if it is conducted physically or remotely.

Please indicate the educational approach. The latter refers to the way the learning program is provided.

*Formal education: the hierarchically structured, chronologically graded 'education system', running from primary school through the university and including, in addition to general academic studies, a variety of specialised programmes and institutions for full-time technical and professional training.

Informal education: the truly lifelong process whereby every individual acquires attitudes, values, skills and knowledge from daily experience and the educative influences and resources in his or her environment – from family and neighbours, from work and play, from the market place, the library and the mass media.

Non-formal education: any organised educational activity outside the established formal system – whether operating separately or as an important feature of some broader activity – that is intended to serve identifiable learning clienteles and learning objectives.*

Please indicate the duration of the learning program.

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Is the Learning Program aligned with the European Quality Assurance Reference Framework for Vocational Education and Training (EQAVET)?

__EQAVET__ is based on a quality assurance and improvement cycle (planning, implementation, evaluation/ assessment, and review/revision) and a selection of descriptors and indicators applicable to quality management at both VET system and VET provider levels. The EQAVET Framework can be used by VET providers and in VET systems to support the quality assurance of learning environments (e.g., school-based provision, work-based learning, apprenticeships, formal, informal and non-formal provision) all types of learning contexts (e.g., digital, face-to-face and blended) public and private sector VET providers VET awards and qualifications at all levels of the European Qualifications Framework.

- ◯ Yes
- ◯ No
- ◯ Don't Know
- ◯ Not Applicable

Is the Learning Program accredited or recognised through the EQF (European Qualification Framework)?

*The **EQF** is an 8-level, learning outcomes-based framework for all types of qualifications that serves as a translation tool between different national qualifications frameworks. This framework helps improve transparency, comparability and portability of people's qualifications and makes it possible to compare qualifications from different countries and institutions.*

- ◯ Yes
- ◯ No
- ◯ Don't Know
- ◯ Not Applicable

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In case you are a High Educational Institution, is the master's programme aligned with the European Higher Education Area guidelines on requirements?

- ◯ Yes
- ◯ No
- ◯ Don't Know
- ◯ Not Applicable

Does the student selection process include criteria for the assessment of students´ entrepreneurial potential?

Includes perceived desirability, perceived feasibility (perceived self-efficacy), and propensity to act that influence the students' intention to generate vale, creating something new.

- ◯ Yes
- ◯ No
- ◯ Don't Know
- ◯ Not Applicable

Is the Learning Program aligned with the European Entrepreneurship Competence Framework (ENTRECOMP)?

EntreComp is a free, flexible reference framework that can be adapted to support the development and understanding of entrepreneurial competence in any setting.

- ◯ Yes
- ◯ No
- ◯ Don't Know
- ◯ Not Applicable

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Is there a tracking system of students' careers after the end of the learning program?

- ◯ Yes
- ◯ No
- ◯ Don't Know
- ◯ Not Applicable

Does the implementation of your program include academic partner?

- ◯ Yes
- ◯ No
- ◯ Don't Know
- ◯ Not Applicable

Are the academic partners engaged in

	Yes	No	Don't Know	Not Applicable
Curriculum Development	◯	◯	◯	◯
Teaching Activities	◯	◯	◯	◯

Does the implementation of the programme include non-academic partners (ex. industry, business, government partners, etc.)?

- ◯ Yes
- ◯ No
- ◯ Don't Know
- ◯ Not Applicable

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Are the non-academic partners engaged in

	Yes	No	Don't Know	Not Applicable
Curriculum Development	○	○	○	○
Teaching Activities	○	○	○	○
Placement, Internship or Field Activities	○	○	○	○

Are the academic or non-academic partners from at least 2 different countries?

- ○ Yes
- ○ No
- ○ Don't Know
- ○ Not Applicable

Does the programme require from students to study across organisations (either physically, virtually, or blended)?

- ○ Yes
- ○ No
- ○ Don't Know
- ○ Not Applicable

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With regards to the learning programme as a whole, are strategies and policies in place to enhance inclusion, diversity and non-discrimination, including targets and monitoring mechanisms?

- ◯ Yes
- ◯ No
- ◯ Don't Know
- ◯ Not Applicable

In relation to the previous question, can you report the strategy/policy?

[ ]

Does the programme provide an internship/ apprenticeship/ job training experience?

- ◯ Yes
- ◯ No
- ◯ Don't Know
- ◯ Not Applicable

Is the Learning Program the output of a European Project?

It refers to the possibility that the Learning Program has been designed or developed through a European Program, as for example Erasmus+ or Horizon Europe.

- ◯ Yes
- ◯ No
- ◯ Don't Know
- ◯ Not Applicable

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What is the level of emphasis that your learning program put on the following areas, in terms of skills development?

*This part asks you to detail if and how the learning program contribute to the development of specific skills. It requires to manifest a value among "not emphasised" and "highly emphasised" per area of competences.

Skills Development: generally used to refer to the productive capabilities acquired through all levels of learning and training, occurring in formal, non-formal, informal and on-the-job settings.*

	Not emphasised	Somewhat emphasised	Emphasised	Highly emphasised	Don't Know
Financial and business management skills	○	○	○	○	○
Entrepreneurial skills	○	○	○	○	○
Developing sustainable business solutions	○	○	○	○	○
Ability to generate new knowledge, ideas, and technological solutions	○	○	○	○	○
Evaluation of unintended consequences of innovation and technology	○	○	○	○	○
Creative thinking and problem-solving skills	○	○	○	○	○

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Interpersonal relations and working collaboratively with people across cultural or national barriers	○	○	○	○	○
Critical thinking and analysis of arguments and information	○	○	○	○	○
Ability to identify short- and long-term consequences of decisions in terms of sustainability and the environment	○	○	○	○	○
Leadership skills	○	○	○	○	○

Which kind of skills your learning program is dedicated to develop that are important to highlight?

With regards to the topic of innovation, does the learning programme

	Yes	No	Don't Know	Not Applicable
Actively promote student's networks, such as building personal contacts with industry partners?	○	○	○	○
Provide students with information and guidance on intellectual property rights (IPR) aligned with the respective (inter)disciplinary field?	○	○	○	○

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Have a continuous improvement plan in place to support instructors covering e.g. training, shared learning or continuous professional development in the area of innovation and entrepreneurship education?	○	○	○	○
Adopt inter-/transdisciplinary approaches by including science/technology/knowledge components?	○	○	○	○
Focus on addressing broad societal and global challenges?	○	○	○	○
Link up with new business and innovation processes?	○	○	○	○

How does your learning program contribute to the current and future labour market?

How does your learning program address current training needs of the labour market?

What is the level of placement derived from your learning program?

How does your learning program encourage digital and green competences?

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APPENDIX D: Organizations of Affiliation of Respondents

_ARTERIA_LAB - University of Évora
AMCRS Animation Media Cluster Region Stuttgart
Angewandte University
Aprinum
Ariane Bieou Culture & Creativity Consulting
Art Directors Club Germany
Art Historians Association of Turkey
Arts for Health Austria
Asian Innovation Hub
Ass. Distretto Produttivo Puglia Creativa
Austrian Federal Economic Chamber - Institute for Economic Promotion - WIFI
Bäckängsgymnasiet
BACKUP PLAN s.r.o.
Bert Berg
BNU
Carus Verlag GmbH & Co. KG
CICANT
coopolis GmbH
Crawford College of Art and Design
Creative circus
Creative Spark
Cultuurloket
DEUSCHLE WERBEAGENTUR
ELIA
Eppinger Figurentheater
ESAAA

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Essay Street (Association)
Eventwood
FAA Tilburg
Faculty of Multimedia Communications, Tomas Bata University in Zlin
Film University Babelsberg Konrad Wolf
Fondazione Centro Sperimentale di Cinematografia
Fontys School of Fine & Performing Arts
FUNDACIÓN REAL FÁBRICA DE TAPICES
FUNDACION UXIO NOVONEYRA
Future Footwear Foundation
GA/ER - Giovani Artisti Emilia Romagna
GECON.es Foundation
Headai
HÉTFA Research Institute
HFH
HKU University of the Arts Utrecht
Hochschule Ansbach
IADT
iClassical Academy
IHK Reutlingen
Institute of Entrepreneurship Development
Instituto Politecnico de Leiria
Janacek Academy of Music and Performing Arts, Theatre Faculty
Johannes-Gutenberg-Schule
Katapult Subtopia
KNIT by kerstin naegler
Know and Can Association
Kreativwirtschaft Austria
LAB Genalguacil

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Lisbon Polytechnic Institute - Theatre and Film School
Live DMA
Luca School of Arts
Manchester Met University
Media and Film Society Baden-Württemberg
Ministry of Economic Affairs, Labour and Tourism Baden-Württemberg
Moholy-Nagy University of Art and
Monika Stoeger Mediadesign
Netherlands Institute for Sound & Vision
OpenFields ZT GmbH
Ortoteatro
Polish-Japanese Academy of Information Technology, New Media Art
PRODEO design
RAB/BKO, State of the Arts
Renfah.com
rft
seekicks | weißensee kunsthochschule berlin
Sociaal Fonds voor de Podiumkunsten
sound and event technology specialist
St.Joost School of Art & Design
STARPATROL Entertainment
Steinbeis Europa Zentrum
Stichting FUTURES
Stockholm University of the Arts
Support Art and Research
Tales Systems CVBA
Tartu Centre for Creative Industries, Tartu Film Fund
Teatro Circo Braga Municipal Company of Culture/Braga UNESCO Creative City in Media Arts
Technological University of the Shannon

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The Artist and the Others
The Glasgow School of Art
The M.A.R.K.13™ - Group
TU Dublin
UAS St. Pölten
Uminova eXpression AB
Universidade Lusofona
Universität Mozarteum Salzburg
Universitatea Națională de Arte București
University of Ljubljana
University Of Southampton
UWE
Values of Culture&Creativity
VANMOOF
Vienna Business Agency
Weißensee Kunsthochschule Berlin
West University of Timisoara Faculty of Arts and Design
Yrkesnämnden för Film & TV
Zomer van Antwerpen vzw
Zurich University of the Arts (ZHdK)

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APPENDIX E: Sector of the Organisation

Sector	Responses	
Architecture	15,82%	28
Audio-visual	28,25%	50
Cultural Heritage	17,51%	31
Design	29,38%	52
Fashion	10,73%	19
Film	23,16%	41
Gaming	11,86%	21
Book and Publishing	10,17%	18
Music	17,51%	31
Performing Arts	22,03%	39
ICT	5,65%	10
Craft	14,12%	25
Social Innovation	16,95%	30
Research and Development	28,81%	51
Education	44,07%	78
Ecology	6,78%	12
VET	4,52%	8
Consultancy	12,99%	23
Supporting creative industries	25,42%	45
Communication	18,08%	32

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APPENDIX F: Geographical Distribution of Responses

Country	Responses	
Austria	19,77%	35
Belgium	8,47%	15
Bulgaria	0,56%	1
Cyprus	0,56%	1
Croatia	1,13%	2
Czechia	1,13%	2
Estonia	0,56%	1
Finland	1,13%	2
France	2,26%	4
Germany	16,95%	30
Greece	0,56%	1
Hungary	1,13%	2
Ireland	5,65%	10
Italy	3,95%	7
Netherlands	11,30%	20
Norway	1,13%	2
Poland	1,13%	2
Portugal	6,78%	12
Romania	1,13%	2
Scotland	0,56%	1
Slovakia	1,13%	2
Slovenia	0,56%	1
Spain	3,39%	6
Sweden	4,52%	8
Turkey	0,56%	1
UK	3,39%	6
Ukraine	0,56%	1

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APPENDIX G: Skills Demands - Data Collection Protocol

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Objective

The objective of this protocol is to guide the process of conducting focus groups or one to one interviews to listed feedback and insights on occupational profiles, specifically regarding the skills and competences outlined in ESCO (European Skills, Competences, Qualifications and Occupations) for a set of selected occupational profiles within the four CYANOTYPES priority sectors – i.e. videogames, design, audiovisual and fashion.

For this, and as agreed by the members of the sub-task working group, the following Miro Boards have been created as a tool for data collection:

- Videogames
-
- Audiovisual
- Fashion

Password: ESCOBOARD

Miro Board Description

- There is one Miro Board per sector, i.e. a total of 4
- Each Miro Board contains the four selected occupational profiles for that specific sector
- For each occupational profile the ESCO description, as well as the essential and optional skills and competences as listed in ESCO, are included
- Skills and Competences are categorized as follows:

Job-specific technical skills
Transversal skills
Soft skills

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** Please note that some skills might fall into two or more of these categories. Therefore, what it is proposed here is just one of the possible distributions. Feel free to indicate any comment on this categorization with a post-it.*

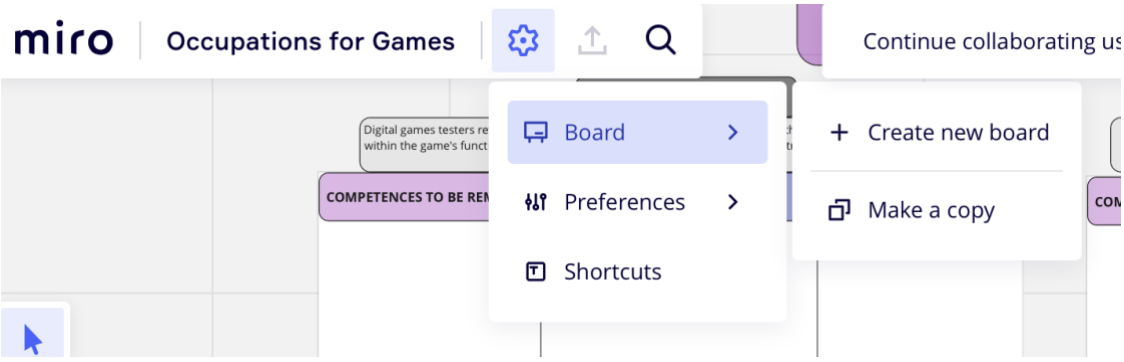
- Blank spaces are left for skills and competences to be added (right-side) or removed (left-side).

Steps

1. Preparation, Setup and Aggregation of Results

- Colour Codes: When adding new skills and competences, please use post-its following the colour code for the different categories – soft, transversal and technical – as established above. Competences to be removed should be the same colours as they are now.
- Miro Board: Please make a copy of the Boards for each participating partner. Each partner can decide how they want to proceed, i.e. creating separate boards for each interview/focus group.

  To make a copy, go to the top left corner:



- Aggregation of Information: It is the responsibility of each partner to aggregate all the information into one Miro Board for each sub-sector by the deadline. Each partner submits one Board per sub-sector.
- Logbook: Each partner should contribute to the shared logbook to capture interesting feedback and comments that cannot be included directly on the Miro Boards. This information can be valuable for analysis and decision-making.

  The shared logbook contains information on:

  - ID (pre-filled)
  - Partner
  - Interview/Focus Group/Others (specify)
  - Date
  - Participant(s)
  - Occupational profile of each participant (if applicable)
  - Region/Country
  - Language
  - Subsector(s)

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- Feedback on specific occupations

2. Data collection

Use the Miro Boards to collect data according to the following phases:

Phase 0 (optional):

Identify your interlocutor. Not all participants may be able to provide information on all the selected occupational profiles.

- Ask participants about their readiness to provide information about the selected occupational profiles (only if you do not know this information beforehand).

Phase 1:

Participants share their knowledge about the occupation, free from any ESCO input.

- Ask participants for their input on the main skills and competences relevant for that specific occupational profile, starting with a blank slate.

Phase 2:

Participants and facilitators compare the output from Phase 1 with the corresponding occupational profile in ESCO to identify any gaps.

- Explain occupational profile using the description from ESCO.
- Compare the participants' output to the occupational profile from ESCO on the Miro Board and add any missing skills if necessary.

Phase 3:

Participants and facilitators review the profile to remove unnecessary competences.

- Conduct a second overview to identify and remove unnecessary competences. Use the ESCO descriptions to explain skills when needed.

Repeat the process for the next occupational profile.

Categorization Framework: Participants should use three categories when providing feedback on skills and competences:

- Job-specific technical skills
- Transversal skills
- Soft skills

IMPORTANT! Please remember to complete the <u>shared logbook</u> when completing a consultation.

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APPENDIX H: List of Agents Consulted About the Skills Demand

Videogames

- ID1 Jens Gutfleisch (Film Commission Stuttgart Region)
- ID2 Maximilian Schmierer (b.Rex GmbH)
- ID9 Mikael Olau (EA)
- ID10 Andreas Halonen (Tarsier Studios)
- ID11 Dan Thronström (Amplifier Game Invest)
- ID12 Molly Ericson (Kavalri Games)
- ID13 Henrik Jonsson (Independent Game Industry Consultant, former game programmer)
- ID21 Flavio Escribano (GeCon)
- ID22 Patrick SCHAUDY (Universität Mozarteum Salzburg)
- ID22 Catelijne van Middelkoop (Willem de Kooning Academy/ Hogeschool Rotterdam)
- ID28 Uwe Neuburger (WIFI WKO)
- ID30 Peter Nagy (CIKE)
- ID31 Matej Hudak (CIKE)
- ID32 Martin Minarik (CIKE)
- ID33 Pavel Barak (CIKE)
- ID34 Lukas Kolek (CIKE)
- ID35 Ondrej Paska (CIKE)
- ID48 David McGreene (Academy of Contemporary Music)
- ID49 Elise Plans (Academy of Contemporary Music)
- ID50 Claudia Matera (Academy of Contemporary Music)

Design

- ID-3 Frank Detering and Christoph Winkler (VDID - association of german industry designers)
- ID4 Lars Schönbörner (Major Major Agency - purpose communication & sustainability)
- ID22 Ruth Mateus-Berr (University of Applied Arts Vienna)
- ID22 Jana Scholze (Kingston University London, Kingston School of Art)
- ID22 Lefteris Heretakis (Royal College of Art)
- ID22 Rolf Hughes (KU Leuven, Faculty Architecture)
- ID22 Diana ANDREESCU (The West University of Timisoara, Faculty of Arts and Design)
- ID22 Kas Houthuijs (Willem de Kooning Academy/ Hogeschool Rotterdam)
- ID22 Lesley Raven(Manchester Metropolitan University, Manchester School of Art)
- ID22 Lisetteh Huijsmans (Fontys Hogeschool voor de Kunsten)
- ID22 Yana Dimitrova (KU Leuven, Faculty Architecture)
- ID22 Olivera Batajic Sretenovic (University of Arts in Belgrade)
- ID22 Dieter Penteliuc-Cotosman (The West University of Timisoara, Faculty of Arts and Design)

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- ID22 Jakub Karpoluk (Polish -Japanese Academy of Information Technology, Faculty of New Media Arts)
- ID22 Eva Svirakova (Tomas Bata University in Zlin)
- ID22 Pablo Calderon Salazar (LUCA School of Arts)
- ID22 Marta Sofia Bento Pires Fernandes (Polytechnic University of Porto)
- ID22 Enrico Bisenzi (Accademia di Belle Arti di Roma)
- ID22 Zuzana Šebeková (Academy of Fine Arts and Design in Bratislava)
- ID22 Joke Mestdagh (Avans Creative Innovation, AKV St. Joost / Koningstheateracademie)
- ID27 Alice Fleischer (Acad. Cooperations), Andreas Kolbinger
- ID36 Roman Juhas (CIKE)
- ID37 Maria Bujnakova(CIKE)
- ID38 Jozef Tusan (CIKE)

Fashion

- ID5 Viktoria Heinzel (Stuttgart Media University)
- ID28 Claudia Neumann (WIFI WKO)
- ID29 Martin Nicllas Wiese (ECHN)
- ID29 Eva di Franco (ECHN)
- ID29 Violeta Nevenova (ECHN)
- ID29 Michela Mattei (ECHN)
- ID29 Sarah Meyers (ECHN)
- ID29 Coralie Preve (ECHN)
- ID46 Tamara Tothova Markovicova (CIKE)
- ID47 Dana Kleinert (CIKE)

Audiovisual

- ID6 Ximo Peris Casado (CLOCK your Skills)
- ID7 Janos Keresnyei (HE Lecturer, past as chief editor and tv manager)
- ID8 Miomir Rajcevic (Director of Photography in the Film Department of the Serbian Broadcasting Corporation)
- ID14 Annick Mastbooms (De Mensen NV)
- ID15 Nathalie Linten (EMG Belgium NV)
- ID16 Kim Cools (DB Video NV)
- ID17 Lou Berghmans (SBC / DOP)
- ID18 Wino Hoogerwijs (Moose-Stache BVBA)
- ID19 Ellen Perquy (Jonnydepony BV)
- ID20 Kitty Holsters (Studio 100 NV)
- ID28 Rudolf Kottbauer (WIFI WkO)
- ID39 Luba Orehovska (CIKE)
- ID40 Zora Jaurova (CIKE)
- ID41 Palo Mateja (CIKE)
- ID42 Robert Rampacek (CIKE)
- ID43 Lukas Teren (CIKE)
- ID44 Petr Horak (CIKE)

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- ID45 Lukas Moudry (CIKE)
- ID46 Mr. Nikola Kokotovic (The Faculty of Dramatic Arts in the Sound Department)
- ID47 Mr. Nikola Jankovic (Vran Media)

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APPENDIX I: Detailed List of Responses to Urgent Skills Needs Categorized in Skills Types

"Thinking about the cultural and creative sector in general, what do you think are the skills that are most urgently needed?"

Entrepreneurial Skills:
1. Business insight, how to budget
2. Managerial attitude (e.g., how to price yourself)
3. Upskilling in new technologies; understanding AI; working with industry not FOR industry
4. Networking, communication, and self-promoting
5. Entrepreneurship, Finances, Communication
6. Pricing; preparing and issuing offers - especially for big and complex projects; Negotiation; Strategic Management
7. Usage of AI tools without losing own creativity
8. Economic basic competences: Price calculation, marketing, making a business model out of a generative idea
9. Skills around stimulating imagination and courage; collaboration; financial management of collective practices; policy making that supports advanced practices from ecological and socially just frameworks
10. Initiating a culture of learning (to know what you don't know, embracing room to grow), feedback, confidence, support and mentorship
11. Decision-making in rapid changes, adaptation of priorities, advocacy, digitalization
12. Innovation management, communication skills, and the skills to build a business - management skills
13. Institutional representation
14. Management, based on values
Digital Skills:
1. Technical skills (e.g., software knowledge)
2. Digital skills (music productions, sound design), marketing skills, freelancer financial skills

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3. Digital literacy
4. Digital craft, software skills, understanding of digital analogue production, digital presentation
5. Digital literacy, data analysis, adaptability, collaboration, storytelling, entrepreneurial mindset, sustainability, ethical awareness
6. Photoshop and editing software
7. Learning how the art world works in a more sustainable way
8. Programming
9. Understanding of beneficial values for humankind in the digital realm
10. Access to stimulating production opportunities and material support using digital tools
11. AI knowledge, software skills
12. Creative Technology, Data Literacy, Code Literacy, Entrepreneurial Thinking
13. Meta-cognitive skills, skills for transformation especially for the Digital and Green challenges
14. Coding and prompting
15. Being Creative not only in content but also regarding business innovation
Transformative Skills:
1. Intellectual Humility, Emotional Intelligence, Non-violent Communication, Empathy, Resilience Skills, Conflict Management, Negotiation, Cognitive Bias Awareness (DEI), intercultural communication skills
2. System thinking
3. Critical use of AI, independence from AI, direct communication, less emails
4. Merging creative and scientific thinking in a data-driven environment
5. Joining technical skills with a broader conceptual and theoretical background for societal goals
6. Relaxed originality, thinking truly outside the box, reflective skills in language, reflective skills in other materials, trust in own abilities and potentials, open for uncertainties, curiosity
7. Transitional skills: how to manage/bridge lack of certain skills; understanding the big picture and how you can still fit in; working with other disciplines
8. Skills in cross-disciplinary research, e.g., artistic research, architecture, urban planning
9. Critical thinking and making

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10. Arts-Sciences and Craftsmanship
11. An explorative mindset
12. Relational, ecological, and non-anthropocentric thinking and acting
13. Thinking in a more sustainable way
14. Being able to sustain yourself from your work
15. Learning to produce in a sustainable way - working in a more sustainable way
Green Skills:
1. Cross-cultural competences (openness, awareness, self-knowledge)
2. Sustainability
3. Cross-cultural competences (openness, awareness, self-knowledge)
4. Entrepreneurship, Critical voice, knowledge and hunger for knowledge
5. Green skills: circular economy, sustainable business development, enabling objectives of Green Deal
6. Soft skills connected to organization of work, time-management, work-life-balance, well-being
7. Initiating a culture of learning (to know what you don't know, embracing room to grow), feedback, confidence, support, and mentorship in the context of Green Deal objectives
8. Happiness, serenity, artistic and creative skills, analogy, analogue knowledge
9. Relational, ecological, and non-anthropocentric thinking and acting
10. Initiating a culture of learning (to know what you don't know, embracing room to grow), feedback, confidence, support and mentorship with a focus on green practices

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APPENDIX J: Prioritization of Skills and Competences Based on Relevance in the Cultural and Creative Sector (Full Table)

	Not relevant	Slightly Relevant	Moderately Relevant	Relevant	Highly Relevant
Working in teams	0,00%	7,69%	7,69%	40,38%	42,31%
Crossover Competences	0,00%	3,85%	13,46%	25,00%	53,85%
Valuing Ideas	0,00%	8,00%	24,00%	30,00%	32,00%
Financial and Economic Literacy	1,92%	3,85%	32,69%	23,08%	34,62%
Working with others	1,92%	3,85%	7,69%	30,77%	53,85%
Mobilising others	3,85%	5,77%	23,08%	34,62%	30,77%
Purposeful Mindsets	1,92%	3,85%	7,69%	38,46%	46,15%
Self-awareness	1,92%	7,69%	11,54%	32,69%	42,31%
Critical Thinking	1,92%	5,77%	11,54%	21,15%	57,69%
Interacting through Digital Technologies	3,85%	19,23%	26,92%	30,77%	17,31%
Sharing through Digital Technologies	1,92%	25,00%	21,15%	34,62%	15,38%
Engaging in Citizenship through Digital Technologies	3,85%	19,23%	25,00%	38,46%	9,62%
Collaborating through Digital Technologies	5,88%	5,88%	21,57%	39,22%	25,49%
Netiquette	5,88%	11,76%	27,45%	33,33%	19,61%
Managing Digital Identity	7,69%	23,08%	9,62%	38,46%	19,23%
Adaptability	0,00%	5,88%	7,84%	27,45%	54,90%
Exploratory Thinking	1,92%	0,00%	17,31%	25,00%	53,85%
Collective Action	3,85%	9,62%	13,46%	19,23%	51,92%
Learning by Doing	1,92%	5,77%	19,23%	32,69%	36,54%
T-shaped People	1,92%	3,85%	7,69%	38,46%	44,23%

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Locating Opportunities for Creative Cooperation	1,92%	7,69%	15,38%	38,46%	32,69%
Understanding Ecosystems	0,00%	9,62%	19,23%	26,92%	40,38%
Learning How to Learn	0,00%	11,54%	11,54%	36,54%	36,54%
Financial Literacy	1,92%	9,62%	21,15%	32,69%	32,69%
Understanding Context	0,00%	5,77%	15,38%	26,92%	48,08%
Inter-Sectoral Communication	1,96%	5,88%	19,61%	31,37%	39,22%
Market Design	1,96%	11,76%	29,41%	35,29%	17,65%
Developing Digital Content	7,69%	23,08%	21,15%	28,85%	17,31%
Integrating and Re-elaborating Digital Content	5,77%	13,46%	26,92%	34,62%	13,46%
Copyright and Licenses	0,00%	15,38%	28,85%	32,69%	19,23%
Programming	11,54 %	15,38%	32,69%	23,08%	11,54%
Active Resilience	1,96%	7,84%	17,65%	37,25%	31,37%
Negative capability	5,88%	5,88%	15,69%	31,37%	35,29%
Mitigating Cognitive Bias	0,00%	17,31%	21,15%	34,62%	19,23%
Anticipatory Governance	1,96%	11,76%	21,57%	27,45%	29,41%
Anticipating Playfully	3,85%	11,54%	21,15%	28,85%	34,62%
Scenario-based Thinking	5,77%	9,62%	13,46%	40,38%	26,92%
Understanding Complex Adaptive Systems	1,96%	7,84%	29,41%	29,41%	27,45%
Rethinking Human Machine Relationships	5,77%	13,46%	26,92%	30,77%	19,23%
Understanding Co-Agency	1,92%	7,69%	9,62%	38,46%	34,62%
Systems Thinking	5,77%	9,62%	11,54%	34,62%	38,46%
Problem Framing	3,85%	5,77%	9,62%	38,46%	40,38%
Futures Literacy	1,92%	7,69%	13,46%	30,77%	44,23%
Political Agency	3,85%	15,38%	19,23%	34,62%	23,08%
Valuing Sustainability	1,92%	3,85%	17,31%	34,62%	38,46%
Supporting Fairness	3,85%	3,85%	23,08%	30,77%	36,54%
Spotting Opportunities	3,85%	7,69%	17,31%	30,77%	36,54%

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Creativity	1,92%	0,00%	11,54%	26,92%	57,69%
Vision	3,85%	5,77%	13,46%	36,54%	38,46%
Understanding Different Points of View	1,92%	5,77%	5,77%	38,46%	46,15%
Navigating Through Complex Information Spaces	3,85%	13,46%	15,38%	30,77%	34,62%
Data Literacy	3,85%	5,77%	28,85%	40,38%	15,38%
Browsing, Searching and Filtering Data, Information and Digital Content	1,92%	19,23%	21,15%	30,77%	21,15%
Evaluating Data, Information and Digital Content	1,92%	17,31%	21,15%	30,77%	26,92%
Managing Data, Information and Digital Content	9,62%	21,15%	21,15%	25,00%	23,08%
The Art of Conversation	1,92%	3,85%	15,38%	32,69%	42,31%
Dialogic Skills	0,00%	7,69%	17,31%	40,38%	26,92%
Artistic Entrepreneurship	3,85%	1,92%	9,62%	36,54%	44,23%
Reshaping Skills	0,00%	15,38%	17,31%	40,38%	25,00%
Unlearning and Relearning	0,00%	15,38%	15,38%	32,69%	32,69%
Scaling Abstraction	3,85%	7,69%	11,54%	38,46%	32,69%
Coordination, Orchestration	1,92%	5,77%	19,23%	40,38%	26,92%
Boundary Spanning	1,92%	9,62%	32,69%	26,92%	25,00%
Self-Awareness & Self-Efficacy	3,85%	3,85%	19,23%	40,38%	30,77%
Motivation & Perseverance	5,77%	13,46%	13,46%	36,54%	28,85%
Coping With Uncertainty, Ambiguity & Risk	1,92%	9,62%	11,54%	36,54%	38,46%
Creating Focus and Attention	3,92%	7,84%	17,65%	21,57%	45,10%
Providing Access to Making Meaning	3,85%	9,62%	17,31%	32,69%	30,77%
Multiple Modes of Reasoning	3,85%	3,85%	23,08%	28,85%	38,46%
Resilience & Tolerance	1,92%	5,77%	11,54%	30,77%	48,08%
Individual Initiative	3,85%	11,54%	15,38%	32,69%	34,62%
Knowing Your Own Strengths	3,85%	3,85%	9,62%	40,38%	38,46%

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Inter-Personal Perspective Taking	0,00%	5,77%	11,54%	46,15%	30,77%
Solving Technical Problems	7,69%	21,15%	19,23%	28,85%	21,15%
Identifying Needs and Technological Responses	7,69%	15,38%	21,15%	28,85%	21,15%
Creatively Using Digital Technologies	3,85%	13,46%	15,38%	28,85%	34,62%
Identifying Digital Competence Gaps	7,69%	21,15%	17,31%	34,62%	17,31%

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