Finance, Learning, Innovation and Patenting for CCIs

FINAL REPORT

Work Package 2

LEARNING

- ESCO's suitability for sector-specific data collection
- Strengthening the position of the CCS in European forecasting tools

Co-funded by the European Union

Intro/General Info about FLIP

Creative FLIP - Finance, Learning, Innovation and Patenting is a Pilot project co-funded by the EU whose main objective is to support healthy and sustainable ecosystems for Cultural and Creative Industries (CCIs) with respect to these four key policy areas.

For more info, see: www.creativeflip.eu

Abstract

This report covers two topics:

The chapter “ESCO’s compatibility for sector-specific data collection” analyses the suitability of the European Skills/Competences, Qualifications and Occupations (ESCO) taxonomy as a reference system for cultural-creative occupations, skills, and occupational skills profiles.

The chapter “Strengthening the position of the CCS in European forecasting tools” analyses challenges to the inclusion and presentation of CCS-relevant information in European skills forecasting and monitoring tools, and develops suggestions to address these.

This document is part of the Creative FLIP Final Report, requested by the European Commission as part of the project deliverables.

AUTHOR(S)

Claudia Plaimauer (3s)

LINGUISTIC VERSIONS

Original: EN

ABOUT THE AUTHOR

To contact Claudia Plaimauer, please write to: claudia.plaimauer@3s.co.at

Please use the following reference to cite this report:
[3s Unternehmensberatung]. 2021, Creative FLIP Final Report, Work Package 2: Learning, Brussels
Please use the following reference for in-text citations:
3s Unternehmensberatung et al. (2021)

DISCLAIMER

The opinions expressed in this document are the sole responsibility of the author and do not necessarily represent the official position of the European Commission.

CONTENTS

LIST OF ABBREVIATIONS

CEDEFOP	European Centre for the Development of Vocational Training
CCS	Cultural and Creative Sector
CCIs	Cultural and Creative Industries
CCS	Cultural and Creative Sector
CLA	Classification of Learning Activities
ESCO	European Skills/Competences, Qualifications and Occupations
ESSNet	European Statistical System Network on Culture
ETF	European Training Foundation
EU-LFS	European Labour Force Survey
Eurofund	European Foundation for the Improvement of Living and Working Conditions
EUROSTAT	Statistical Office of the European Union
FCS	UNESCO Framework for Cultural Statistics
ILO	International Labour Organization
ISCED	International Standard Classification of Education
ISCED FOET	International Standard Classification of Education / Fields of Education and Training
ISCO	International Standard Classification of Occupations (ISCO-08)
KSC	Knowledge, skills and competences
NACE	Statistical Classification of Economic Activities in the European Community (NACE
OECD	Organisation for Economic Co-operation and Development
UNESCO	United Nations Educational, Scientific and Cultural Organization
VET	Vocational education and training

LIST OF BOXES

LIST OF FIGURES

LIST OF TABLES

EXECUTIVE SUMMARY

Objectives and scope of Creative FLIP

Creative FLIP strives to support healthy and sustainable ecosystems related to Finance, Learning, Innovation and Patenting for Cultural and Creative Industries (CCIs). More specifically, it aims to:

- improve access to finance, value recognition, and to develop capacities to generate revenue from Intellectual Property (IP) for actors in the CCIs;
- enhance cross-sectorial benefits between the CCIs and other sectors through support to skills development and promotion of creative skills.

Work Package 2 is dedicated to Learning, and comprises four activities:

- Activity 1 (carried out by 3s) investigates whether the European Skills/Competences, Qualifications and Occupations classification (ESCO) is suitable as a reference system for creative and cultural occupations and skills.
- Activity 2 (carried out by VVA) reviews a sample of CCIs occupations and domains with respect to existing and future skills needs and gaps in selected EU Member States.
- Activity 3 (carried out by 3s) develops Policy Recommendations to enhance the extent to which information on the Cultural and Creative Sector (CCS) is provided by European forecasting tools.
- Activity 4 (carried out by VVA) aims to share the overall findings of WP2 with the relevant target groups (public institutions, civil society, private businesses etc.), through dissemination workshops in selected countries.

Objectives and scope of this report

This report presents the findings of the two Work Package "Learning" activities carried out by 3s:

- In chapter 2, we analyse ESCO's suitability for sector-specific data collection, covering the outcomes of activity 1.
- Chapter 3 identifies challenges impeding the visibility of the CCS in European data collection and forecasting tools, covering outcomes of activity 3.

Below, we summarise the main insights as well as Policy Recommendations developed within these chapters.

Culture is not a unit of statistical analysis

From a statistical viewpoint, cultural employment comprises cultural occupations working in any economic sector as well as non-cultural occupations working in a cultural sector. Thus, to comprehensively capture CCS-relevant employment data, information on the occupation (recorded in the International Standard Classification of Occupations – ISCO) has to be combined with information on the sector (recorded in the Statistical Classification of Economic Activities in the European Community – NACE).

However, cultural occupations occur at almost every skill level and with a broad variety of skills specialisations, and thus are scattered all over ISCO. With respect to economic activities relevant to the CCS, the same applies for NACE: cultural information is fragmented and not accessible under one single heading.

Furthermore, even at the most disaggregated level of ISCO and NACE (4-digit codes), the level of detail is still too coarse to clearly distinguish cultural from non-cultural units in all cases. As a consequence, some cultural information is included in ISCO or NACE groups that also contain non-cultural content.

This has significant implications with respect to the collection of CCS-relevant employment information:

- Data on occupation as well as economic sector has to be collected and combined at the highest level of detail (4-digit units) available in ISCO and NACE.
- Yet even then, CCS-relevant information cannot in all cases be clearly distinguished from other information, because one 4-digit unit of NACE and 13 4-digit units of ISCO are partly cultural only.

Furthermore, fully and partly cultural ISCO and NACE groups have, to date, only been identified for the CCS as a whole, and not for individual domains like Visual Arts or Performing Arts. As a consequence, employment information can be presented at the detailed, yet fragmented level of individual ISCO and NACE groups, or aggregated at the level of the CCS as a whole, but at the level of specific cultural-creative domains it is currently impossible to make any statements.

We thus suggest to improve the representation of the CCS in international taxonomies by:

1. Identifying cultural-creative ESCO occupations, and using these as a basis for a more detailed definition of fully as well as partly cultural ISCO unit groups.
2. Unambiguously linking partly as well as fully cultural ISCO unit groups to CCS domains.
3. Exploring the feasibility of also linking 4-digit NACE groups in an unambiguous manner to individual creative domains.

Once ISCO, ESCO and NACE are linked to CCS domains, cultural-creative information could be aggregated at different levels of detail. This could help to make the CCS better visible in European monitoring and forecasting tools: it could be presented at the level of the CCS as a whole, but also at the level of individual domains and their subordinated ISCO unit groups and ESCO occupations.

CCS-relevant employment information is difficult to present and access

Because international taxonomies currently present CCS-relevant content only in a very fragmented manner (namely spread all over ISCO, ESCO, NACE), users have to know very well where to look for it: there is neither a sign-posted access to the CCS as whole, nor to any of its domains. As a consequence, relevant information is difficult to find in European data collections (e.g. the EU-LFS), and impossible to present in a user-friendly way in European monitoring or forecasting tools (e.g. Skills OVATE, Cedefop Skills Forecasts).

If our efforts to improve the interoperability between international taxonomies (especially ISCO, ESCO, NACE) and the Eurostat Framework of Cultural Statistics are carried forward, the final outcome – a breakdown of the CCS into domains, subordinated ISCO unit groups and cultural-creative ESCO occupations – could significantly improve the visibility of the CCS and its domains.

In general, CCS-relevant information is well covered in ESCO. Nevertheless, there is room for improvement with respect to consistency and transparency as well as visibility of cultural-creative information.

Just like ISCO or NACE, ESCO neither provides sign-posted access to CCS-relevant information as a whole, nor does it highlight cultural-creative occupations, skills/competences or knowledge concepts. Although ESCO uses ISCO as a structural backbone for its occupations pillar, we seem to have been the first to attempt to use this obvious connecting point to link ESCO with a CCS classification. Once completed, the

resulting breakdown of cultural-creative domains into subordinated ISCO unit groups and relevant occupations could be used to make cultural-creative occupations more visible and accessible in ESCO.

When systematically analysing how three selected CCS domains – Design and Creative Services, Visual Arts and Crafts, Performance and Celebration (as defined UNESCO, 2009)[1] – and ten occupations (actor/actress; advertising manager; clothing CAD technician; costume maker; digital games designer; fine arts instructor; goldsmith; singer; video artist; violin maker) are represented in ESCO, we observed that:

- No major occupational gaps can be identified, yet occasionally the level of detail at which ISCO unit groups are broken down into occupations can be challenged.
- At the level of occupations, there is not in all cases a clear-cut distinction between cultural and non-cultural profiles, which slightly reduces ESCO's value for narrowing down the relevant parts of partly cultural ISCO unit groups. For the purposes of the CCS, we recommend to more clearly distinguish cultural from non-cultural occupations in ESCO.
- Due to the varying, yet generally rather high level of detail at which knowledge and skills/competences (KSCs) are specified in occupational profiles, it is difficult to gain an overview of individual requirements, or to see mobility paths between occupations. Our recommendation is to use already existing metadata (specifying broader KSCs or placement in the knowledge and skills hierarchy) to quickly enhance the transparency of occupational profiles. Yet in the long run, it might be advisable to systematically review the level of detail at which occupational skills profiles are specified in ESCO.
- When compared across occupations, the allocation of KSCs is not always consistent, especially when it comes to transversal KSCs. We have piloted a methodology to identify these inconsistencies and recommend that it be used in ESCO's maintenance.

[1] The UNESCO's domain breakdown was used instead of Eurostat's for pragmatic reasons: it is the only framework for cultural statistics identifying relevant ISCO unit groups per domain.

1. INTRODUCTION

1.1. Objectives of the study

Implemented by a consortium of six partners led by the Goethe-Institut, the Creative FLIP project strives to support healthy and sustainable ecosystems related to Finance, Learning, Innovation and Patenting for Cultural and Creative Industries (CCIs). More specifically, it aims to:

- improve access to finance, value recognition, and to develop capacities to generate revenue from Intellectual Property (IP) for actors in the CCIs;
- enhance cross-sectorial benefits between the CCIs and other sectors through support for skills development and promotion of creative skills.

Work Package 2 (Learning), carried out by VVA together with 3s, comprises four activities:

- Activity 1 (carried out by 3s) investigates whether the European Skills/Competences, Qualifications and Occupations classification (ESCO) is suitable as a reference system for creative and cultural occupations and skills.
- Activity 2 (carried out by VVA) reviews a sample of CCIs occupations and domains with respect to existing and future skills needs and gaps in selected EU Member States.
- Activity 3 (carried out by 3s) develops Policy Recommendations to enhance the extent to which information on the Cultural and Creative Sector (CCS) is provided by European forecasting tools.
- Activity 4 (carried out by VVA) aims to share the overall findings of WP2 with the relevant target groups (public institutions, civil society, private businesses etc.), through dissemination workshops in selected countries.

1.2. Content and structure of the report

This report presents the findings of two of the four activities of Work Package 2 (Learning):

- Chapter 2 analyses ESCO's suitability for sector-specific data collection and thus summarises tasks and outcomes of activity 1.
- Chapter 3, dedicated to activity 3, identifies challenges impeding the visibility of the CCS in European data collection and forecasting tools, and suggests a way forward to remedy these.

1.3. Overview of the methodology

Work on activities 1 and 3 is primarily based on desk research, but has been validated and extended via exchange with selected CCIs stakeholders and EU policy makers – either via Email and bilateral web meetings, or in the context of two Creative FLIP workshops (ESCO Focus Group Workshop in March 2020; WP 2 Dissemination Workshop in May 2021) and a conference organised by Cedefop ("Getting the future right"[2] in April 2021).

For the ESCO analysis, we investigated a sample of three CCS domains (design and creative services; performance and celebration; visual arts and crafts) and a representative choice of ten occupations along key quality criteria for taxonomies (completeness; transparency; level of detail; structure; consistency).

When developing recommendations for a better inclusion of information relevant to skills governance in the CCS, we first clarified the technical requirements for identifying and aggregating information on the

[2] See https://www.cedefop.europa.eu/mt/events-and-projects/events/getting-future-right-towards-smarter-and-people-centred-skills-intelligence.

CCS, then identified the major data sources, monitoring and forecasting activities at EU level. Focussing on those presenting the lowest barrier to delivering the desired information for the CCS, we checked these against our technical requirements. We identified challenges and suggested remedial actions which we discussed with selected experts, and validated during the final workshop and the Cedefop conference "Getting the future right".

2. ESCO'S SUITABILITY FOR SECTOR-SPECIFIC DATA COLLECTION

KEY FINDINGS

IDENTIFIED CHALLENGES

Accessibility of information relevant to the CCS

- No sign-posted access to cultural-creative information – neither for occupations, nor for skills/competence or knowledge concepts.
- No clear-cut boundary between occupations with or without a cultural-creative skills profile: sometimes differentiated (e.g. *knitter* for artisanal work practice, *knitting machine operator* for automated work practices), sometimes merged within one occupation (e.g. *stonemason* covers artisanal work practices as well as computer-controlled materials processing in one profile).
- Due to the high level of detail and the unstructured presentation of occupational skills profiles, it is difficult to gain an overview of requirements for occupations or to see mobility paths between them. The lack of structure and the abstraction also hamper the suitability of ESCO's occupational skills profiles for matching supply and demand. However, this criticism mainly applies to the manner in which profiles are presented on the ESCO portal: if occupational profiles are enriched with additional metadata from the KSCs pillar (especially semantic relations between concepts and the KSC's placement in the skills and knowledge hierarchy), their transparency can be considerably enhanced.

Interoperability between ESCO and international frameworks for cultural statistics

- All major frameworks for cultural statistics define their occupational scope in terms of fully or partly cultural ISCO unit groups. ESCO uses ISCO as a structural backbone for its occupations pillar.
- To date, it is not possible to disaggregate the CCS into domains that are clearly defined in terms of ESCO occupations.

Coverage of cultural-creative information

- No major occupational gaps have been identified. Nevertheless, the level of detail at which ISCO unit groups have been broken down varies considerably.
- The level of specificity with which KSCs requirements are characterised in profiles also varies considerably.
- KSCs requirements are characterised in occupational profiles in great detail, yet transversal KSCs have not been adequately considered.
- When compared across occupations, the allocation of attitudes and values, knowledge as well as skills/competences to individual profiles is not always consistent.

RECOMMENDATIONS

Improve visibility and accessibility of CCS-relevant information

- Highlight CCS-relevant KSCs and occupations, or even make these collectively accessible as a special collection within ESCO.
- Distinguish more clearly cultural-creative from non-cultural occupations; avoid covering creative, artisanal and purely executive, machine-controlled practices within one and the same occupational profile.

KEY FINDINGS

Improve interoperability between ESCO and the Eurostat framework for cultural statistics

- Exploit ESCO to further refine the occupational scope of the CCS in the Eurostat framework.
- Exploit the Eurostat framework's domain structure to cluster cultural-creative ESCO occupations.

Revise the level of detail at which information is provided

- Balance the level of detail at which ISCO unit groups are broken down into occupations, carefully weighing the different factors to be considered when defining occupations, e.g. distinctiveness of KSCs profiles, relevance to the European labour market, relevance to European cultural identity and heritage.
- Balance the degree of specificity in occupational skills profiles: Introduce more specific KSCs only if absolutely necessary to clearly differentiate otherwise indistinguishable occupations. Highly specific KSCs are of limited reusability across occupations, thus obscuring mobility paths between them.

Improve coverage and consistency of occupational skills profiles

- Develop a systematic approach for addressing transversal KSCs in occupational skills profiles.
- Identify inconsistencies and gaps in occupational skills profiles via a systematic analysis of occupations, as demonstrated for ten sample occupations. When addressing these gaps, make amendments on a sound empirical basis, e.g. on big data analysis of job advertisements, CVs and curricula, or on representative surveys.
- Exploit KSCs' metadata (semantic relations between KSCs; KSCs' position within skills and knowledge hierarchy) to improve clarity and transparency of occupational skills profiles.

2.1. Starting situation

According to Eurostat's definition, cultural employment *"includes all individuals working in a culture-related economic activity (NACE Rev. 2 classification) regardless their occupation, as well as all individuals with a culture-related occupation (ISCO-08 classification) whatever the economic activity they are employed in."*[3]

Cultural employment thus arises in three types of situations:[4]

- An individual exercises a cultural occupation and works in the cultural sector.
- An individual exercises a cultural occupation and works outside the cultural sector.
- An individual exercises a non-cultural occupation and works in the cultural sector.

For assessment purposes, cultural employment is defined by intersecting information on the economic sector with information on occupation.

But what constitutes a cultural occupation? ISCO is currently used to define this. But since cultural occupations occur at very different skills levels and with various skills specialisations (these two criteria being the organising principles of ISCO), cultural occupations are spread throughout the classification. Furthermore, even if all relevant occupations were identified in ISCO, the most detailed level of the classification – ISCO unit groups – is still too broad to make a clear distinction between cultural and non-cultural occupations. This is the case, for example, of *1431 Sports, recreation and cultural managers,* as well as 12 other ISCO unit groups.

Can ESCO provide the level of detail needed to clearly define the sphere of cultural-creative occupations? The system's great advantage is that it uses ISCO to structure its occupations pillar,[5] breaking down ISCO's most disaggregated classes – the unit groups – into more detailed occupations, 2,942 in total. Thus ESCO could be exploited to disaggregate partly cultural ISCO unit groups like *1431 Sports, recreation and cultural managers* into their cultural (*cultural centre director; cultural facilities manager; performance production manager*) and non-cultural components (*beauty salon manager; betting manager; gambling manager; lottery manager; recreational facilities manager; spa manager; sport facility manager; zoo curator*).

But apart from providing the possibility to more clearly define the occupational sphere of the CCS, how suitable is ESCO in general as a reference system for cultural-creative occupations, skills, and occupational skills profiles?

2.2. Scope and methodology

In order to explore this question, we investigated a sample of three CCS domains and a representative choice of ten occupations. Sections 2.2.1.-2.2.3 describe the methodology used to narrow down the field of investigation.

In order to analyse the selected CCS domains and occupational profiles, the following criteria and guiding questions were applied:

[3] https://ec.europa.eu/eurostat/web/culture/data

[4] ESSNet culture report, 2019, p. 140f.

[5] https://ec.europa.eu/esco/portal/occupation?resetLanguage=true&newLanguage=en

Box 1: Research questions for ESCO analysis

- **Completeness:** Does ESCO contain all occupations relevant to the chosen subsector? Do ESCO's occupational skills profiles give a complete picture of skills requirements in the cultural occupations?
- **Transparency:** Are the transversal components of skills profiles (skills shared between occupations across (sub-)sectors) sufficiently transparent? Is it possible to make a distinction between closely related occupations, based on their skills profiles?
- **Level of detail:** Are ESCO's skills profiles sufficiently detailed to draw a descriptive picture of occupational requirements in the CCS? Are ESCO's occupations broken down in a sufficiently fine-grained manner?
- **Structure:** Does ESCO's structure (grouping of occupations as well as skills into clusters of related content) facilitate a focus on cultural and creative skills/occupations? Are ESCO's skills profiles clustered in a way that facilitates a differentiation between "technical-professional skills", "management skills" and "soft skills"?
- **Consistency:** Have transversal as well as technical-professional skills been considered consistently across occupations? Is there a consistent level of occupational differentiation across ISCO unit groups relevant to the CCS?

2.2.1. Selection of CCS domains

In the absence of any taxonomy specific to cultural occupations, the International Classification of Occupations (ISCO-08) in its most current version, in combination with the major classification frameworks for cultural statistics (Eurostat, 2018; ESSNet, 2012; UNESCO, 2009), were selected as the main tools to identify cultural occupations in ESCO.

The UNESCO Framework for cultural statistics (UNESCO, 2009, p. 23f.) identifies seven cultural domains:

- A: Cultural and Natural Heritage
- B: Performance and Celebration
- C: Visual Arts and Crafts
- D: Books and Press
- E: Audio-visual and Interactive Media
- F: Design and Creative Services
- Intangible Cultural Heritage (a transversal domain)

These are supplemented by another three transversal domains relevant to the production and transmission of culture:

- Archiving and preservation
- Education and training
- Equipment and supporting materials

Eurostat builds on the framework developed by ESSNet-Culture. Slightly narrower in scope, this classification sets out the following ten cultural domains (ESSNet-Culture, 2012, p. 55f.):

- Advertising
- Architecture
- Archives

- Arts crafts
- Audio-visual and Multimedia
- Book & Press
- Heritage
- Libraries
- Performing Arts
- Visual Arts

The classification developed by ESSNet-Culture also served as the starting point for Creative Europe's definition of eligible sectors.[6]

Although the ESSNet-Culture framework lists all ISCO sub-major (3-digit) and unit (4-digit) groups that are fully or at least partly relevant to culture (ESSNet-Culture, 2012, p. 15ff.), it doesn't relate these to the respective cultural domains. So far, this mapping has only been done by the FCS (UNESCO 2009, p.73ff.). The FCS's definition of domains was therefore a better tool to group ISCO unit groups and to identify subordinated ESCO occupations of cultural relevance.

In order to pilot this mapping, and as a basis for the subsequent gap analysis, we selected the following FCS domains:

- Design and creative services
- Performance and celebration
- Visual arts and crafts

We also included the occupations from "Education and training", insofar as they were relevant to the above three domains.

2.2.2. Identification of relevant ESCO occupations

All of the classificatory frameworks that we evaluated[7] to define the scope of the CCS refer to ISCO. ISCO is also the structural backbone of ESCO's occupations pillar. We thus resorted to ISCO's most disaggregated level of analysis, unit groups, to identify ESCO occupations of potential relevance to the CCS.

If all three sector frameworks – UNESCO's, ESSNet's and Eurostat's – considered an ISCO unit group to be "fully cultural", we long-listed all occupations allocated to it in ESCO as relevant to the sector. If there was disagreement between the three sector frameworks (e.g. Eurostat's and ESSNet's assessment being in conflict with FCS's) we carefully considered the diverging assessments. In any case, the description and skills profile of subordinated ESCO occupations were the major decision-making factors: if these emphasised e.g. technical, managerial, administrative or other skills over cultural-creative ones, or if these completely lacked a cultural-creative character, the respective ESCO occupations were considered to be "non-cultural".

Below, we provide:

- A broad characterisation of every domain (using the FCS structure);
- An overview of the domain's breakdown into ISCO unit groups and the number of subordinated ESCO occupations assessed as relevant to the CCS.

[6] Regulation (EU) No 1295/2013 of the European Parliament and of the Council of 11 December 2013 establishing the Creative Europe Programme (2014 to 2020) and repealing Decisions No 1718/2006/EC, No 1855/2006/EC and No 1041/2009/EC, article 2.
[7] Eurostat, 2018, p. 15ff; ESSNet, 2012, p. 156ff; UNESCO, 2009, p. 74ff

For a more detailed presentation of results, refer to Annex 1 and the embedded Excel tables.

a. Subsector "Design and creative services"[8]

The UNESCO framework characterises the domain "Design and creative services" as covering "*activities, goods and services resulting from the creative, artistic and aesthetic design of objects, buildings and landscape*" (UNESCO, 2009, p. 28). It includes fashion, graphic and interior design, landscape design, architecture and advertising as part of the core cultural domains, but only as inputs into a final product that is not always cultural. Since education and training is considered to be a transversal domain of the CCS if it contains elements and activities pertinent to the sector, occupations dedicated to teaching design are also relevant here.

For this domain, we identified 41 ESCO occupations of relevance.

We consider ISCO unit group 2164 to be only partly cultural, thus following ESSNet's assessment rather than Eurostat's and UNESCO's, because the subordinated ESCO occupation *traffic planner* has a non-cultural profile. Although both ESSNet and Eurostat exclude ISCO unit group 2431, we assess it as partly cultural because ESCO lists one occupation relevant to this domain: *creative director*. Although FCS refers only to the "*design of objects, buildings and landscape*" (UNESCO, 2009, p. 28) when describing the scope of "design and creative services", we suggest that it also include design services for the human body. *Body artist* (3435), *personal stylist* and *make-up and hair designer* (both 5142) would thus also be integrated as relevant occupations, even if this is contrary to FCS's, ESSNet's and Eurostat's assessment of 5142 as being non-cultural.[9]

Table 1: Breakdown of "Design and creative services" into ISCO unit groups and number of relevant ESCO occupations

ISCO code	ISCO label	Number of identified ESCO occupations
1222	Advertising and public relations managers	1
2161	Building architects	2
2162	Landscape architects	2
2163	Product and garment designers	14
2164	Town and traffic planners	2
2166	Graphic and multimedia designers	6
2310	University and higher education teachers	1
2320	Vocational education teachers	2
2431	Advertising and marketing professionals	1
3432	Interior designers and decorators	8
3435	Other artistic and cultural associate professionals	1
5142	Beauticians and related workers	2

[8] The ESSNet-Culture framework defines "visual arts" and "architecture" as separate domains.

[9] In our assessment, 5142 is partly cultural because three out of its 12 occupations have a clearly creative skills profile, the third one (*make-up artist*) being of relevance to the domain "Performance and celebration."

b. Subsector "Performance and celebration"[10]

The UNESCO framework characterises the domain "Performance and celebration" as covering "*all expressions of live cultural events,*" thus including "*both professional and amateur activities, such as theatre, dance, opera and puppetry. It also includes the celebration of cultural events – Festivals, Feasts and Fairs – that occur locally and can be informal in nature. Music is defined in this domain in its entirety, regardless of format. As such, it includes live and recorded musical performances, music composition, music recordings, digital music including music downloads and uploads, and musical instruments*" (UNESCO, 2009, p. 26). Since education and training is considered to be a transversal domain of the CCS if it contains elements and activities that are pertinent to the sector, occupations dedicated to teaching performing arts and related activities are also relevant here.

For this domain, we identified 72 ESCO occupations of relevance.

Although FCS lists 2655 and 3435 only under "Audio-visual and interactive media" we regard both to be at least partly relevant to this domain. Although ISCO unit group 5142 is not listed in any CCS framework as "cultural", we assess it as being "partly cultural" because ESCO lists one occupation relevant to this domain: *make-up artist*. For 2320, which both ESSNet and Eurostat consider to be partly cultural, ESCO doesn't list any occupations relevant to this domain. The UNESCO framework also does not mention 2330 and 2355 as relevant to this subsector, whereas ESSNet and Eurostat considers them both to be fully relevant. For our selection of ESCO occupations, we once again followed the Eurostat and ESSNet assessment rather than UNESCO's.

Table 2: Breakdown of "Performance and celebration" into ISCO unit groups and number of relevant ESCO occupations

ISCO code	ISCO label	Number of identified ESCO occupations
2310	University and higher education teachers	5
2330	Secondary education teachers	4
2354	Other music teachers	1
2355	Other arts teachers	3
2652	Musicians, singers and composers	8
2653	Dancers and choreographers	4
2655	Actors	1
2659	Creative & performing artists, not elsewhere class.	9
3435	Other artistic and cultural associate professionals	23
5142	Beauticians and related workers	1
7312	Musical instrument makers and tuners	13

[10] The ESSNet-Culture framework's equivalent domain "performing arts" is narrower in scope, including neither festivals, feasts and fairs nor amateur activities.

c. Subsector "Visual arts and crafts"[11]

The UNESCO framework characterises the domain "Visual arts and crafts" as focusing on "*the creation of works, which are visual in nature. They are intended to appeal to the visual sense and can take many forms*" (UNESCO, 2009, p. 26). This domain thus covers fine arts such as paintings, drawings, sculpture, crafts[12] and photography, as well as the commercial spaces where art is exhibited. Since education and training is considered to be a transversal domain of the CCS if it contains elements and activities that are pertinent to the sector, occupations dedicated to teaching visual arts and crafts are also relevant here, while virtual art is excluded and covered in "Audio-visual and interactive media".

For this domain, we identified 57 ESCO occupations of relevance.

In contradiction to all CCS frameworks for cultural statistics, we assess ISCO unit groups 7318 and 7319 as "partly cultural" only, because each shows as subordinated ESCO occupations one non-cultural profile: *fishing net maker* (in 7318) and *sports equipment repair technician* (in 7319).

Although the UNESCO framework considers ISCO unit groups 7532-7536 to be cultural, we follow ESSNet's and Eurostat's assessment that these ISCO unit groups mostly do not contain any occupations of central importance to the CCS: in ESCO only 7533 lists one occupation of interest to this domain, *doll maker*. Although ESSNet and Eurostat classify 7531 *Tailors, dressmakers, furriers and hatters* as non-cultural, we lean more towards UNESCO's assessment (cultural) and consider this unit group to be at least partly cultural, the subordinated ESCO occupations *costume maker* and *wig and hairpiece maker* being clearly relevant to this domain as well as to "Performance and celebration". The UNESCO framework lists 7549 as relevant to "Visual arts and crafts", whereas ESSNet and Eurostat consider it to be non-cultural – an assessment we share, by analogy to the one taken for unit groups 7532-7536.

Two ESCO occupations, s*tone mason* and *stone engraver,* are borderline cases: their 'parent' ISCO unit group 7113 is considered to be non-cultural by all of the three CCS frameworks. Nevertheless, when reviewing the skills profiles and descriptions of these two occupations in ESCO – summarising artisanal as well as automated work practices within one occupation – they have to be assessed as "partly cultural". For the purposes of analysing the CCS, a more clear-cut distinction between artisanal and non-artisanal profiles would be better (see also Section 2.3.1.b).

[11] The ESSNet-Culture framework defines "visual arts" and "arts crafts" as separate domains, "arts crafts" being much narrower in scope.

[12] Only crafts with a substantial manual contribution by the artisan are included here; manufactured contemporary crafts are excluded from this domain, as they are covered under F Design and creative services.

Table 3: Breakdown of "Visual arts and crafts" into ISCO unit groups and number of relevant ESCO occupations

ISCO code	ISCO label	Number of identified ESCO occupations
2310	University and higher education teachers	2
2330	Secondary education teachers	1
2355	Other arts teachers	2
2651	Visual artists	10
3431	Photographers	2
7313	Jewellery and precious-metal workers	9
7314	Potters and related workers	2
7315	Glass makers, cutters, grinders and finishers	2
7316	Sign writers, decorative painters, engravers and etchers	8
7317	Handicraft workers in wood, basketry and related materials	6
7318	Handicraft workers in textile, leather and related materials	5
7319	Handicraft workers, not elsewhere classified	1
7522	Cabinet-makers and related workers	4
7531	Tailors, dressmakers, furriers and hatters	2
7533	Sewing, embroidery and related workers	1

2.2.3. Selecting a sample of ESCO occupations for detailed analysis

To achieve representativeness for the whole CCS, we selected ESCO occupations that differed as much as possible. The choice was influenced by several labour market-related factors (e.g. educational attainment, labour demand, labour market imbalance etc.) as well as the following additional criteria:

Box 2: Selection criteria for sample occupations

- The occupations come from at least three different cultural domains.
- The occupations vary with respect to skill level, function, exposure to digitalisation and technological change, as well as rate of self-employment.
- At least one domain (Performance and celebration) as well as some additional occupations belonging to other domains (digital games designer, fine arts instructor) are also relevant for Work Package 1 "Finance" where the sub-sectors performing arts, gaming, socio-cultural practices are in focus.
- At least some occupations (*digital games designer, violin maker, video artist*) are potentially also relevant for Work Package 4 "Patenting".

Furthermore, we ensured that with the ESCO occupation *fine arts instructor,* an occupation relevant to one of the three transversal domains (in this case "Education and training", see UNESCO 2009, p. 23) would also be represented.

Table 4: Sampled ESCO occupations with preliminary allocation to CCS domains

ESCO occupation	Function	ISCO 08 code	ISCO 08 label	Skill level
Sub-sector *Design and creative services*				
Advertising manager	Dissemination	1222	Advertising and public relations managers	3&4
Digital games designer*	Creation	2166	Graphic and multimedia designers	4
Fine arts instructor	Education/ training	2310	University and higher education teachers	4
Sub-sector *Performance and celebration*				
Actor/actress	Creation	2659	Creative and performing artists, not elsewhere classified	4
Singer	Producing	2652	Musicians, singers and composers	4
Violin maker	Producing	7312	Musical instrument makers and tuners	2
Sub-sector *Visual arts and crafts*				
Clothing CAD technician**	Creation	3118	Draughtspersons	3
Costume maker	Producing	7531	Tailors, dressmakers, furriers and hatters	2
Goldsmith	Producing	7313	Jewellery and precious-metal workers	2
Video artist*	Creation	2651	Visual artists	4

* These occupations were added later on, following feedback from the European Commission.
**This occupation has been reassessed as being non-cultural.

For the survey on skills needs and gaps (see VVA's contribution to Work Package 2), the sample occupations had to be selected during a rather early phase of the project. Later on, when analysing the occupational breakdown of the three domains and the occupational profiles in more detail, we discovered that:

- *Digital games designer* and *video artist* are members of the domain "Audio-visual and interactive media" rather than of "Design and creative services" and "Visual arts and crafts";
- *Clothing CAD technician*'s description and skills profile is non-cultural; furthermore, in contradiction to FCS, ESSNet and Eurostat both rate the whole ISCO unit group 3118 as being irrelevant to the CCS – an assessment we share.

Although considered in the analysis of occupational skills profiles (see Section 2.3.3.), the three occupations *clothing CAD technician, digital games designer*, and *video designer* were excluded from the occupational breakdown of the three domains under investigation.

2.3. Analysis of ESCO's suitability as a reference system for the CCS

2.3.1. Occupation pillar

a. Comprehensiveness

Does ESCO contain all occupations relevant to the domains under investigation, or are there any significant gaps? This question could only be tackled once the ESCO occupations had been identified for "Design and creative services", "Performance and celebration" and "Visual arts and crafts" (see Annex 1).

In April and May 2016, the European Commission already carried out a gap analysis, in the course of which the comprehensiveness and granularity of ESCO was compared to that of ISCO as well as eight selected national occupational classifications from EU Member States. ESCO was amended based on the outcome of this analysis.

Given the particular sectoral and geographical focus of this project, it was decided to supplement the Commission's 2016 gap analysis by comparing ESCO to additional taxonomies, as long as these fulfilled at least one of the criteria listed below.

Box 3: Selection criteria for taxonomies used in the gap analysis

- The taxonomy is a comprehensive and general, yet non-European classification of occupations;
- It is a specialist classification of occupations covering at least one of the three sub-sectors to be analysed;
- It is a national occupational classification used within at least one of the nine countries selected for this project (Bulgaria, Czech Republic, Finland, France, Germany, Poland, Slovenia, Spain, United Kingdom), and has not yet been evaluated within the Commission's 2016 gap analysis.

The following references were thus selected:

Comprehensive non-European occupational classifications:

- Australian and New Zealand Standard Classification of Occupations (ANZSCO)
- O*NET Standard Occupational Classification (O*NET-SOC)

Specialist classifications (lowest level of aggregation being ISCO unit groups):

- The European Statistical System Network on Culture (ESSNet-culture)
- Guide to Eurostat culture statistics — 2018 edition

National occupational classifications (all aligned with ISCO):

- Bulgaria: Национална класификация на професиите и длъжностите (Bulgarian National Classification of Professions and Positions)
- Finland: Classification of occupations 2010 (Finland)
- Poland: Polish Classification of Occupations and Specialisations for Labour Market Needs (Klasyfikacja Zawodów i Specjalności – KZiS)
- Slovenia: Standard Classification of Occupations 2008 (SKP-08)
- United Kingdom: Standard Occupational Classification (SOC 2010)

Simply comparing the amount of occupations contained within these taxonomies (see Table 5 below) to the ones contained within ESCO (2,942 occupations) suggests that ESCO is – in most cases considerably – more detailed than any of the seven national taxonomies.

Table 5: Number of occupations contained within selected national taxonomies

National classification of	Number of occupations
Australia	1,023
Bulgaria	370
Finland[13]	539
Poland	2,443
Slovenia	430
UK	369
US	974

As a result of this exercise, we only identified one occupation of minor relevance to "Design and creative services" (*floral designer* or *floral arranger*), and another one relevant to "Cultural and natural heritage" rather than to "Visual arts and crafts" (*gilder*).

Table 6: Occupations not yet considered by ESCO

Occupation	Evidence from taxonomies	Additional evidence	Closest related ESCO occupation
Floral designer	O*NET: as 27-1023.00 - *Floral Designers*	Klassifikation der Berufe[14]: *Florist/in (Engl.: flower arranger)*, and many more specialisations	Flower and garden specialised seller
Flower arranger	ISCO: as example of unit group 7549	Klassifikation der Berufe: *Florist/in (Engl.: flower arranger)*, and many more specialisations	Flower and garden specialised seller
Gilder	O*NET: as alternative title of 51-9123.00 Painting, Coating, and Decorating Workers and of 51-7021.00 Furniture Finishers	Klassifikation der Berufe: *Vergolder/in (Engl.: gilder); Restaurator/in – Vergolderhandwerk (Engl.: gilding restorer); Vergoldermeister/in (Engl.: master of gilding)*, and many more specialisations *VergolderIn und StaffiererIn* is an apprenticeship occupation in Austria	Construction painter

[13] The most detailed level of the Finnish Classification of occupations 2010 contains all 436 ISCO-08 groups (of which some are unused (e.g. 1113), supplemented by a national addition of 103 5-digit groups.

[14] Klassifikation der Berufe (KldB) is the German national taxonomy of occupations, available at: https://statistik.arbeitsagentur.de/DE/Navigation/Grundlagen/Klassifikationen/Klassifikation-der-Berufe/KldB2010/KldB2010-Nav.html

b. Level of detail

Although the gap analysis didn't identify any major occupations missing from the three domains that are relevant to the CCS, the level of detail at which ISCO unit groups are broken down into occupations gives rise to a few questions, especially when taking into account labour market relevance and the diversity of the occupational skills profiles concerned. For example:

- Why does ESCO not offer a separate occupation for instrumental musicians, but rather embeds these in the very broadly defined *musician* (subordinated to ISCO unit group 2652), covering both vocal and instrumental performance as well as conducting? *Singer* is singled out as a narrower concept of *musician* (so is *musical conductor* and *choirmaster/choirmistress*), yet clarinet player, pianist, trumpet player etc. are not included under a separate occupational skills profile, but only mentioned as alternative labels of *musician*.
- Why does ESCO sometimes introduce separate occupations to distinguish artisanal from automated work practices? For example, *carpet handicraft worker, carpet weaver*, and *weaver* (all subordinated to ISCO unit group 7318) are artisanal occupations, separate from *textile machine operator* (subordinated to ISCO unit group 8152) which is related to automated work. Yet this is not the case for *stone mason* or *stone engraver* (subordinated to ISCO unit group 7113) where artisanal[15] and automated work practice are conflated in one profile.
- Why introduce separate profiles for occupations that closely resemble each other, for example *ceramic painter* and *porcelain painter*, or *landscape designer* and *landscape architect* (subordinated to ISCO unit group 2162), yet not distinguish instrumental from vocal musicians?

Table 7 identifies ISCO unit groups and corresponding ESCO occupations that we consider are not broken down in sufficient detail; Table 8 lists ESCO occupations we consider to be too highly differentiated.

Table 7: ISCO unit groups with missing occupational detail

ISCO unit group	Missing occupations	Most closely resembling occupation	Comment
2320	Instructor for musical instrument making[16]	Vocational teacher	Musical instrument making is taught in VET, yet the corresponding vocational teacher is not yet represented in ESCO
2652	Instrumental musician	Musician	ESCO contains specialised instrumental musicians only as alternative titles of *musician* Evidence: O*NET: 27-2042.02 - Musicians, Instrumental ANZSCO: 211213 Musician (Instrumental)

[15] Furthermore, the artisanal practice of *stone mason* is to a certain extent also included in *sculptor* (alternative labels: stone sculptor, marble sculptor).

[16] Draft label only.

ISCO unit group	Missing occupations	Most closely resembling occupation	Comment
2652	Pop/rock singer, opera singer, chorister, singer-songwriter[17]	Singer	The skills profile of *singer* is very broad and could be split into specialisations reflecting the specific skills demand of different genres

The above amendment suggestions were generated by a comparative analysis of ESCO profiles and a review of the occupational taxonomies selected for the gap analysis. Since occupational taxonomies always lag behind current labour market developments, it was to be expected that this methodology would not discover new and emerging occupations, but only gaps regarding more or less established ones.

More promising approaches, such as an automated vacancy analysis, a Europe-wide survey or a representative expert consultation, were unfortunately beyond the scope of this study due to the limited budget available for this project.

Table 8: Merging candidates in Design and creative services, Performance and celebration, Visual arts and crafts

Closely resembling ESCO occupations		Amendment suggestion	Comment
Carpet weaver	Carpet handicraft worker	Merge with *carpet handicraft worker*	Small labour market relevance; carpet weaver is already included as alternative label of *carpet handicraft worker*, and included in its description
Ceramic painter	Porcelain painter	Merge occupations	Overlapping description and skills profile
Filigree maker	Goldsmith, silversmith	Merge all three occupations under *gold and silversmith*	ESCO description is “Filigree makers create a delicate kind of jewellery, usually of gold and silver, called a filigree.”
Fishing net maker	Textile machine operator	Delete as a separate occupation, instead cover as alternative label of *textile machine operator*	Small labour market relevance; not covered as separate occupation in e.g. Polish taxonomy, O*NET, or Klassifikation der Berufe
Hand brick moulder	Production potter, Brick and tile caster	Delete as a separate occupation, instead cover under *production potter*	Small labour market relevance; skills profile overlaps with production potter (also artisanal occupation) and brick and tile caster (non-artisanal occupation)
Illustrator	Drawing artist	Delete as a separate occupation, instead cover as alternative label of *drawing artist*	Overlapping description and skills profile

[17] These are draft suggestions only.

Closely resembling ESCO occupations		Amendment suggestion	Comment
Interior planner	Interior designer	Delete as a separate occupation, instead cover as alternative label of *interior designer*	Overlapping description and skills profile; interior space planner is already alternative label of *interior designer*
Jewellery engraver, jewellery mounter, jewellery polisher, jewellery repairer	Jeweller	Merge all four occupations under *jeweller*	O*NET distinguishes under *Jewellers and Precious Stone and Metal Workers* only: *Jewellers; Gem and Diamond Workers; Precious Metal Workers*
Knitter	Knitting machine operator	Delete as a separate occupation, instead cover as alternative label of *knitting machine operator*	Small labour market relevance
Land planner[18]	Urban planner	Merge occupations under *urban and regional planner*	O*NET covers both occupations under *urban and regional planners,* and AMS-BIS[19] under *RaumplanerIn*; only the much more detailed Klassifikation der Berufe distinguishes *Raumplaner/RaumplanerIn* from *Stadtplaner/StadtplanerIn*
Landscape architect	Landscape designer	Merge occupations	Overlapping description and skills profile; *landscape design expert* and *landscape design specialist* are already alternative labels of *landscape architect*
Leather goods hand cutting operator; Leather goods hand stitcher	Leather goods artisanal worker	Merge occupations under *leather goods artisanal worker*	Overlapping description and skills profile
Street performer	Musician; Circus artist; Puppeteer; Singer etc.	Delete *street performer*	*Street performer* has a very general skills profile, yet its alternative labels (street musician, street circus artist, street singer etc.) underlines the overlap with *musician, circus artist, singer* etc.; in our assessment, the particular location of the performance doesn't justify a separate occupation

[18] This occupation displays alternative labels like *town planner, city planning engineer* and even *urban planner*. Using the preferred label of one ESCO occupation as an alternative label for another is unfavourable taxonomic practice because it blurs, rather than clarifies, the two occupational profiles. Yet in this case, we take it as a welcome indicator for the close proximity of these two occupations: if they are impossible to clearly keep apart, then it is best to merge them.

[19] The taxonomy used by the Austrian Public Employment Service for structuring occupational online information, available at: https://www.ams.at/bis/bis/

Closely resembling ESCO occupations		Amendment suggestion	Comment
Visual merchandiser	Merchandiser	Merge occupations under *merchandiser*, supplementing visual merchandiser as alternative label	O*NET summarises both occupations under 27-1026.00 - Merchandise Displayers and Window Trimmers

c. Structure

In ESCO, each occupation is mapped against exactly one ISCO unit group, thus clustering occupations of related skills specialisation and level in a mono-hierarchical structure. When accessing ESCO occupations systematically, ISCO provides the top four layers of this hierarchical structure, the fourth layer (ISCO unit groups) then gives access to ESCO occupations, which are either equal to ISCO unit groups or narrower than these.[20]

As a consequence, ESCO presents cultural-creative occupations, which can occur at almost any level and with very different skill specialisations, all over the classification. When entering the occupations pillar systematically via ISCO, there is not a single entry point giving access to all cultural-creative occupations, but many. If you want to navigate to a cultural-creative occupation, e.g. *cultural policy officer*, you have to know ISCO well enough to choose the correct path (as in Table 9).

Table 9: Systematic access to ESCO occupation *cultural policy officer*

2 Professionals	ISCO
24 Business and administration professionals	
242 Administration professionals	
2422 Policy administration professionals	
Policy officer* Agricultural policy officer Cultural policy officer Education policy officer Environmental policy officer [and many more narrower occupations]	ESCO

* *Policy officer* has several narrower terms, only one of them, *cultural policy officer*, being fully relevant to the CCS.

Furthermore, ESCO users must be aware that in many cases, ISCO unit groups present cultural-creative occupations alongside non-cultural ones, as demonstrated in Table 9: *Policy officer* has several narrower occupations, only one of them, *cultural policy officer*, being fully relevant to the CCS.

In many cases, the label already reveals an occupation's cultural-creative character, as in *cultural policy officer*, but occasionally only a careful evaluation of the occupation's description and associated skills profile unveils its potential relevance to the CCS, as in *tourist animator,* for example.

[20] https://ec.europa.eu/esco/portal/escopedia/International_Standard_Classification_of_Occupations__40_ISCO_41_

There is yet another factor that complicates the use of ESCO for the CCS: To date, there is no interoperability between ESCO and sector-specific classifications like the Eurostat or the UNESCO framework for cultural statistics (Eurostat, 2018; UNESCO, 2009). Thus questions like which ESCO occupations are relevant to "Arts Crafts" or to "Books & Press" (cultural domains of the Eurostat framework), or to "Performance and Celebration" (cultural domain of the UNESCO framework) are impossible to answer.

d. Consistency

As already demonstrated in Section 2.3.1.b, the level of detail at which ISCO unit groups are broken down into occupations is not always consistent. Some, such as 2163 Product and garment designers (14 subordinated ESCO occupations) or 7312 Musical instrument makers and tuners (13 subordinated ESCO occupations) are highly differentiated, whereas others, like 2655 Actors (2 subordinated occupations), are less so.

The criteria used for justifying the introduction of separate occupations are also not always applied in a consistent manner:

- Sometimes, artisanal and automated work practice are covered within one single profile (as in *stonemason* or *stone engraver*), sometimes this criterion is used to justify separate occupations (as in *knitter* and *knitting machine operator*).
- Clearly distinct skills profiles are mostly a criterion for defining separate occupations; yet sometimes largely overlapping profiles are defined as different occupations, as in *ceramic painter* and *porcelain painter*, for example. We even identified one occupation (*street performer*) for which the particular location in which it is practised (on the street instead of on stage) seems to justify its existence (although *musicians, magicians, circus artists, singers, actors* etc. might not only perform on stage either).

Generally speaking, inconsistencies reduce the transparency and predictability of a taxonomy and thus put higher demands on users when searching for information, or when interpreting findings. For the purposes of the CCS, an inconsistent distinction between artisanal and non-artisanal occupations reduces ESCO's usefulness as a reference for cultural statistics.

2.3.2. Skills pillar

ESCO systematically distinguishes between knowledge and skills/competences.

In line with the European Qualification Framework, knowledge means *"the outcome of the assimilation of information through learning. Knowledge is the body of facts, principles, theories and practices that is related to a field of work or study."*[21] Yet slightly deviating from the EQF, ESCO doesn't distinguish between skills and competences but summarises *"the ability to apply knowledge and use know-how to complete tasks and solve problems"*[22] under the unified category of skills/competences.

Depending on how widely a knowledge or a skill/competence concept can be applied, ESCO distinguishes four levels of reusability:

Transversal KSCs are relevant to a broad range of occupations and sectors and are thus regarded as essential for the professional as well as the personal development of a person. **Cross-sectoral KSCs** are of importance to occupations across several economic sectors, **sector-specific KSCs** to at least two

[21] https://ec.europa.eu/esco/portal/escopedia/Knowledge
[22] https://ec.europa.eu/esco/portal/escopedia/Skill

occupations within that sector, whereas **occupation-specific KSCs** are only relevant within one occupation and its specialisms. Of the 13,353 KSCs, the majority has been classified as sector-specific, and a very small fraction only as transversal (see Table 10)

Table 10: Distribution of ESCO KSCs over different reusability levels

Reusability level	Number of KSCs
Transversal	453
Cross-sector	3,643
Sector-specific	6,412
Occupation-specific	2,977
Total	**13,485**

Users find KSCs via searches, or alternatively access them systematically, using the "knowledge and skills hierarchy", a single all-embracing hierarchical framework of four distinct sub-classifications for knowledge, skills/competences, attitudes and values, language skills and knowledge. This classification organises all 13,485 KSCs in a three-level hierarchy, leading in several steps from the general to the increasingly specific.

Structure

Prior to the introduction of the knowledge and skills hierarchy, the KSCs pillar barely had any systematic structure at all[23] that could be exploited to identify CCS-relevant information. The publication of the ESCO skills and knowledge hierarchy in May 2020 improved the situation in general, yet not fully satisfactorily with respect to cultural-creative skills/competences and knowledge concepts: these have been embedded into general (mostly non-cultural-creative) clusters and thus are neither visible nor accessible as a distinct subset of the KSCs pillar.

Knowledge concepts

ESCO's knowledge concepts are expressed as nouns or noun phrases and are systematically grouped along ISCED Fields of education and training (ISCED-F 2013).[24]

To a certain extent, this structure facilitates the identification of CCS-relevant knowledge concepts: ISCED-F "arts and humanities" points users to many relevant concepts such as "fine arts" or "music and performing arts", yet it doesn't point exclusively to cultural-creative content, since it also gives access to non-cultural concepts such as *natural language processing* or *religious studies*. Furthermore, cultural-creative knowledge concepts can also be found – albeit in smaller numbers – under several other ISCED-F classes, for example *professional transition in an arts career* under ISCED-F "education" or *architectural design* under ISCED-F "engineering, manufacturing and construction".

ESCO thus doesn't support access to all of its cultural-creative knowledge concepts under a single heading. It also doesn't highlight cultural-creative knowledge in partly cultural ISCED-F classes, which would make these more visible.

[23] Except for the relatively small sub-sets of transversal, language and digital skills.

[24] https://ec.europa.eu/eurostat/ramon/nomenclatures/index.cfm?TargetUrl=LST_CLS_DLD&StrNom=CL_ISCEDF13&StrLanguageCode=EN&StrLayoutCode=HIERARCHIC

Skills/competence concepts

ESCO's skills/competences are expressed as verbs or verb phrases and are systematically grouped along a proprietary classification distinguishing between skills/competences, attitudes and values, language skills and knowledge, also proceeding in several steps from the rather general to the specific.

The skills classification contains some categories grouping together mainly cultural-creative skills/competences, for example:

Skills
S1 - communication, collaboration and creativity
S1.14 - performing and entertaining
S1.14.2 - performing artistic or cultural activities

But the skills/competences hierarchy contains many more concepts of relevance to the CCS (below marked in bold) where cultural skills/competences can be found alongside non-cultural ones, for example:

Skills
S1 - communication, collaboration and creativity
S1.6 - promoting, selling and purchasing
S1.6.2 - promoting products, services, or programs
advertise an art collection
advertise sport venue
conduct mobile marketing
conduct religious missions
create cultural venue outreach policies
customise travel package
develop tourism destinations
implement sales strategies
manage artistic career
manage health promotion activities

Thus, what was observed for the structural representation of knowledge concepts also applies to the structural representation of skills/competences: There is neither a single skills group giving access to cultural-creative skills/competences as a whole, nor are cultural-creative skills highlighted in any way.

2.3.3. Occupational skills profiles

In ESCO, occupations are linked to skills/competences and knowledge concepts that are considered essential ("*usually required when working in an occupation, independent of the work context or the employer*")[25] or at least optional ("*may be required or occur when working in an occupation depending on the employer, on the working context or on the country*")[26] for professional practice.

ESCO currently divides occupational profiles into four clusters: essential skills/competences; essential knowledge; optional skills/competences; optional knowledge. Within each cluster, concepts are listed in alphabetical order, without any further subdivision.

[25] https://ec.europa.eu/esco/portal/escopedia/Essential
[26] https://ec.europa.eu/esco/portal/escopedia/Optional

Most of the structural information available in the skills pillar is invisible to users when calling occupational profiles for display on the ESCO portal, namely:

- The KSC's **reusability level,**[27] indicating its applicability across occupations or even sectors;
- The KSC's **hierarchical relation to other KSCs**, showing the connection between specific, "contextualised"[28] KSCs and the broader ones to which they are subsumed;
- The KSC's placement in the **skills and knowledge hierarchy,**[29] grouping all KSCs with respect to conceptual similarity.

The above structural information only becomes visible to users of the ESCO portal when they individually access each KSC listed in the profile. When doing so, it becomes possible to generalise, for example from the occupation-specific *help set performance schedule* or the cross-sectoral *create campaign schedule* to their shared transversal broader concept *manage time*. It also becomes possible to see that other skills/competences in the same category of the skills and competence hierarchy (as in the above case *S4.2 - organising, planning and scheduling work and activities*) lead to occupational profiles with similar requirements.

In our analysis, we evaluate the profiles of the ten sample occupations in two ways:

a. We initially assess how information is presented on the ESCO portal: Is it easy for stakeholders of the CCS to interpret and compare occupational skills profiles?
b. We then also look at the underlying database itself, to determine whether detected shortcomings are due only to the way in which information is presented, or whether more efforts are needed overcome these.

The challenges we identify are summarised in Section 2.3.3.c.

All tables contained in the sub-sections of Section 2.3.3. are extracts or special evaluations of the data contained in Annex II, which due to its size and complexity unfortunately can only be made available in electronic form.

a. Accessing information on occupational skills profiles via the ESCO portal

Within occupational skills profiles, the ESCO portal only differentiates between "skill/competence" and "knowledge" concepts on the one hand, and "essential" versus "optional" KSCs on the other. Unless users analyse KSCs one by one, it is rather unclear which parts of the overall profile represent e.g. creative, managerial, sector-specific, or transversal requirements (see Box 4 for an example).

[27] https://ec.europa.eu/esco/portal/escopedia/Skill_reusability_level

[28] European Commission, 'ESCO Handbook', 2019. Available at: https://ec.europa.eu/esco/portal/document/en/0a89839c-098d-4e34-846c-54cbd5684d24. Hereafter 'ESCO Handbook'.

[29] https://ec.europa.eu/esco/portal/escopedia/Skills_pillar under "structure of the skills pillar."

Box 4: Essential and optional knowledge and skills/competences associated with "goldsmith"

Essential skills and competences

apply smithing techniques
build jewellery models
cast jewellery metal
clean jewellery pieces
create jewellery
cut metal products
develop jewellery designs
heat jewellery metals
pour molten metal into moulds
select gems for jewellery
select metals for jewellery
smoothen rough jewel parts
use jewellery equipment

Essential Knowledge

characteristics of precious metals
jewellery processes
metal and metal ore products

Optional skills and competences

adjust jewellery
advise customers on jewellery and watches
apply restoration techniques
design objects to be crafted
engrave patterns
ensure conformance to jewel design specifications
estimate cost of jewellery and watches' maintenance
estimate restoration costs
estimate value of used jewellery and watches
evaluate restoration procedures
maintain jewels and watches
mount stones in jewels
pass on trade techniques
perform damascening
perform enamelling
record jewel processing time
record jewel weight
select restoration activities
trade in jewellery

Optional Knowledge

coining
electroplating metal materials
electroplating processes
engraving technologies
imitation jewellery
jewellery product categories
watches and jewellery products

Source: http://data.europa.eu/esco/occupation/8a007cd3-ba40-4c55-b238-587bd59e74b2
(Extract by 3s)

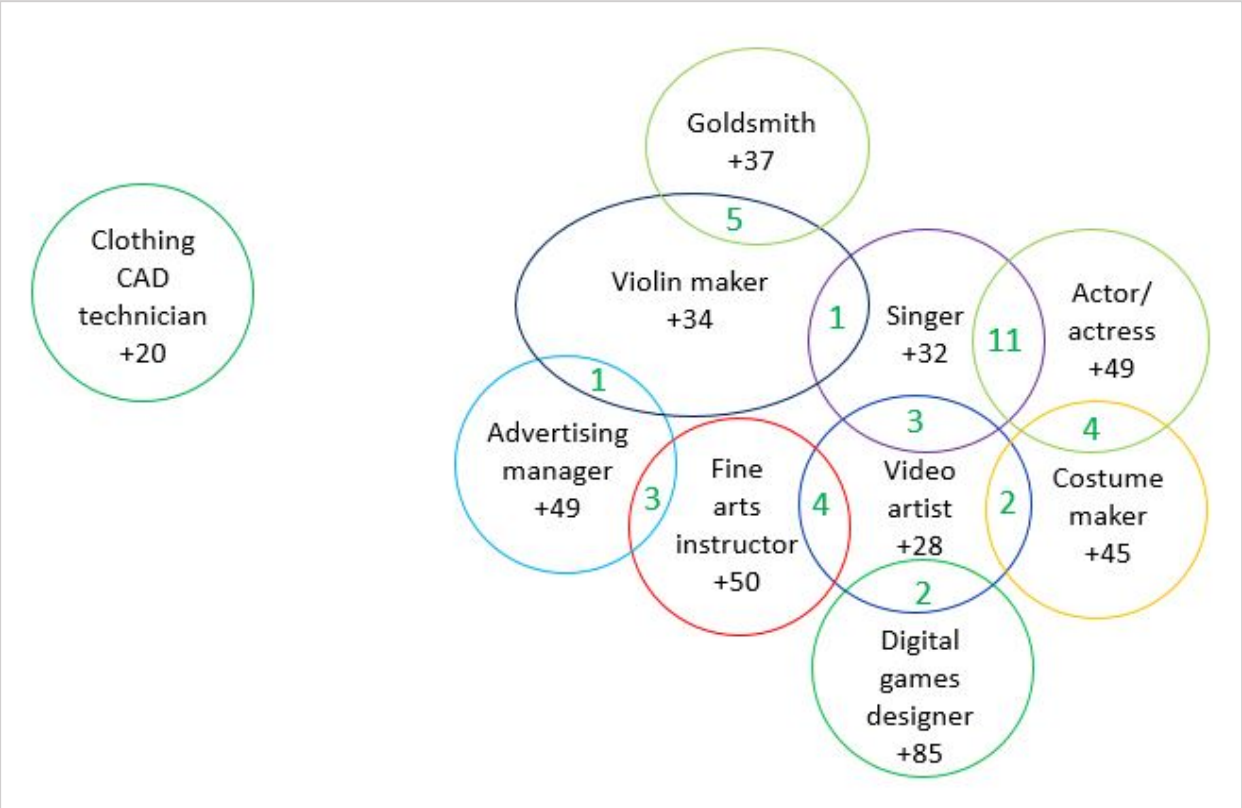
However it is exactly this categorisation that is needed if you want a quick answer to questions such as:

- Which creative KSCs are required in this occupation?
- To what extent are the KSCs requirements for e.g. *goldsmith* similar to the ones for e.g. *silversmith*?
- Which of the KSCs identified as being relevant across cultural-creative occupations in general (Mietzner & Kamprath, 2013) have been explicitly described as such in the profile, and which not?
- To what extent do the skills sets of job applicants match the profile characterised by ESCO?

Just viewing the profile information presented on the ESCO portal doesn't answer the above questions. Particularly as users cannot easily discover similarities and differences between occupational profiles by simply checking to what extent these overlap with respect to KSCs labels – see Figure 1 demonstrating this for the 10 occupations on which this study focuses:[30]

- These ten occupations have a total of 483 KSCs labels allocated;
- Of these, only 36 are listed in more than one profile, and none in more than two.
- Even the two occupations with the biggest overlap – *actor/actress* and *singer,* sharing 11 skills labels – don't seem to have very similar KSCs requirements because they have many more that differ: *singer* has 32, and *actor/actress* has 49 additional KSCs assigned.

Figure 1: Overlap of skills labels within the ten sample occupations

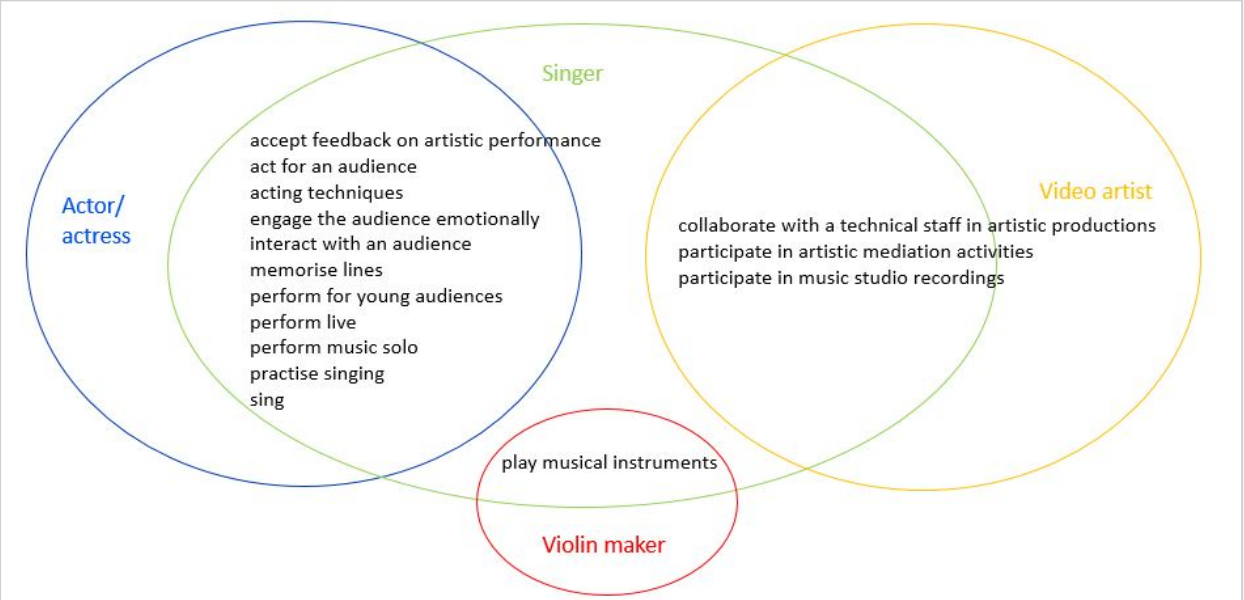


Source: 3s

If we shine the spotlight on the occupations with the biggest overlap, *singer* and *actor/actress,* and list the skills labels actually shared between these occupations (see Figure 2), the result is counter-intuitive: these two occupations do not overlap with respect to transversal requirements, but rather with respect to 11 very specific cultural-creative skills.

[30] All knowledge, skills/competence associations are treated equally, not differentiating between optional and essential.

Figure 2: Skills/competence labels overlapping between singer, actor/actress, video artist, violin maker



Source: 3s

To truly identify overlaps between occupational profiles, users have to go beyond simply looking at shared skills labels and compare the underlying concepts expressed by these. But this requires considerable additional effort, as demonstrated below in Table 11, where we show to what extent and with which words some of the requirements identified as transversally important for cultural-creative occupations (Mietzner & Kamprath, 2013) are expressed in singer and actor/actress.

Table 11: Conceptual overlap of KSCs allocated to singer and actor/actress

Skills concept	Actor/actress	Singer
Ability to organise	organise an exhibition; organise cultural events; organise rehearsals	work independently as an artist
Ability to work in a team	work with an artistic team	collaborate with a technical staff in artistic productions; perform music in ensemble; work with composers
Business administration	—	manage artistic project
Communication	declaim; communicate during show; speak different languages; pronunciation techniques	—
Creativity	develop magic show concepts; develop puppet shows; interpret performance concepts in the creative process	compose music; design a music show; improvise music
Entrepreneurial thinking	—	manage artistic career; organise a repertoire; specialise in a musical genre

Skills concept	Actor/actress	Singer
IT comp./dealing with new technologies	—	—
Legislation/law/IP and copyrights	—	legal environment in music
Persistence	—	cope with stage fright
Readiness to learn	memorise lines; study roles from scripts	memorise lines; accept feedback on artistic performance
Relation/Network management	—	—
Strategic, proactive thinking	—	select music for performance

Source: 3s

Although not visible at first glance, once efforts have been invested in identifying underlying concepts, it is possible to see that according to ESCO, *singer* and *actor/actress* actually overlap with respect to the following transversal skills:

- Ability to organise
- Ability to work in a team
- Creativity
- Readiness to learn

KSCs relating to these transversal requirements are expressed in both profiles, even though almost always[31] with a different wording. For example, the concept *ability to work in a team* is expressed by *work with an artistic team* in the *singer*'s profile, whereas in the *actor*'s profile the same concept is more contextualised as *collaborate with a technical staff in artistic productions; perform music in ensemble; work with composers.* Wouldn't it be much more user-friendly if ESCO made these connections transparent in the occupational profiles themselves?

b. Accessing information on occupational skills profiles via ESCO database manipulations

Even if the occupational skills profiles as presented on the portal do not show the required information at first sight, couldn't this be supplemented with additional information already contained in the database? Couldn't we learn much more about the comprehensiveness and consistency of occupational skills profiles if we also considered a KSC's reusability level, its semantic relations and placement in the skills hierarchy?

A preliminary impression of comprehensiveness can already be gained when evaluating to what extent transversal, cross-sectoral, sector-specific and occupation-specific KSCs are specified for the ten profiles. For this, we analysed the reusability level of allocated KSCs (see Table 12 below).

[31] The only transversal skills concept shared between actor/actress and singer which is also expressed by the same label is *memorise lines*.

Table 12: Sample occupations: Number of allocated KSCs per reusability level

Occupation	Number of KSCs per reusability level				Total
	transversal	cross-sectoral	sector-specific	occupation specific	
Actor/actress	0	25	37	1	63
Advertising manager	0	48	4	0	52
Clothing CAD technician	0	6	14	0	20
Costume maker	0	20	25	2	47
Digital games designer	1	9	72	4	86
Fine arts instructor	0	36	21	0	57
Goldsmith	0	10	32	0	42
Singer	0	5	31	0	36
Video artist	0	8	31	0	39
Violin maker	0	18	23	0	41
Total	**1**	**185**	**290**	**7**	**483**

Source: 3s

Four occupations are described in more detail (in descending order of profile length: *digital games designer; actor/actress; fine arts instructor; advertising manager*) than the average sample occupation; one occupation (*clothing CAD technician*) shows a particularly brief KSCs profile.

The underrepresentation of transversal and occupation-specific KSCs is striking, as is the overrepresentation of cross-sectoral and sector-specific ones. There is only one profile, *digital games designer,* containing a KSC labelled "transversal" in ESCO. This is a surprising result, considering that ESCO's KSCs pillar contains a total of 453 transversal KSCs. Yet of these, only four (*attend to hygiene; computer programming; use databases; use word processing software*) have actually been used in occupational profiles, and only in a very few (in 52 of a total of 2,942 occupations, to be precise).

This peculiarity has to be attributed to the fact that transversal KSCs had been considered too abstract to characterise occupations: these had "*to be brought to a more detailed level so that they can be directly used in occupational profiles*" (ESCO Handbook, p. 21). To that end, hundreds of more specific KSCs were added to the skills pillar.

Since these new and more specific KSCs were also subordinated to the transversal skills they contextualise, we can exploit this hierarchical relation to generalise: for example, from the cross-sectoral *use different communication channels* or *perform interviews* to the underlying transversal *interact with others*. This technique also allows us to systematically uncover underlying transversal information otherwise invisible in ESCO's occupational profiles (see Table 13 below).

Table 13: Sample occupations: Underlying transversal KSCs made visible by aggregating cross-sectoral, sector- and occupation-specific KSCs

Transversal KSC	actor/actress	advertising manager	clothing CAD technician	costume maker	digital games designer	fine arts instructor	goldsmith	singer	video artist	violin maker
interact with others	2	4				1		1	3	
make decisions						3	2	1	1	1
work in teams	1			3		1		1	1	
adapt to change	1			2		1			1	
address an audience	5					1		5	1	
lead others	2	4				1		1		
work independently	1			1				1	1	
carry out work-related calculations		1				1			1	
evaluate information			1				1			1
give advice to others		4				2	1			
manage time				1	1		1			
think creatively		1			1				1	
accept constructive criticism	1							1		
carry out work-related measurements				1			1			
creatively use digital technologies		1		1						
demonstrate intercultural competence	2					1				
demonstrate willingness to learn	2			1						
follow safety precautions in work practices				4		1				
make an effort	1			1						
memorise information	2							1		
use questioning techniques		1								1
work efficiently				1					1	
computer programming					36					
cope with pressure								1		
demonstrate curiosity	1									
demonstrate good manners	1									
develop strategy to solve problems	1									
meet commitments				2						
process qualitative information	1									
report facts		1								
support colleagues				1						
support company plan		1								
support cultural diversity						1				
use digital device operating systems						1				
use learning strategies						3				
Total number of contextualised transversal KSCs	**24**	**18**	**1**	**19**	**38**	**18**	**6**	**13**	**11**	**3**
Total number of transversal KSCs	**15**	**9**	**1**	**12**	**3**	**13**	**5**	**9**	**9**	**3**

Source: 3s

Legend: **Green boxes** indicate which transversal KSCs are represented in the occupation (as contextualisation). **Numbers in green boxes** indicate how many of the cross-sectoral, sector- and occupation-specific KSCs allocated to a given occupation have a transversal core meaning (these contextualised transversal KSCs are subordinated to transversal KSCs). **Total number of transversal KSCs**

indicates how many different transversal KSCs are characterised per occupation (equals number of green boxes).

An assessment of the number and distribution of transversal KSCs within our ten sample occupations leads to the following observations:

- The extent to which transversal requirements have been expressed in the profiles shows great variation, ranging from *clothing CAD technician* having barely any to *digital games designer* having a total of 38.
- The range of transversal KSCs addressed also shows great variation, from only one in *clothing CAD technician* to 15 in *actor/actress*.
- Personal-social KSCs expected to be of universal relevance to creative professionals (Mietzner & Kamprath, 2013, Figure 3, p. 290) like *interact with others, work in teams* or *demonstrate willingness to learn* are mentioned in some profiles only.
- The transversal relevance of *creative thinking* has been highlighted in the profiles of *advertising manager, digital games designer* and *video artist*, but not in the others. Only for *clothing CAD technician* does this omission fully make sense.
- *Singer* and *actor/actress*, both belonging to the same cultural domain ("Performance and celebration), share seven transversal KSCs but differ with respect to ten; *fine arts instructor* and *video artist,* belonging to different domains (Visual arts and crafts/Education and Training; Audio-visual and interactive media), share six and also differ with respect to ten. Shouldn't *actor/actress* and *singer* share more transversal KSCs?
- The three "crafts" occupations of our sample, *costume maker, goldsmith* (both from Visual arts and crafts), and *violin maker* (Performance and celebration) do not have a single transversal KSC in common, which is implausible.

In addition to the semantic links between KSCs concepts, which we have just exploited to make transversal KSCs more visible in profiles, we now utilise the KSCs' placement within the all-embracing knowledge and skills hierarchy to make even more mobility paths between occupations transparent. In a fist step, we analyse how and to what extent attitudes and values have been expressed in the sample profiles (see Table 14).

Table 14: Sample occupations:
Skills/competences and underlying concepts referring to attitudes and values

Occupation	Skills/competences	Underlying concept
Actor/actress	show intercultural awareness	demonstrate consideration
	show professional responsibility	assume responsibility
	work with a voice coach	demonstrate willingness to learn
Advertising manager	-	-
CAD clothing technician	-	-
Costume maker	finish project within budget	stay within budget
	follow work schedule	meet deadlines and follow schedules
	meet deadlines	meet deadlines and follow schedules
Digital games designer	-	-
Fine arts instructor	adapt teaching to student's capabilities	demonstrate consideration
	apply intercultural teaching strategies	demonstrate consideration
Goldsmith	-	-
Singer	cope with stage fright	cope with pressure
Video artist	-	-
Violin maker	-	-

Source: 3s

This evaluation also gives rise to a range of questions:

- Why are only four out of ten occupations characterised with respect to required attitudes and values?
- Why is *show intercultural awareness* mentioned for *actor/actress* yet not for *singer*, an occupation quite as often working at international level or within multicultural teams?
- Why does only the profile of *costume maker* contain any reference to time management (*follow work schedule; meet deadlines*) and the ability to cope with budget restrictions (*finish project within budget*)?
- Why is *be able to cope with stage fright* only highlighted for singer, yet not for actor/actress?
- Why does only *actor/actress* yet not *singer* mention *work with a voice coach* as a requirement?
- Why is *show professional responsibility* mentioned for actor/actress yet not for the other nine occupations?

In Table 15, we systematically evaluate the 128 knowledge allocations listed in the sample profiles. Note that for ease of comparison and overview, the table only refers to the knowledge concepts' classification under broad and narrow fields of education and training. The more specific knowledge concepts themselves are presented in the unabbreviated ESCO data table provided in Annex II.

These are our observations regarding coverage and distribution of knowledge in the sample profiles:

- Nine out of ten sample profiles have at least one knowledge concept related to the field of "arts and humanities", which makes sense considering the mostly cultural-creative content summarised by this broad field of education and training. But shouldn't *costume maker* be amended to at least contain reference to the knowledge field "fashion, interior and industrial design", just like *clothing CAD technician*? Why is knowledge concerning "handicraft" mentioned for *fine arts instructor, goldsmith*, and *violin maker* but not for *costume maker*? Why is knowledge of "audio-visual techniques and media production" mentioned for *actor/actress, advertising manager, clothing CAD technician, digital games designer*, and *fine arts instructor* but not for *singer*?
- Why is *digital games designer* (11 concepts) so elaborately characterised with respect to "arts and humanities" and *video artist* (one concept) so sparsely? Shouldn't at least knowledge of the field "audio-visual techniques and media production" be supplemented to the *video artist's* profile? Why does *actor/actress* (7 concepts) need to be more knowledgeable in "arts and humanities" than *singer* (2 concepts)? Isn't know-how of "audio-visual techniques and media production" also required for *singer*?
- It makes sense that *advertising manager* needs far more knowledge in the field of "business, administration and law" than any other occupation of our sample. But is it adequate that ESCO doesn't specify any knowledge requirements for "management and administration" or "marketing and advertisement" for nine out of ten sample occupations? Considering the prevalence of freelancing for occupations such as *actor/actress, singer* or *video artist*, this seems inappropriate.
- When it comes to legal know-how, why is IP knowledge mentioned for advertising manager and fine arts instructor (in both profiles as copyright legislation), for singer (as legal environment in music) and video artist (as intellectual property law), yet not for actor/actress, goldsmith and violin maker? And why has a general concept (intellectual property law) been used in the profile of video artist, a more specific one (copyright legislation) in advertising manager and fine arts instructor, and a rather nebulous one (legal environment in music) for singer? For users, it is easier to see the common requirement of IP knowledge if the same words are used in all cases.

- The three "crafts" occupations of our sample (*costume maker; goldsmith; violin maker*) as well as *clothing CAD technician* are all characterised with respect to "engineering, manufacturing and construction" knowledge, which is plausible. Yet why is knowledge of "materials (glass, paper, plastic and wood)" mentioned for *goldsmith* and *violin maker* only, yet not for *fine arts instructor*?
- It makes sense that *digital games designer* needs more knowledge in the field of "information and communication technologies" than any other of our sample occupations. Yet it is puzzling to discover that according to ESCO, eight out of the ten analysed profiles don't seem to need any knowledge of ICT. Isn't CAD and CAM software knowledge, for example, required in jobs for *goldsmith*s and *clothing CAD technician?* Don't e.g. *violin maker* and *costume maker* need at least basic knowledge of computer use? Doesn't *fine arts instructor* need to be acquainted with e.g. *graphics editing software*?
- Is it a good strategy to extensively characterise *digital games designer*'s optional requirements for "software and applications development and analysis" (only two out of its 51 knowledge requirements are essential), considering that an occupational taxonomy should abstract from and not summarise job offers?[32] This level of detail also requires a lot of maintenance, considering how quickly knowledge in this field of expertise evolves.
- Only two out of ten sample occupations are currently characterised with respect to knowledge "natural sciences, mathematics and statistics": *fine arts instructor* requires chemical knowledge (*types of paint*), *violin maker* needs to have know-how in mathematics (*3D modelling*) and physics (*acoustics*). But why isn't *3D modelling* also mentioned in the profiles of *clothing CAD technician* and *goldsmith*?

[32] In comparison to ESCO, the "Chips For Game Skills" project applies a much more appropriate level of abstraction when analysing skills requirements of the gaming industry. See e.g. https://pelimerkit.metropolia.fi/en/2020/06/10/game-job-skills-research/

Table 15: Sample occupations: Number and broad/narrow field of education & training of allocated knowledge concepts

Broad and Narrow field of education and training	Actor/ actress	Advertising manager	Clothing CAD technician	Costume maker	Digital games designer	Fine arts instructor	Goldsmith	Singer	Video artist	Violin maker	*Totals*
Arts and humanities											
audio-visual techniques and media prod.	1	1	1	0	11	1	0	0	0	0	***15***
fashion, interior and industrial design	0	0	1	0	0	0	0	0	0	0	***1***
fine arts	0	0	0	0	0	1	0	0	1	0	***2***
handicrafts	0	0	0	0	0	1	5	0	0	2	***8***
history and archaeology	0	0	0	0	0	0	0	0	0	1	***1***
literature and linguistics	2	0	0	0	0	0	0	0	0	0	***2***
music and performing arts	4	0	0	0	0	0	0	2	0	4	***10***
Business, administration and law											
law	0	1	0	0	1	1	0	1	2	0	***6***
management and administration	0	3	0	0	0	0	0	0	0	0	***3***
marketing and advertising	0	4	0	0	0	0	0	0	0	0	***4***
Education											
education science	0	0	0	0	0	3	0	0	0	0	***3***
teacher training without subject spec.	0	0	0	0	0	1	0	0	0	0	***1***
Engineering, manufacturing and construction											
building and civil engineering	0	0	0	0	0	0	0	0	0	2	***2***
materials (glass, paper, plastic and wood)	0	0	0	0	0	0	1	0	0	1	***2***
mechanics and metal trades	0	0	0	0	0	0	4	0	0	2	***6***
textiles (clothes, footwear and leather)	0	0	6	1	0	0	0	0	0	0	***7***
Generic programmes and qualifications											
personal skills and development	0	0	0	0	0	1	0	0	0	0	***1***
Health and welfare											
therapy and rehabilitation	1	0	0	0	0	0	0	0	0	0	***1***
medical diagnostic & treatment tech.	0	0	1	0	0	0	0	0	0	0	***1***

Broad and Narrow field of education and training	Actor/ actress	Advertising manager	CAD clothing technician	Costume maker	Digital games designer	Fine arts instructor	Goldsmith	Singer	Video artist	Violin maker	*Totals*
Information and communication technologies (ICTs)											
computer use	0	1	0	0	2	0	0	0	0	0	*3*
database & network design & admin.	0	0	0	0	1	0	0	0	0	0	*1*
software & applications dev. & analysis	0	0	0	0	51	0	0	0	0	0	*51*
Natural sciences, mathematics and statistics											
chemistry	0	0	0	0	0	1	0	0	0	0	*1*
mathematics	0	0	0	0	0	0	0	0	0	1	*1*
physics	0	0	0	0	0	0	0	0	0	1	*1*
Services											
occupational health and safety	0	0	0	0	0	1	0	0	0	0	*1*
Social sciences, journalism and information											
political sciences and civics	0	2	0	0	0	0	0	0	0	0	*2*
Totals	***8***	***12***	***9***	***1***	***66***	***11***	***10***	***3***	***3***	***14***	***137***

Source: 3s

Table 16 analyses the ten sample skills profiles with respect to skills/competences coverage and distribution. Here too, we only show 'parent' levels of the skills/competence hierarchy, not the skills/competences themselves, which are fully accessible in Annex II.

As done before for attitudes and values as well as for knowledge, we summarise the insights gained via the systematic analysis:

- The ten sample profiles contain a total of 337 skills/competence allocations; half of these relate to the broad field "communication, collaboration and creativity".
- As could be expected, all ten occupations are characterised with respect to the narrow field "creating artistic, visual or instructive materials" – a*ctor/actress* much more extensively than any other of the sample occupations, whilst *clothing CAD technician* barely contains any skills from this field. *Actor/actress* as well as *singer* were allocated the most skills related to "performing and entertaining", whilst *video artist* is most extensively characterised with respect to "creating artistic, visual or instructive materials".
- Yet there are also some inconsistencies with regard to the broad field "communication, collaboration and creativity": Why does only the *goldsmith* need skills in "advising and consulting", yet not the *violin maker* who is just as much in contact with customers? Are skills in "liaising and networking" not relevant to all occupations with a high rate of freelancing? Currently, the profiles of *actor/actress* and *singer* lack these. Why is multilingualism ("using more than one language") a requirement for *actor/actress*, yet not for *singer,* an occupation quite as often working in a multicultural environment? Several skills related to "working with others" are expected from *actor/actress*, yet none from *clothing CAD technician*, *digital games designer*, *goldsmith* or *violin maker*: why is this?
- Within the broad field of "information skills", it is implausible that only *costume maker* requires skills in *measuring physical properties*, yet not *goldsmith* and *violin maker*. It also seems to be an omission that skills relating to *monitoring developments in area of expertise* are only expected from *costume maker* and *fine arts instructor,* and of none of the other sample occupations.
- When it comes to the broad field of "management skills", these are mentioned mostly for *advertisement manager*, as can be expected. But that *goldsmith* and *violin maker* need absolutely no such skills is unlikely: at least when practised as self-employment, skills in *allocating and controlling resources* and *organising, planning and scheduling work and activities* are indispensable. Skills related to *leading and motivating* have surprisingly been allocated to the profile of *actor/actress* only, yet not to *advertisement manager* or *fine arts instructor* where these are more likely to be a requirement.
- Skills related to the broad field of "working with computers" are – as expected – most extensively characterised in the *digital games designer*'s profile; also *clothing CAD technician, fine arts instructor* and *video artist* have digital skills assigned. Yet why are skills in the subfield of *using digital tools to control machinery* only mentioned for *clothing CAD technician,* yet not for *goldsmith* and *violin maker*?

Table 16: Sample occupations: Number and classification of allocated skills/competences

Broad and narrower field of skills/competence hierarchy	Actor/ actress	Adverti-sing manager	Clothing CAD technician	Costume maker	Digital games designer	Fine arts instruc-tor	Gold-smith	Singer	Video artist	Violin maker	*Totals*
Communication, collaboration and creativity											
advising and consulting	0	3	0	0	0	1	1	0	0	0	***5***
communication, collaboration and creativity	0	0	0	0	0	1	0	0	0	0	***1***
creating artistic, visual or instructive materials	7	3	2	9	4	8	3	2	15	1	***54***
designing systems and products	0	0	0	2	5	1	0	0	0	1	***9***
liaising and networking	0	3	0	2	0	3	0	0	3	0	***11***
negotiating	0	1	0	0	0	0	0	0	0	0	***1***
obtaining information verbally	1	2	0	0	0	0	0	0	0	1	***4***
performing and entertaining	21	0	0	0	0	0	0	17	1	2	***41***
presenting information	1	3	0	0	0	1	0	1	2	0	***8***
promoting, selling and purchasing	2	1	0	1	0	0	1	1	0	1	***7***
solving problems	1	0	0	0	0	0	0	0	0	0	***1***
teaching and training	0	0	0	0	0	5	1	0	0	1	***7***
using more than one language	1	0	0	0	1	0	0	0	0	0	***2***
working with others	6	1	0	3	0	1	0	3	1	0	***15***
writing and composing	0	1	0	0	1	0	0	3	0	0	***5***

Broad and narrower field of skills/competence hierarchy	Actor/ actress	Adverti-sing manager	Clothing CAD technician	Costume maker	Digital games designer	Fine arts instruc-tor	Gold-smith	Singer	Video artist	Violin maker	*Totals*
Information skills											
analysing and evaluating information and data	0	3	2	0	1	1	1	0	2	1	***11***
calculating and estimating	0	1	0	0	2	0	4	0	1	3	***11***
conducting studies, investigations & examinations	4	1	0	0	0	0	0	0	0	0	***5***
documenting and recording information	0	1	0	1	0	1	2	0	1	0	***6***
measuring physical properties	0	0	0	1	0	0	0	0	0	0	***1***
monitoring developments in area of expertise	0	0	0	1	0	2	0	0	0	0	***3***
monitoring, inspecting and testing	0	1	1	0	0	0	1	0	0	1	***4***
processing information	0	0	0	0	0	1	0	0	1	0	***2***
Assisting and caring											
protecting and enforcing	1	0	0	5	0	1	0	0	0	0	***7***
providing information & support to public & clients	1	0	0	0	0	2	0	0	0	0	***3***
Management skills											
allocating and controlling resources	0	1	0	4	0	2	0	0	1	0	***8***
building and developing teams	0	0	0	0	0	1	0	0	0	0	***1***
developing objectives and strategies	0	3	0	2	2	2	0	1	2	0	***12***
leading and motivating	1	0	0	0	0	0	0	0	0	0	***1***
management skills	0	0	0	0	0	0	0	2	0	0	***2***
organising, planning & scheduling work &activities	2	6	0	2	0	1	0	0	0	0	***11***
recruiting and hiring	0	2	0	0	0	0	0	0	0	0	***2***
supervising people	3	3	0	0	0	3	0	1	0	0	***10***
Working with computers											
accessing and analysing digital data	0	0	0	0	1	0	0	0	1	0	***2***
programming computer systems	0	0	0	0	1	0	0	0	0	0	***1***
using dig. tools for collab., content creation & problem solv.	0	0	1	0	2	2	0	1	1	0	***7***
using digital tools to control machinery	0	0	1	0	0	0	0	0	0	0	***1***

Broad and narrower field of skills/competence hierarchy	Actor/ actress	Adverti-sing manager	Clothing CAD technician	Costume maker	Digital games designer	Fine arts instruc-tor	Gold-smith	Singer	Video artist	Violin maker	*Totals*
Handling and moving											
assembling and fabricating products	0	0	0	2	0	0	2	0	0	7	***11***
cleaning	0	0	0	0	0	0	2	0	0	0	***2***
making moulds, casts, models and pat terns	0	0	1	1	0	1	3	0	0	0	***6***
sorting and packaging goods and materials	0	0	1	0	0	0	2	0	0	0	***3***
transforming and blending materials	0	0	0	0	0	0	1	0	0	1	***2***
using hand tools	0	0	0	1	0	0	5	0	0	4	***10***
washing and maintaining textiles and clothing	0	0	0	1	0	0	0	0	0	0	***1***
Constructing											
building and repairing structures	0	0	0	1	0	0	0	0	0	1	***2***
finishing interior or exterior of structures	0	0	0	0	0	1	1	0	0	1	***3***
Working with machinery and specialised equipment											
Install., maintain. & repair. electr., electronic & preci. equip.	0	0	0	1	0	0	0	0	1	0	***2***
Install., maintain. & repairing mech.equipment	0	0	0	1	0	0	1	0	0	1	***3***
operating machinery for extract. & proc. of raw mat.	0	0	0	0	0	2	0	0	0	0	***2***
operating machinery for manufacture of products	0	0	1	1	0	0	1	0	0	0	***3***
using precision instrumentation and equipment	0	0	1	0	0	0	0	0	3	0	***4***
working with machinery & specialised equipment	0	0	0	1	0	0	0	0	0	0	***1***
Totals	***52***	***40***	***11***	***43***	***20***	***44***	***32***	***32***	***36***	***27***	***337***

Source: 3s

c. Challenges of using ESCO's occupational skills profiles to analyse the CCS

Comprehensiveness & consistency

Occupational requirements for essential and optional KSCs are described in great detail, although not always in a consistent manner. Our comparison of ten sample profiles identified several omissions, e.g. regarding ICT and IP knowledge, working with computers, or management skills. In particular, KSCs that are needed across a sector where freelancing is so prevalent could be considered more systematically, such as for example (self)marketing, financial/entrepreneurial skills, knowledge of IP.

Transversal requirements are currently not adequately addressed. If considered at all, these are embedded (contextualised) within cross-sectoral or even sector-specific KSCs, and occasionally even duplicated under different names. E.g. *meet deadlines, write to a deadline, meet deadlines and follow schedules, manage time, follow work schedule* etc. are all more or less synonymous, or at least all express the same core meaning, yet due to the different labels used in profiles this is not detectable at first sight.

The number and character of allocated KSCs also differ across occupations. Of the ten sample profiles, *digital games designer* (86 KSCs allocated) was at the upper end of the range, *clothing CAD technician* (20 KSCs allocations) at the lower. Some profiles have mostly sector-specific KSCs assigned (*digital games designer*), others mostly cross-sectoral ones (*advertising manager*). Some occupations have a broad range of transversal KSCs concepts contextualised in their profiles (e.g. *actor/actress* contains 24 contextualisations from 15 different transversal core concepts), others a very small range only (e.g. *clothing CAD technician* only one). *Digital games designer* stands out in this respect: No other sample occupation has more contextualised transversal KSCs in its profile (38 in total), yet these relate to three transversal core concepts only (one to *manage time*, one to *think creatively*, and 36 to *computer programming*).

Transparency

Due to the unstructured presentation and the high level of detail at which KSCs requirements are described, considerable mental processing is required on the part of the user to obtain an overview of occupational skills profiles. The high level of detail and the little overlap in KSCs also obscures mobility paths between occupations. This is further exacerbated by the inconsistent consideration of transversal KSCs.

However, this criticism mainly applies to the manner in which profiles are presented in the ESCO portal. Once occupational profiles are enriched with KSCs' metadata information – especially with information on semantic relations between concepts, or with information about the KSC's placement in the skills and knowledge hierarchy – the transparency of occupational KSCs profiles can be considerably enhanced.

Level of detail

Due to the practice of KSCs contextualisation, ESCO's occupational profiles tend to be highly descriptive. Yet this descriptiveness is associated with a drawback: the high level of detail reduces the reusability of KSCs, and thus lowers the likelihood of finding all occupations where almost the same KSC is required. For example, KSCs relating to teamwork appear in the ten sample profiles in a range of guises: *work with an artistic team, work with the camera crew, work with the director of photography, work with the lighting crew, teamwork principles,* etc. Not surprisingly, these rather specific skills are then allocated to only very few occupations. As a consequence, searching with one of these specific KSCs labels, e.g. *work with an artistic team*, does not retrieve all occupations where the concept of teamwork is relevant, simply

because in the other profiles, different degrees of contextualisation have been chosen (e.g. the more specific *work with the lightning crew*).[33]

The high level of KSCs detail has yet another trade-off: the particularly short-lived technology KSCs are quickly outdated, as demonstrated for *digital games designer*.

Structure

For display on the ESCO portal, KSCs in occupational profiles are clustered along the dimensions skill/competence or knowledge, and essential or optional. Within the resulting four clusters, KSCs are then listed in alphabetical order. This presentation doesn't facilitate the identification of KSCs having related content. It also complicates a critical review of occupational profiles, e.g. if these are to be used as a blueprint for filling vacancies, or when comparing an applicant's skills set with standard occupational requirements.

2.4. Recommendations to improve ESCO's suitability for analysing the CCS

2.4.1. Occupations pillar

To improve the accessibility of cultural-creative occupations in ESCO, we recommend (1) to identify and (2) to structure all relevant occupations, applying the criteria and domain structure developed by Eurostat and ESSNet-Culture (Eurostat, 2018; ESSNet-Culture, 2012). This framework identifies both fully and partly cultural ISCO occupations, at 3-digit as well 4-digit level (Eurostat, 2018, p. 15ff.). In the course of our research, we have piloted the identification of cultural-creative ESCO occupations for three domains, as specified by the UNESCO framework for cultural statistics[34] (see Annex I for details). Yet for the final breakdown of cultural-creative domains into ISCO unit groups and ESCO occupations, we recommend using the domain structure proposed by the Eurostat framework.

Once finalised, the resulting definition of the CCS in terms of domains, ISCO unit groups and identified ESCO occupations could serve as a resource, for example to structure sector-specific access to ESCO or to (dis)aggregate Eurostat's statistical information. Nevertheless, for this purpose a clear-cut distinction between cultural-creative and non-cultural ESCO occupations is desirable. To this end, we recommend revising the very few cases detected so far where creative, artisanal and purely executive, machine-controlled occupational practices are covered within one and the same occupational profile. If this is not possible, such borderline cases could be marked as "partly cultural" ESCO occupations.

Although our gap analysis didn't identify any major omissions, we suggest to revise the level of detail at which ESCO breaks down ISCO unit groups into occupations. Our observations on this matter (see Section 2.3.1.b) could be used as a starting point for a discussion in the ESCO community forum dedicated to arts and culture. In this context, an attempt should also be made to clarify the criteria for splitting a generic ESCO occupation into specialisations (for example: importance for the European labour market, distinctiveness of KSCs profiles, coverage in European VET programmes, importance for European cultural heritage[35] etc.).

[33] In the language of information science, this phenomenon is called the "precision-recall-dilemma."

[34] As already mentioned in Section 2.2.1, to date, FCS is the only framework for cultural statistics that already maps relevant ISCO unit groups onto cultural-creative domains.

[35] E.g. there might not be many jobs in Europe for gilders or thatchers, nevertheless these occupations are very relevant to preserving Europe's cultural heritage.

2.4.2. Skills pillar

Although the recently introduced knowledge and skills hierarchy greatly improves systematic access to knowledge, skills and competences in ESCO, access to CCS-relevant content would be further facilitated if it were highlighted in ESCO. Once individually marked, these KSCs would then also be more visible in occupations otherwise considered "non-cultural", thus highlighting the cross-sectoral importance of creative KSCs.

As a general suggestion, efforts should be made to reduce terminological duplication and conceptual overlap in the skills pillar. CCS users would not be alone in benefitting from the resulting increase in consistency and transparency.

We also recommend to review the level of detail at which KSCs have been specified in ESCO, introducing contextualisations of already existing KSCs only where needed to differentiate otherwise indistinguishable profiles. Although individual occupations would be described less precisely, this would be more than compensated by a better visibility of mobility paths across occupations and even sectors.

2.4.3. Occupational skills profiles

Not only for the purposes of CCS stakeholders but also for users in general, the coverage and consistency of ESCO's occupational skills profiles would benefit from a systematic analysis, as piloted within this project for ten sample occupations. Potential amendments should be validated by insights gained from big data analysis of job advertisements, CVs and curricula, or via representative surveys, for example.

In addition, or alternatively, the knowledge and skills hierarchy as well as the currently revised transversal KSCs model[36] could be promoted as a template for developing and revising ESCO's occupational skills profiles. For the purposes of the CCS in particular, sector-specific blueprints could be developed on the basis of preparatory work such as that of Mietzner, D. et al., 2013.

Furthermore, the skills and knowledge hierarchy could be exploited to improve the way in which the ESCO portal presents KSCs in occupational profiles: Clarity and transparency of profiles could be significantly enhanced if better use were made of already available metadata, like semantic relations between KSCs, or a KSC's position within the skills and knowledge hierarchy. The user-friendly design created for displaying the ten sample profiles during the ESCO Focus group (12 March 2020) might serve as an inspiration for such developments – see Annex 3.

[36] Bjørnåvold, J. et al., 2021.

3. STRENGTHENING THE POSITION OF THE CCS IN EUROPEAN FORECASTING TOOLS

KEY FINDINGS

IDENTIFIED CHALLENGES

Economic activities of the CCS are generally difficult to capture

- Employment in small and microenterprises is not adequately represented in business survey samples.
- Not all cultural-creative domains are adequately covered.
- Not all forms of occupational activity are adequately covered.
- The value of cultural output is often difficult to measure.

Data on skills that is at the same time specific enough, representative, comprehensive as well as timely is scarce

- Skills are not comprehensively covered in EU surveys.
- If skills are covered in surveys, then only at a rather general level.
- Big data analysis might be able to generate more specific information on skills, but is not representative.
- Occupations, qualification levels, or educational content are used as skills proxies.

Culture is not a unit of statistical analysis

- Both the occupation and the sector need to be known to comprehensively identify cultural employment.
- Occupations relevant to the CCS are defined via ISCO, information on economic activity via NACE; yet this information is scattered all over ISCO and NACE, and partly immersed in groups containing also non-cultural components, thus providing only a fuzzy definition of sectoral scope.
- Cultural-creative domains, as defined by Eurostat or by the Creative Europe programme, are not aligned with relevant ISCO or NACE groups, thus ruling out the possibility of aggregating information also at the level of domains.

No interoperability between ESCO and cultural-creative sector classifications

- To date, it is not possible to disaggregate the CCS into domains that are clearly defined in terms of ESCO occupations.

RECOMMENDATIONS

Increase level of detail in data provision

- On the side of data provision, strive towards raising requirements for national data collection to better meet the needs of the CCS.
- Emphasise the need to invest more in national data collection.

KEY FINDINGS

Refine the definition of the CCS in international taxonomies, thereby also improving the interoperability between sector classifications (most importantly Eurostat, 2019) and ISCO, ESCO and NACE

- Unambiguously link Eurostat's cultural domains to fully as well as partly cultural ISCO 4-digit groups.
- Narrow down partly cultural ISCO 4-digit groups by identifying subordinated fully cultural ESCO occupations.
- Explore the feasibility of linking 4-digit NACE groups in an unambiguous manner to the domains of the Eurostat framework.

Exploit the amended Eurostat framework to aggregate and present information on the CCS

- Aggregate information at different levels of specificity: for the CCS as a whole, for individual cultural-creative domains, or for fully cultural ISCO unit groups.
- Aggregate information more comprehensively, also encompassing partly cultural ISCO unit groups, provided information has been collected at the more specific level of identified fully cultural ESCO occupations. These could be directly summarised under cultural-creative domains, or could alternatively be aggregated under fully or partly cultural ISCO unit groups. In the latter case, only fully relevant occupations should be taken into account.
- The breakdown of the CCS into Eurostat domains and subordinated ISCO 4-digit groups (and, where necessary, fully cultural ESCO occupations) could also be exploited to structure information on cultural-creative occupations and associated skills in reports or in online information tools (e.g. Cedefop's Skills Panorama, or in Skills OVATE). Data could be made available for the sector as a whole, but also at the level of individual domains, ISCO unit groups (currently only possible for fully cultural ones), and even individual ESCO occupations.

3.1. Starting situation

"*Skills are a key part of the infrastructure of the economy; the choices made by policy-makers, enterprises and individuals on investment in education and skills can help to determine the path the economy takes. These individual choices also need to be guided by good labour market information and analysis.*" (ETF, ILO, Cedefop, 2018, p. 82).

At European level, Cedefop is the most prominent actor when it comes to providing labour market and skills intelligence for VET policy and provision, providing a range of complementary activities – not only analysing but also collecting data.

Forecasting activities as well as data collection are also undertaken by organisations such as ILO, OECD, or Eurofund. Although they also comprehensively cover EU Member States and economic sectors, these initiatives neither analyse occupations and economic sectors at a level of detail necessary for identifying the CCS, nor do they have skills in focus.

3.2. Scope and methodology

This activity aims to develop recommendations for a better inclusion of information relevant to skills governance in the CCS.

In a first step, we clarify the technical requirements for identifying and aggregating information on the CCS. We then identify the major data sources, monitoring and forecasting activities relevant for analysing skills demand or supply in the CCS. Of these, we analyse those that present the lowest barriers to delivering the desired information for the CCS, using the following questions as guides:

- Is it currently possible to retrieve information on the CCS from these data sources or forecasts?
- Is information currently provided on skills (e.g. creative thinking, managerial competences, digital skills), or at least on fields of study, on tasks, occupations, or other proxies for skills?
- Which constraints hamper the provision of information on CCS and skills?
- Which measures could support a better coverage of information relevant to the CCS in the future?

Challenges identified via desk research were discussed with selected experts[37] via Email or web meeting, and validated during a final workshop.[38] The Cedefop conference "Getting the future right"[39] and its associated workshops were used as an additional opportunity to verify insights and recommendations developed during the project.

[37] We would like to thank Marta Beck-Domzalska (Eurostat) and Vladimir Kvetan (Cedefop) for answering our questions and for sharing their views.

[38] Creative FLIP dissemination workshop (19th April 2021); Cedefop conference and workshops "Getting the future right" (13/15/20 April 2021)

[39] Cedefop conference and workshops "Getting the future right" (13/15/20 April 2021) – documentation available at: https://www.cedefop.europa.eu/en/events-and-projects/events/getting-future-right-towards-smarter-and-people-centred-skills-intelligence

3.3. Technical requirements for identifying and aggregating information on CCS skills demand & supply

As already touched upon in Section 2.1., in order for cultural employment to be comprehensively assessed, information on the economic sector as well as on the practiced occupation must be available at an appropriate level of detail.

In terms of NACE sectors (Eurostat, 2019, p. 13f.), cultural employment is covered by:

- 5 fully cultural groups at 2-digit level
- An additional 5 fully cultural groups at 3-digit level
- An additional 8 fully cultural groups at 4-digit level
- One additional 4-digit group that is partly cultural.

In terms of ISCO occupations (Eurostat, 2019, p. 15ff.), cultural employment is covered by:

- 4 fully cultural groups at 3-digit level
- An additional 17 fully cultural groups at 4-digit level
- 13 additional 4-digit groups that are partly cultural.

It follows from the above that even if employment data is collected at the most disaggregated level of NACE or ISCO (4-digit level), there are still one NACE group (73.11 Advertising agencies) and 14 ISCO unit groups (e.g. 1431 Sports, recreation and cultural centre managers; 2310 University and higher education teachers; 2513 Web and multimedia developers) mixing cultural and non-cultural aspects even at the most detailed level of these taxonomies.

As a consequence, it is to be expected that data on employment in the CCS is difficult not only to aggregate, but also to present to the public, due to the fact that:

- Information is scattered all over ISCO and NACE, and partly immersed in groups also containing non-cultural content;
- Cultural-creative domains, as defined by Eurostat (ESSNet-Culture, 2012, p. 55f.) or by the Creative Europe programme,[40] are not aligned with relevant ISCO or NACE groups;
- The occupation and the sector both need to be known to comprehensively identify cultural employment.[41]

Furthermore, the assessment and coverage of the CCS in international taxonomies might also need to be reviewed:

- For the domains analysed in the section on ESCO (see Section 2.2.2.) we occasionally felt the need to challenge Eurostat's/ESSNet-Culture's assessment of ISCO unit groups being fully, partly, or not at all relevant to the CCS (e.g. in the case of ISCO 2164, 2431, 5142, 7318, 7319, 7531, or 7533);
- NACE has already been criticised for poorly representing music, video games, fashion and crafts, and ISCO for not capturing appropriately designers and craftspeople (KEA, 2015, p. 91).

[40] See footnote 4

[41] If only the occupation is known, non-cultural occupations working within a cultural sector are not covered. If only the sector is known, you cannot distinguish between cultural-creative and non-cultural occupational activity within it.

3.4. European data sources and their challenges

When projecting supply and demand for occupations and skills, European forecasting tools depend on harmonised data collections covering all EU Member States. Despite considerable efforts to improve the volume, range and quality of statistics on the cultural and creative sectors at European level during the last 25 years, the economic and social value of the CCS still remains largely underestimated. A feasibility study on CCS data collection and analysis (KEA, 2015) as well as the work by ESSNet-Culture (ESSNet-Culture, 2012) identified several reasons why economic activities of the CCS are not fully captured:

- Employment in small and micro-enterprises is not adequately represented in business survey samples;
- Not all domains (e.g. cultural heritage, performing arts) and all forms of cultural-creative activity (e.g. freelancing, volunteering, occupations practiced as a second job only[42]) are adequately covered;
- The value of some cultural output is difficult to measure (e.g. output of art festivals, museums, galleries, libraries, performing arts; value of copyright, or brand value; value earned from new distribution and sales patterns, or from innovative forms of cultural engagement);
- International trade in cultural services is neither adequately covered in taxonomies nor in statistics (e.g. streaming of performances, international contracts for architects or designers);
- National employment data is not always reported in a sufficiently fine-grained manner by Member States.

In addition to these general problems with capturing economic activities in the CCS, information on skills demand and supply is generally scarce, especially if it is to be specific, representative, comprehensive as well as timely. The problem of data availability is further exacerbated by the fact that in general, a high level of granularity is needed to comprehensively capture cultural-creative employment data: information for occupations as well as for economic sectors have to be recorded at the 4-digit level of ISCO and NACE; in some cases even more detail is needed.

Thus, even though official statistics are valued for their regional coverage, their comparability across Member States as well as their reliability, they are also limited with respect to their scope and detail (see overview in Table 17), and thus also with respect to their usefulness as source of skills intelligence:

- The **Adult Education Survey** focuses on participation in education and training of adult learners aged 25-64, delivering broad characteristics of learning activities only (reported at a general level of ISCED FOET) as well as information on self-reported language skills.
- The **EU Labour Force Survey** focuses on employment characteristics of people aged 15 and over as well as on persons outside the labour force, related to occupations (minimum requirement for data collection: 3-digit ISCO codes) and economic sectors (minimum requirement for data collection: 2-digit NACE codes).
- The **European Jobs Monitor** focuses on qualitative shifts in employment structure, analysing these with respect to occupations and sectors (reported at 2-digit level[43] of ISCO and NACE).

[42] Whenever a survey respondent considers a cultural-creative occupation to be secondary, only the main job (which might be the bread-winning non-cultural occupation) is registered by the EU-LFS, thus excluding secondary cultural-creative employment from statistics.

[43] Yet the 2019 update is available at 1-digit NACE, 2-digit ISCO only – see: https://www.eurofound.europa.eu/de/observatories/emcc/european-jobs-monitor/methodology

- The **European Skills and Jobs survey** collects information on skills requirements (reported at a rather general level, e.g. literacy, numeracy, digital skills), skills mismatches, initial and continuing learning of adult workers, and reports these at a more generic level of ISCO and NACE as well.

Beyond official statistics, supplementary information can be extracted from e.g. administrative sources, professional associations, cultural observatories, and the internet. This data is in some cases more timely, more detailed, and may contain information unavailable in official statistics. However it tends to be incomplete (not available for all Member States, not equally representative of all sectors etc.), inconsistent across Member States, and difficult to access (e.g. privacy restrictions, fee-based access, no public access, high technical requirements).

High hopes are placed on big data analysis of job advertisements to fill data gaps on skills. In recent years, Cedefop has invested considerable efforts in this methodology, with the aim of enriching its structured data collection, drawn from official statistics, with skills intelligence powered by big data. Therefore, this relatively novel data source is added to our list:

- **Skills Online Vacancy Analysis Tool for Europe** (Skills OVATE) offers detailed information on the jobs and skills demanded in online job advertisements across all Member States, recording these at the 4-digit level of ISCO groups for occupations, NACE groups for economic sectors, and ESCO or O*NET for skills.

For identifying skills information relevant to the CCS, the European Labour Force Survey and Skills OVATE have the highest potential to deliver relevant data: both cover occupations and sectors at a reasonably low level of aggregation, Skills OVATE even recording detailed information on skills demand.

Nevertheless, employment information for the CCS – especially for the sector as a whole, or for specific domains – is difficult to extract even from these data sources, because culture is not fully defined from the statistical viewpoint: The international taxonomies most relevant in this context, NACE and ISCO, do not single out culture as a separate unit of analysis. Cultural-creative activities are either spread all over the taxonomy (e.g. crafts, design, fashion, music, video games in NACE), embedded in partly cultural or even non-cultural categories (e.g. furniture restauration in ISCO *7533 Cabinet-makers and related workers*), or not covered at all (e.g. the event sector). This fuzzy definition of cultural-creative employment hampers data collection, aggregation and presentation of research results.

For 13 of the 48 ISCO-08 unit groups listed in the Eurostat framework (Eurostat, 2018, p. 15ff.) as relevant for cultural statistics, not enough information is available concerning their cultural part because they are classified as “partly cultural”. The EU-LFS doesn’t take these “partly cultural” ISCO unit groups into consideration, nor the NACE three-digit codes classified as partly cultural. The only exception is where someone with a “partly cultural” occupation works in a fully cultural NACE sector, or conversely, someone working in a partly cultural NACE sector exercises a fully cultural occupation.

To accurately calculate cultural employment, the minimum requirement for reporting a sector and an occupation should be at least 4-digit NACE and ISCO (yet for one NACE and 13 ISCO 4-digit groups, even this is not detailed enough). Despite this, the current EU-LFS regulation[44] specifies as a minimum requirement for national data delivery 2-digit codes for NACE and 3- digit ones for ISCO.

As a consequence, some countries deliver their data at a level of specificity too general for calculating all cultural-creative sectors and occupations. As a result, Eurostat employs different methods for estimates:

[44] A new Regulation on integrated European social statistics (IESS) is expected to enter into force in 2022 at the latest (Eurostat, 2018, p. 20). It most likely will define the minimum requirement for data delivery to be NACE three-digit and ISCO-08 four digit, thus making cultural employment statistics more accurate in the future.

In cases where countries do not deliver national data at a sufficiently fine-grained level, the EU-LFS's algorithm carries out estimates on the basis of other countries' results, which may lead to a bias.

Furthermore, two partly cultural NACE codes of high relevance to the CCS (NACE 58.1 *Publishing of books, periodicals and other publishing activities* and NACE 91.0 *Libraries, archives, museums and other cultural activities*) are treated as if they are fully cultural. By also taking into account their non-cultural four-digit groups, NACE 58.1 and NACE 91.0 are thus slightly overestimated.

With the development of Skills OVATE, Cedefop has invested considerable efforts in supplementing EU-wide labour market information with the help of novel data sources (online vacancies) and methods (web scraping, artificial intelligence, big data analysis). Although this real-time labour market analysis provides faster and more detailed information on occupations and skills, and on the regions and sectors where these are in demand, there are also drawbacks, mainly with regards to representativeness:

- Not all job vacancies are advertised online; some jobs are more likely to be advertised online than others, leading to occupational bias;
- The volume, variety and quality of the data depend on the portals selected for analysis, leading to selection bias;
- The penetration of online job markets varies in and across countries and changes over time, leading to regional and chronological biases.

It should also be kept in mind that skills listed in a vacancy have a signalling function only (they are meant to attract appropriate candidates), and do not reflect the full job profile. Furthermore, the techniques and ontologies used for collecting, processing and analysing online vacancies are susceptible to errors, contributing to further distortions. Considerable additional work is required to improve data quality and mitigate potential biases, leading to an unfortunate reduction in the timeliness of the resulting insights.

To address the various dilemmas of data provision, Cedefop and Eurostat recently joined forces to set up a European Web Intelligence Hub[45] that would use all available data sources including the emerging digital ones, to provide more timely and relevant statistics on skills demand. This would combine the best of both worlds: the structured, harmonised, yet only coarse-grained and not very timely data collection of official EU statistics, and the unstructured, biased, yet highly detailed and timely information provision enabled by big data analysis.

[45] The public procurement documents are available at: https://etendering.ted.europa.eu/cft/cft-document.html?docId=72021

Table 17: Key data sources for EU skills forecasting

	Responsible organisation	Classification	Focus	Updates	Comment
Adult Education Survey (AES)	Eurostat	CLA; ISCED FOET	Adults' participation in education and training	One-off survey	Broad characteristics of the learning activities; self-reported language skills
EU Labour Force Survey (EU-LFS)	Eurostat	ISCED; ISCO; NACE	Employment status	Annual average of quarterly data	Key source for employment status and trends in the EU
European Jobs Monitor (EJM)	Eurofund	ISCO; NACE	Employment structure; quality of jobs	Annual	Based primarily on EU-LFS; skill levels
European Skills and Jobs survey (ESJ)	Cedefop	ISCO; NACE	Skills mismatch	One-off survey (5-year cycle intended)	Basic, digital and transversal skills across occupations and sectors
Skills Online Vacancy Analysis Tool for Europe (Skills OVATE)[46]	Cedefop	ESCO; ISCO; NACE; O*NET	Demand for skills and occupations	Unknown[47]	High level of detail, yet biased; to be used as a complement to traditional sources

Source: 3s

[46] Due to its relevance as a skills monitoring tool, Skills OVATE is covered under Section 3.5 as well.

[47] Insights are currently presented on the basis of data collected between 1 July 2018 and 30 September 2020.

3.5. European skills monitoring and forecasting tools and their challenges

Table 18 provides an overview of major labour market forecasting tools potentially relevant to our context. Yet when it comes to forecasting skills demand and supply at European level, there seems to be only one tool truly relevant to the CCS: Cedefop's Skills Forecasts. In a two-year cycle since 2010, these identify broad employment trends across all Member States for the next 10-15 years by sector of economic activity and occupational group. These macro-economic projections are based on harmonised international data provided by the EU Labour Force Survey. Due to the lack of more detailed data, and for the sake of comparability across all Member States, the modelling framework applies rather high levels of aggregation (Cedefop, 2012, p. 130f.):

- Sector of economic activity at NACE digit 1 and 2;
- Occupations at ISCO digit 1 and 2;
- Qualification levels distinguishing low (ISCED 0-2), medium (ISCED 3-4), high (ISCED 5-6);
- Qualification content as ISCED fields of education and training.

Obviously, at this level of generality it is impossible to generate any forecasts for the CCS. Furthermore, despite its title, entities like e.g. creative thinking or managerial skills are far beyond the scope of Cedefop's skills forecasts, which only generate a broader outlook on occupations and qualification levels as a proxy for skills. Yet there are plans, sometime in the future, to integrate actual skills needs data into the forecast, for example from Skills OVATE.[48]

Other international activities (as listed in Table 18), such as the OECD's Employment Outlook[49] and its Labour Force Forecast,[50] or the ILO's Labour Force Estimates and Projections[51] operate at an even higher level of aggregation than Cedefop's Skills Forecasts, and are therefore even less suitable for identifying information relevant to the CCS. The same applies to Cedefop's studies on skills mismatch: Although it delivers very interesting broad insights across EU Member States with respect to the situation of specific categories of workers (e.g. employees at risk, migrants and minorities, older workers), results are too highly aggregated for the purposes of our study.

Since Europe-wide data on skills demand and supply that is timely, detailed, representative and comprehensive is so difficult to obtain, it is a big advantage to have a European monitoring tool that identifies current trends from online vacancies[52] across all Member States: Skills OVATE.[53] The goal of this instrument is to identify trends faster and at a higher level of detail than is possible with macro-economic projections. Skills OVATE currently presents data collected from July 2018 until September 2020 in 28 EU Member States. Although in principle available at a greater level of detail, the portal currently presents information at a high level of aggregation only, which considerably impairs the identification of CCS-relevant information. Yet, even if accessed via the datalab option offered by Cedefop,[54] which allows data access at the highest level of detail, the limitations described in Section 3.3 still hold:

[48] According to information provided by Cedefop during the conference "Getting the future right".
[49] See https://www.oecd-ilibrary.org/employment/oecd-employment-outlook_19991266
[50] See https://www.oecd-ilibrary.org/employment/labour-force-forecast/indicator/english_c6d4db79-en
[51] See https://www.ilo.org/ilostat-files/Documents/LFEP.pdf
[52] In the future, Cedefop intends to combine online job vacancy analyses with conventional sources, such as household and employee surveys and skills forecasts (Cedefop, 2019, p. 25).
[53] See https://www.cedefop.europa.eu/en/data-visualisations/skills-online-vacancies
[54] To apply for access, send an email to wih-datalab@cedefop.europa.eu.

- Since culture is not a unit of statistical analysis, information relevant to the CCS is scattered all over ISCO and NACE, and partly immersed in groups containing also non-cultural components;
- Aggregations along cultural-creative domains, as defined by Eurostat (e.g. performing arts or visual arts) are impossible because cultural-creative domains are not aligned with relevant ISCO or NACE groups;
- For one NACE and 13 ISCO 4-digit groups, cultural information cannot be distinguished from non-cultural information because in these cases the granularity of information provision is still too coarse.

Table 18: European monitoring and forecasting tools

	Responsible organisation	Forecast	Focus	Updates	Comment
Employment Outlook	OECD	Yes (next year)	Labour force development	Annual	No differentiation between (other than very broad) sectors
European Skills Forecast	Cedefop	Yes (next 10-15 years)	Labour supply and demand	Every two years	Occupations and qualifications as proxies for skills; ISCO, NACE at high aggregation level only
Labour Force Estimates and Projections (LFEP)	ILO	Yes (next 12 years)	Labour force development	Irregular (last update 2017)	No differentiation between sectors, occupations or skills
Labour Force Forecast	OECD	Yes (next two years)	Labour force development	Annual	No differentiation between sectors, occupations or skills
Skills Online Vacancy Analysis Tool for Europe (Skills OVATE)	Cedefop	No, but very recent trends	Demand for skills and occupations	Unknown[55]	Occupations at ISCO 4-digit level, ESCO or O*NET skills, NACE sectors

Source: 3s

[55] Insights are currently presented on the basis of data collected between 1 July 2018 and 30 September 2020.

3.6. Recommendations for making CCS-relevant employment information better visible in European forecasting tools

3.6.1. Summary of identified challenges

The challenges identified to generating and forecasting information on skills for the CCS across all Member States are multiple:

1. **General problems with adequately capturing economic activities in the CCS**, which are mostly due to the special character of the sector (see Section 3.4).
2. **Data on skills is generally scarce:** Occupations, qualification levels, or educational content are often used as proxies for skills; if actual skills are surveyed, then this is done neither in a detailed manner nor comprehensively across all Member States; big data, due to problems with representativeness, is no panacea either.
3. **Culture is not a unit of statistical analysis**: Relevant units are scattered all over ISCO and NACE; even at the most disaggregated level you cannot in all cases clearly distinguish cultural from non-cultural occupations or sectors; both the occupation as well as the sector need to be known to comprehensively identify cultural employment.
4. It follows from point 3 above that **employment data must be collected in a sufficiently fine-grained manner** to allow for a statistical analysis of the CCS: at least 4-digit level of ISCO and NACE, in some cases even more detail, is needed.
5. A **lack of interoperability between classifications**: To date, only the UNESCO framework for cultural statistics at least roughly identifies ISCO unit groups per cultural domain. For the Eurostat framework, relevant ISCO as well as NACE codes have only been identified for the sector as a whole. ESCO, which in principle could provide the additional level of detail needed to clearly define the cultural component of partly cultural ISCO unit groups, has not yet been mapped onto the Eurostat framework for cultural statistics and its domains.
6. Since the CCS are not a unit of analysis in ISCO and NACE, **relevant information is also difficult to aggregate**: To date, aggregations are only possible at the different levels of ISCO and NACE, or for the CCS as a whole, yet not for individual cultural domains. In the case of the partly cultural 4-digit groups of NACE and ISCO, information cannot be used at all because relevant content cannot be distinguished from irrelevant content.

3.6.2. Recommendations to address the challenges

Regarding challenges (1.), (2.) and (4.)

Due to the limitations in data, Cedefop's Skills Forecasts only show broad employment trends in sectors, occupations and education levels. Nevertheless, the forecasting methodology could produce more detailed projections if the data provided a sufficient level of detail.[56] As far as the EU-LFS – the main data source of Cedefop's Skills Forecasts – is concerned, data provision differs between Member States: some only deliver information at the minimum requirement for detail (thus preventing the identification of CCS-relevant information), others exceed the minimum requirement. An analysis at EU level unfortunately has to be based on the lowest common denominator, hence using data with a suboptimal level of detail.

In this respect, it is necessary to (1.) better align the minimum requirements for national data provision with the needs of the CCS, and to (2.) emphasise the need to invest more in national data collection.

[56] According to information provided by Cedefop during the conference "Getting the future right".

Regarding challenges (3.), (5.) and (6.)

A first step towards making the CCS better accessible for statistics has already been taken in Section 2.2.2. (see also Annex 1) where we identified relevant ESCO occupations for three selected cultural-creative domains. For pragmatic reasons, we based our work on the UNESCO framework, yet for the purposes of EU data collection, the domain structure defined by Eurostat would be more advantageous.

If relevant ESCO occupations were unambiguously[57] subordinated to cultural-creative domains, the resulting taxonomy could be exploited to comprehensively identify cultural-creative information at several levels of aggregation: at the very detailed level of individual ESCO occupations, at the level of ISCO unit groups, domains (as demonstrated in Figure 3 for one domain only[58]), or at the level of the CCS as a whole.

Figure 3: Breakdown of "Visual Arts" domain in terms of ISCO unit groups and ESCO occupations

DOMAIN	ISCO unit group	*ESCO occupation*
VISUAL ARTS	2355 Other arts teachers	*photography teacher*
		visual arts teacher
	2651 Visual artists	*art restorer*
		artistic painter
		cartoonist
		ceramicist
		conceptual artist
		drawing artist
		glass artist
		mask maker
		printmaker
		sculptor
	3431 Photographers	*photographer*

Source: 3s

Thanks to this approach, partly cultural ISCO unit groups (in Figure 3: 2355) or unit groups only partly relevant to a specific domain (in Figure 3: 3431 because *photojournalist*, also subordinated to 3431 in ESCO, is better allocated to the domain "Books & Press") could be narrowed down to exactly those ESCO occupations to be included.

Breaking down the cultural-creative sector into domains and subordinated ISCO unit groups summarising all ESCO occupations of relevance, would also improve the interoperability of all classifications involved

[57] This means, one ESCO occupation is assigned to one cultural-creative domain only. In cases where this is impossible, e.g. for *actor/actress* (being relevant to "Performing Arts" as well as to "Audio-visual and Multimedia"), a pragmatic solution needs to be found (e.g. counting the occupation in one domain, and leaving a reference in the other).

[58] The breakdown of "Visual Arts", a domain of the Eurostat framework, is preliminary only, presented here to simulate the final outcome.

– of the Eurostat framework for cultural statistics, of ISCO, and of ESCO. Benefits of this improved interoperability could be:

- The Eurostat breakdown of the CCS into domains could be implemented as sector-specific access to ESCO occupations, thus making cultural-creative content more visible.
- A breakdown of the CCS in terms of Eurostat domains and fully as well as partly cultural ISCO unit groups could be implemented in e.g. EU-LFS data or Skills OVATE to guide users towards domain-specific content.
- A breakdown of the CCS into domains and relevant ESCO occupations would enable a comprehensive aggregation of occupational information relevant to the CCS, because that way even partly cultural ISCO unit groups could be narrowed down to purely cultural content. But obviously, as long as data is not being collected at the level of ESCO occupations, this prospect is only a dream for the future.

Within this project, a first step has already been taken to improve the definition and accessibility of the CCS in international taxonomies. We are convinced that, once completed, the improved framework for cultural statistics would be of considerable value not only for identifying and aggregating cultural-creative labour market information, but also for making research results better accessible to users.

REFERENCES

- *Australian and New Zealand Standard Classification of Occupations* (ANZSCO), available at: https://www.abs.gov.au/ausstats/abs@.nsf/mf/1220.0
- Bjørnåvold, J., Hart, J., Noack, M. & Plaimauer, C., 2021, *Towards a structured and consistent terminology on transversal skills and competences.* Draft report to ESCO Member States Working Group and EQF Advisory Group on a terminology for transversal skills and competences (TSCs). Unpublished.
- *Bulgarian National Classification of Professions and Positions* (orig. Национална класификация на професиите и длъжностите), available at: https://en.mycompetence.bg/position
- Cedefop, 2012, *Skills supply and demand in Europe. Methodological framework*, available at: https://www.cedefop.europa.eu/files/5525_en.pdf
- Cedefop, 2015, *Skill shortages and gaps in European enterprises. Striking a balance between vocational education and training and the labour market*, available at: https://www.cedefop.europa.eu/files/3071_en.pdf
- Cedefop, 2018, *Skills Forecast: trends and challenges to 2030*, available at: https://www.cedefop.europa.eu/files/3077_en.pdf
- Cedefop, 2019, *Online job vacancies and skills analysis: A Cedefop pan-European approach*, available at: https://www.cedefop.europa.eu/files/4172_en.pdf
- Cedefop, 2021, *Coronavirus impact on jobs in EU sectors and occupations: A skills forecast analysis*, available at: https://www.cedefop.europa.eu/en/news-and-press/news/coronavirus-impact-jobs-eu-sectors-and-occupations-skills-forecast-analysis (full report to be published later this year)
- Cedefop, 2021, *Perspectives on policy and practice: Tapping into the potential of big data for skills policy*, available at: https://www.cedefop.europa.eu/files/2229_en.pdf
- Cedefop, 2021, *Understanding technological change and skill needs: skills surveys and skills forecasting* (Cedefop practical guide 1), available at: https://www.cedefop.europa.eu/files/4197_en.pdf
- Cedefop, 2021, *Understanding technological change and skill needs: big data and artificial intelligence methods* (Cedefop practical guide 2), available at: https://www.cedefop.europa.eu/files/4198_en.pdf
- Cedefop, 2021, *Understanding technological change and skill needs: technology and skills foresight* (Cedefop practical guide 3), available at: https://www.cedefop.europa.eu/files/4199_en.pdf
- *Classification of Learning activities*, available at: https://ec.europa.eu/eurostat/web/products-manuals-and-guidelines/-/ks-gq-15-011
- *Classification of occupations 2010* [Finnish national occupational classification], available at: https://www.stat.fi/en/luokitukset/ammatti/
- *Classification of Occupations and Specialisations for Labour Market Needs* [Polish national occupational classification] (orig. Klasyfikacja Zawodów i Specjalności – KZiS), available at: http://psz.praca.gov.pl/-/15252-klasyfikacja-zawodow-i-specjalnosci

- ESSNet-Culture, 2012, *European statistical system network on culture*, available at: http://ec.europa.eu/culture/library/reports/ess-net-report_en.pdf
- ETF, Cedefop & ILO, 2016, *Developing skills foresights, scenarios and forecasts: Guide to anticipating and matching skills and jobs* (VOLUME 2), available at: https://www.cedefop.europa.eu/files/2216_en.pdf
- ETF, Cedefop & ILO, 2016, *Guide to anticipating and matching skills and jobs: Working at sectoral level* (Volume 3), available at: https://www.cedefop.europa.eu/files/2217_en.pdf
- European Commission, 2019, *ESCO handbook*, available at: https://ec.europa.eu/esco/portal/document/en/0a89839c-098d-4e34-846c-54cbd5684d24
- European Commission, 2020, *EU Labour Force Survey Database User Guide*, available at: https://ec.europa.eu/eurostat/documents/1978984/6037342/EULFS-Database-UserGuide.pdf
- European Commission*, European Skills, Competences, Occupations and Qualifications (ESCO)*, available at: https://ec.europa.eu/esco/portal/home (Export of data base v1.0.8. used for analysis)
- Eurostat, 2018, *Guide to Eurostat culture statistics*, available at: https://ec.europa.eu/eurostat/documents/3859598/9433072/KS-GQ-18-011-EN-N.pdf/72981708-edb7-4007-a298-8b5d9d5a61b5?t=1544174403000
- Eurostat, 2019, *Culture Statistics*, available at: https://ec.europa.eu/eurostat/documents/3217494/10177894/KS-01-19-712-EN-N.pdf/915f828b-daae-1cca-ba54-a87e90d6b68b?t=1571393532000
- Eurostat Reference Metadata on cultural employment, available at: https://ec.europa.eu/eurostat/cache/metadata/en/cult_emp_esms.htm
- ILO, 2018, Review of the case for revision of ISCO-08, available at: https://www.ilo.org/wcmsp5/groups/public/---dgreports/---stat/documents/meetingdocument/wcms_636056.pdf
- ILO & OECD, 2018, *Approaches to anticipating skills for the future of work*, available at: https://www.ilo.org/wcmsp5/groups/public/---dgreports/---inst/documents/publication/wcms_646143.pdf
- *International Standard Classification of Education* (ISCED 2011), available at: http://uis.unesco.org/sites/default/files/documents/international-standard-classification-of-education-isced-2011-en.pdf
- *International Standard Classification of Education. Fields of Education and Training 2013* (ISCED-F), available at: http://uis.unesco.org/sites/default/files/documents/isced-fields-of-education-and-training-2013-en.pdf
- KEA, 2015, *Feasibility study on data collection and analysis in the cultural and creative sectors in the EU*, available at: https://ec.europa.eu/assets/eac/culture/library/studies/ccs-feasibility-study_en.pdf
- *Klassifikation der Berufe* (KldB-2010) [German national occupational classification], available at: https://statistik.arbeitsagentur.de/DE/Navigation/Grundlagen/Klassifikationen/Klassifikation-der-Berufe/KldB2010-Fassung2020/KldB2010-Fassung2020-Nav.html

- Mietzner, D. & Kamprath, M., 2013, *A Competence Portfolio for Professionals in the Creative Insustries*, Creativity and Innovation Management, Creativity and Innovation Management 22(3): p. 280–294, available at: https://www.readcube.com/articles/10.1111/caim.12026
- OECD & UNESCO Institute for Statistics [no date], Proposals concerning cultural occupations within ISCO, available at: https://www.oecd.org/sdd/na/38455994.doc
- *O*NET Standard Occupational Classification* (O*NET-SOC) [US national occupational classification], available at: https://www.onetcenter.org/taxonomy.html
- *Polish Classification of Occupations and Specialisations for Labour Market Needs* (orig.: Klasyfikacja Zawodów i Specjalności – KZiS), available at: http://psz.praca.gov.pl/-/15252-klasyfikacja-zawodow-i-specjalnosci
- *Standard Occupational Classification* (SOC 2010) [United Kingdom national occupational classification], available at: https://www.ons.gov.uk/methodology/classificationsandstandards/standardoccupationalclassificationsoc/soc2010
- *Standard Classification of Occupation 2008* (SKP-08) [Slovenian national occupational classification], available at: https://www.stat.si/Klasje/Klasje/Tabela/5334
- UNESCO, 2009, *UNESCO framework for cultural statistics*, available at: http://www.uis.unesco.org/Library/Pages/DocumentMorePage.aspx?docIdValue=183&docIdFld=ID

ANNEX I: BREAKDOWN OF THREE CULTURAL-CREATIVE SUBSECTORS INTO ESCO OCCUPATIONS

ANNEX I.xlsx

Note: For a complete display of all information, please refer to the embedded file ANNEX_I.xlsx. The tables below are only an extraction thereof, concentrating on the most central aspects.

Design and Creative Services

ISCO unit group	ISCO unit group_label	ESCO occupation
1222	Advertising and public relations managers	advertising manager
2161	Building architects	architect
2161	Building architects	interior architect
2162	Landscape architects	landscape architect
2162	Landscape architects	landscape designer
2163	Product and garment designers	automotive designer
2163	Product and garment designers	clothing fashion designer
2163	Product and garment designers	costume designer
2163	Product and garment designers	fashion designer
2163	Product and garment designers	footwear designer
2163	Product and garment designers	furniture designer
2163	Product and garment designers	industrial designer
2163	Product and garment designers	jewellery designer
2163	Product and garment designers	leather goods designer
2163	Product and garment designers	model maker
2163	Product and garment designers	puppet designer
2163	Product and garment designers	textile colourist
2163	Product and garment designers	textile designer
2163	Product and garment designers	textile product developer
2164	Town and traffic planners	land planner
2164	Town and traffic planners	urban planner
2166	Graphic and multimedia designers	art director
2166	Graphic and multimedia designers	desktop publisher
2166	Graphic and multimedia designers	director of photography
2166	Graphic and multimedia designers	graphic designer
2166	Graphic and multimedia designers	illustrator
2166	Graphic and multimedia designers	production designer
2310	University and higher education teachers	architecture lecturer
2320	Vocational education teachers	design and applied arts vocational teacher
2320	Vocational education teachers	industrial arts vocational teacher

ISCO unit group	ISCO unit group_label	ESCO occupation
2431	Advertising and marketing professionals	creative director
3432	Interior designers and decorators	interior designer
3432	Interior designers and decorators	interior planner
3432	Interior designers and decorators	merchandiser
3432	Interior designers and decorators	miniature set designer
3432	Interior designers and decorators	scenic painter
3432	Interior designers and decorators	set builder
3432	Interior designers and decorators	set designer
3432	Interior designers and decorators	visual merchandiser
3435	Other artistic and cultural associate professionals	body artist
5142	Beauticians and related workers	make-up and hair designer
5142	Beauticians and related workers	personal stylist

Performance and Celebration

ISCO unit group	ISCO unit group_label	ESCO occupation
2310	University and higher education teachers	classical languages lecturer
2310	University and higher education teachers	modern languages lecturer
2310	University and higher education teachers	music instructor
2310	University and higher education teachers	performing arts school dance instructor
2310	University and higher education teachers	performing arts theatre instructor
2330	Secondary education teachers	drama teacher secondary school
2330	Secondary education teachers	literature teacher secondary school
2330	Secondary education teachers	modern languages teacher secondary school
2330	Secondary education teachers	music teacher secondary school
2354	Other music teachers	music teacher
2355	Other arts teachers	circus arts teacher
2355	Other arts teachers	dance teacher
2355	Other arts teachers	drama teacher
2652	Musicians, singers and composers	choirmaster/choirmistress
2652	Musicians, singers and composers	composer
2652	Musicians, singers and composers	music arranger
2652	Musicians, singers and composers	music director
2652	Musicians, singers and composers	musical conductor
2652	Musicians, singers and composers	musician
2652	Musicians, singers and composers	répétiteur
2652	Musicians, singers and composers	singer
2653	Dancers and choreographers	choreographer
2653	Dancers and choreographers	choreologist
2653	Dancers and choreographers	dance répétiteur
2653	Dancers and choreographers	dancer
2655	Actors	actor/actress

ISCO unit group	ISCO unit group_label	ESCO occupation
2659	Creative and performing artists, n.e.c.	circus artist
2659	Creative and performing artists, n.e.c.	community artist
2659	Creative and performing artists, n.e.c.	disc jockey
2659	Creative and performing artists, n.e.c.	performance artist
2659	Creative and performing artists, n.e.c.	puppeteer
2659	Creative and performing artists, n.e.c.	stand-up comedian
2659	Creative and performing artists, n.e.c.	street performer
2659	Creative and performing artists, n.e.c.	tourist animator
2659	Creative and performing artists, n.e.c.	variety artist
3435	Other artistic and cultural associate professionals	assistant stage director
3435	Other artistic and cultural associate professionals	automated fly bar operator
3435	Other artistic and cultural associate professionals	costume attendant
3435	Other artistic and cultural associate professionals	dresser
3435	Other artistic and cultural associate professionals	extra
3435	Other artistic and cultural associate professionals	fight director
3435	Other artistic and cultural associate professionals	flying director
3435	Other artistic and cultural associate professionals	followspot operator
3435	Other artistic and cultural associate professionals	head of workshop
3435	Other artistic and cultural associate professionals	intelligent lighting engineer
3435	Other artistic and cultural associate professionals	light board operator
3435	Other artistic and cultural associate professionals	lighting designer
3435	Other artistic and cultural associate professionals	lighting technician
3435	Other artistic and cultural associate professionals	prompter
3435	Other artistic and cultural associate professionals	prop maker
3435	Other artistic and cultural associate professionals	prop master/prop mistress
3435	Other artistic and cultural associate professionals	pyrotechnic designer
3435	Other artistic and cultural associate professionals	pyrotechnician
3435	Other artistic and cultural associate professionals	scenery technician
3435	Other artistic and cultural associate professionals	stage machinist
3435	Other artistic and cultural associate professionals	stage manager
3435	Other artistic and cultural associate professionals	stage technician
3435	Other artistic and cultural associate professionals	theatre technician
5142	Beauticians and related workers	make-up artist
7312	Musical instrument makers and tuners	guitar maker
7312	Musical instrument makers and tuners	harp maker
7312	Musical instrument makers and tuners	harpsichord maker
7312	Musical instrument makers and tuners	idiophone musical instruments maker
7312	Musical instrument makers and tuners	instrument technician
7312	Musical instrument makers and tuners	keyboard musical instrument maker
7312	Musical instrument makers and tuners	membranophone musical instruments maker
7312	Musical instrument makers and tuners	musical instrument technician
7312	Musical instrument makers and tuners	organ builder
7312	Musical instrument makers and tuners	piano maker

ISCO unit group	ISCO unit group_label	ESCO occupation
7312	Musical instrument makers and tuners	stringed musical instrument maker
7312	Musical instrument makers and tuners	violin maker
7312	Musical instrument makers and tuners	wind musical instrument maker

Visual Arts and Crafts

ISCO unit group	ISCO unit group_label	ESCO occupation
2310	University and higher education teachers	art studies lecturer
2310	University and higher education teachers	fine arts instructor
2330	Secondary education teachers	art teacher secondary school
2355	Other arts teachers	photography teacher
2355	Other arts teachers	visual arts teacher
2651	Visual artists	art restorer
2651	Visual artists	artistic painter
2651	Visual artists	cartoonist
2651	Visual artists	ceramicist
2651	Visual artists	conceptual artist
2651	Visual artists	drawing artist
2651	Visual artists	glass artist
2651	Visual artists	mask maker
2651	Visual artists	printmaker
2651	Visual artists	sculptor
3431	Photographers	photographer
3431	Photographers	photojournalist
7313	Jewellery and precious-metal workers	filigree maker
7313	Jewellery and precious-metal workers	goldsmith
7313	Jewellery and precious-metal workers	jeweller
7313	Jewellery and precious-metal workers	jewellery engraver
7313	Jewellery and precious-metal workers	jewellery mounter
7313	Jewellery and precious-metal workers	jewellery polisher
7313	Jewellery and precious-metal workers	jewellery repairer
7313	Jewellery and precious-metal workers	precious stone cutter
7313	Jewellery and precious-metal workers	silversmith
7314	Potters and related workers	hand brick moulder
7314	Potters and related workers	production potter
7315	Glass makers, cutters, grinders and finishers	glass beveller
7315	Glass makers, cutters, grinders and finishers	glass-blower
7316	Sign writers, decorative painters, engravers and etchers	ceramic painter
7316	Sign writers, decorative painters, engravers and etchers	decorative painter
7316	Sign writers, decorative painters, engravers and etchers	glass engraver

ISCO unit group	ISCO unit group_label	ESCO occupation
7316	Sign writers, decorative painters, engravers and etchers	glass painter
7316	Sign writers, decorative painters, engravers and etchers	metal engraver
7316	Sign writers, decorative painters, engravers and etchers	porcelain painter
7316	Sign writers, decorative painters, engravers and etchers	sign maker
7316	Sign writers, decorative painters, engravers and etchers	wood painter
7317	Handicraft workers in wood, basketry and related materials	artisan papermaker
7317	Handicraft workers in wood, basketry and related materials	basketmaker
7317	Handicraft workers in wood, basketry and related materials	brush maker
7317	Handicraft workers in wood, basketry and related materials	toymaker
7317	Handicraft workers in wood, basketry and related materials	wicker furniture maker
7317	Handicraft workers in wood, basketry and related materials	woodcarver
7318	Handicraft workers in textile, leather and related materials	carpet handicraft worker
7318	Handicraft workers in textile, leather and related materials	carpet weaver
7318	Handicraft workers in textile, leather and related materials	knitter
7318	Handicraft workers in textile, leather and related materials	leather goods artisanal worker
7318	Handicraft workers in textile, leather and related materials	weaver
7319	Handicraft workers, n.e.c.	candle maker
7522	Cabinet-makers and related workers	antique furniture reproducer
7522	Cabinet-makers and related workers	frame maker
7522	Cabinet-makers and related workers	furniture restorer
7522	Cabinet-makers and related workers	recreation model maker
7531	Tailors, dressmakers, furriers and hatters	costume maker
7531	Tailors, dressmakers, furriers and hatters	wig and hairpiece maker
7533	Sewing, embroidery and related workers	doll maker

ANNEX II: SAMPLE OCCUPATIONS – ENRICHED SKILLS PROFILES

ANNEX II.xlsx

- **Table "sample profiles all KSC"** contains the KSCs profiles of the ten sample occupations, enriched by metadata on KSCs' reusability level and their position in the skills and knowledge hierarchy.
- **Table "sample profiles only transv KSC"** contains those sections of the ten sample profiles that express transversal KSCs content. The transversal core meaning of allocated cross-sectoral, sector-specific and occupation-specific KSCs was made visible by aggregating these onto their 'parent' transversal KCS, exploiting metadata information on semantic relations between KSCs concepts.

Note: In our analyses of occupational skills profiles, we do not distinguish between essential and optional KSCs.

ANNEX III: SAMPLE OCCUPATIONS – DESIGN SUGGESTION

ANNEX III.zip

For the feedback forms used during the ESCO Focus Group workshop (Brussels, 12/03/2020), we designed a display format which makes metadata information (a KSC's position in the knowledge and skills hierarchy) directly accessible in occupational profiles. The format might serve as an inspiration for displaying ESCO profiles in a more user-friendly manner.

The embedded file contains the feedback forms of all ten sample occupations. In addition, below we provide a slightly abbreviated impression of the *actor/actress'* profile, demonstrating how clarity and transparency can be enhanced if detailed KSCs information is organised under broader headlines.

ACTOR / ACTRESS	
Actors/actresses play roles and parts on live stage performances, TV, radio, video, motion picture productions, or other settings for entertainment or instruction. They use body language (gestures and dancing) and voice (speech and singing) in order to present the character or story according to the script, following the guidelines of a director.	
SKILL PROFILE	
SKILL GROUP	**SKILL**
Attitudes and Values	
Demonstrate consideration	*adapt to different roles*
Demonstrate consideration	*show intercultural awareness*
Demonstrate willingness to learn	*work with a voice coach*
Meet commitments	*show professional responsibility*
Communication, collaboration and creativity	
Creating artistic, visual or instructive materials	*develop magic show concepts*
Creating artistic, visual or instructive materials	*develop puppet shows*
Creating artistic, visual or instructive materials	*interpret performance concepts in the creative process*
Creating artistic, visual or instructive materials	*organise an exhibition*
Creating artistic, visual or instructive materials	*plan choreographic improvisation*
Liaising and networking	*deal with public*
Obtaining information verbally	*attend read-through*
Performing and entertaining	*act for an audience*
Performing and entertaining	*analyse theatre texts*
Performing and entertaining	*attend rehearsals*
Performing and entertaining	*communicate during show*
Performing and entertaining	*declaim*
Performing and entertaining	*engage the audience emotionally*
Performing and entertaining	*perform for multiple takes*
Performing and entertaining	*perform for young audiences*
Performing and entertaining	*perform improvisation*
Performing and entertaining	*perform in a public space*
Performing and entertaining	*perform live*
Performing and entertaining	*perform music solo*
Performing and entertaining	*perform scripted dialogue*
Performing and entertaining	*perform stunts*
Performing and entertaining	*perform with motion capture equipment*
Performing and entertaining	*practice dance moves*
Performing and entertaining	*practise singing*
Performing and entertaining	*rehearse role*
Performing and entertaining	*sing*
Promoting, selling and purchasing	*participate in tourism events*
Promoting, selling and purchasing	*promote yourself*
Solving problems	*create solutions to problems*

Using more than one language	*speak different languages*
Working with others	*accept feedback on artistic performance*
Working with others	*follow directions of the artistic director*
Working with others	*interact with an audience*
Working with others	*interact with fellow actors*
Working with others	*rehearse with fellow actors*
Working with others	*show confidence*
Working with others	*work in an international environment*
Working with others	*work with an artistic team*
Information skills	
Conducting studies, investigations & examinations	*conduct background research for plays*
Conducting studies, investigations & examinations	*study media sources*
Conducting studies, investigations & examinations	*study music*
Conducting studies, investigations & examinations	*study relationships between characters*
Conducting studies, investigations & examinations	*study roles from scripts*
Processing information	*memorise lines*
Assisting and Caring	
Protecting and enforcing	*work with respect for own safety*
Management skills	
Leading and motivating	*lead cast and crew*
Organising, planning & scheduling work & activities	*organise cultural events*
Organising, planning & scheduling work & activities	*organise rehearsals*
Supervising people	*analyse own performance*
Supervising people	*assess progress with the artistic team*
Supervising people	*direct an artistic team*
KNOWLEDGE PROFILE	
KNOWLEDGE DOMAIN	**KNOWLEDGE**
Audio-visual techniques and media production	*photography*
Literature and linguistics	*literary theory*
Literature and linguistics	*music literature*
Music and performing arts	*acting techniques*
Music and performing arts	*breathing techniques*
Music and performing arts	*pronunciation techniques*
Music and performing arts	*vocal techniques*
Personal skills and development	*be in touch with your body*

This report covers two topics:

The chapter “ESCO’s compatibility for sector-specific data collection” analyses the suitability of the European Skills/Competences, Qualifications and Occupations (ESCO) taxonomy as a reference system for cultural-creative occupations, skills, and occupational skills profiles.

The chapter “Strengthening the position of the CCS in European forecasting tools” analyses challenges to the inclusion and presentation of CCS-relevant information in European skills forecasting and monitoring tools, and develops suggestions for addressing these.