DigiCulture

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Introduction, goals and structure of the report

This Conceptual *Framework of Digital Competences for Culture and Creative Industries* aims at sharing research materials and reflections on the development of Digital Competences in Culture and Creative Industries (CI) Adult Education for the promotion of transversal skills and social inclusion.

Five institutions from five different Countries worked together to identify pending research questions on digital resources and methods in Cultural and Creative Industries (CI) Education and to draft an overview of the state of the art of research in digital competences for the cultural sector.

Aims of the Conceptual Framework of Digital Competences for Culture and Creative Industries

This document emphasizes the problems related to the development of digital resources and their integration into various cultural environments and in the CI Education area. It is to be considered as a theoretical basis for the E+ KA204 DigiCulture project partnership.

The main aims of the DigiCulture *Conceptual Framework of Digital Competences for Culture and Creative Industries* are the following:

- to present the possibilities offered by cultural and CI adult education for the enhancement of 21st century learning skills;
- to highlight the potential role of digital competences and resources in cultural and CI adult education, within the context of 21st century learning;
- to propose pending research questions on digital resources and methods in cultural and CI education;
- to present an overview of the state of the art of research about digital competences for cultural and CI education sector.

The DigiCulture project (Improving the Digital Competences and Social Inclusion of Adults in Creative Industries, 2018-2021) aims to create a sustainable and efficient education program devoted to adult learners with low digital skills and underqualified adults involved in the creative industries sector. It addresses a gap in Creative Industries (CI) education where there is low emphasis on the use of new digital technologies and on the development of entrepreneurship skills (e.g. project management); both new graduates and current employees demonstrate a lack of these skills. CI employees are often not involved with any formal institution, being freelancers, sometimes members of disadvantaged groups (with economic problems) or from minority groups. By acquiring digital skills, they will be able to improve their career opportunities by gaining access to new distribution markets through internet access and ecommerce, using new entrepreneurial tools or adding new forms of digital expression to their work.

The DigiCulture project has the following priorities:

1. To enhance awareness of the need for training in digital skills for the CI;
2. To design and validate cross-country Guidelines for Digital Competences for CI;

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3. To create an Integrated Virtual Learning Hub as an online and mobile MOOC platform for developing digital competences in the culture and heritage sector using Open Educational Resources (OERs), Tools and Practices;

4. To design, develop and deliver a *Digital Skills and Social Inclusion for Creative Industries Course*, translated into all partners' languages, aimed at promoting digital competences and social inclusion in adults involved in the CI sector;

5. To improve the achievement and recognition of digital skills through formal and informal learning by introducing *Digital Skills e-assessment* and *Open Badges* for adult education in CI;

6. To provide engaging and effective learning experiences in the context of Digital Skills promotion for CI adult employers;

7. To enhance collaboration between education providers, universities, cultural and heritage institutions and associations, cultural actors, workers and volunteers;

8. To verify how achievement, assessment and validation of digital skills contribute to the uptake of new skills in adult learners.

By developing the *Conceptual Framework of Digital Competences*, Cultural and Creative Industries, universities, researchers and educators will be provided with a framework for the development of Digital Competences for adult learners. Moreover, they will have a theoretical basis for the promotion of social inclusion, media literacy, intercultural competences and 4C skills (critical thinking, creativity, communication and collaboration; Trilling & Fadel, 2009) in the CI Education sector.

This document includes:

- Pending research questions on the promotion of Digital competences in the CI Education context;
- An overview of the State of the Art of Digital competences promotion in the CI sector;
- A reflection on the development of Digital competences within the adult education context for the promotion of learners' social inclusion.

The DigiCulture *Conceptual Framework* can be the basis of new academic research, yielding new insights into the use of digital resources in CI education. Firstly, the results will be useful for the DigiCulture project in order to identify the most appropriate teaching and learning methodologies, tools, intervention strategies and evaluation tools for the promotion of Digital Competences. Secondly, the framework will be the starting point for the design and implementation of the *DigiCulture Course* that will be developed within the project. Lastly, new insights can be brought into practice, which is the way the DigiCulture *Conceptual Framework* enhances digital integration in learning, teaching and training within the CI sector.

The main target group of the DigiCulture *Conceptual Framework of Digital Competences for Culture and Creative Industries* are the following:

- Researchers;
- Educators;
- Teachers.

Pending research questions and the State of the Art of Digital competences promotion in CI sector will be used as a theoretical basis for Researchers to develop new academic research. These points of the

DigiCulture *Conceptual Framework* aim to present available research on Digital competences promotion in the CI sector, summarising the results of different academic studies.

Reflection on the development of Digital competences within an adult education context can help teachers and educators involved in the creation of an innovative learning pathway to focus on the development of social inclusion, media literacy, intercultural competences and 4C skills (critical thinking, creativity, communication and collaboration; Trilling & Fadel, 2009) within the wider context of promoting the acquisition of digital competences.

Creative Industries identification and definition

According to the UNESCO definition, Creative Industries are «industries that combine the creation, production and commercialization of products which are intangible and cultural in nature. These contents are typically protected by copyright and they can take the form of goods or services».

The DigiCulture partnership also adopted the UK (Department for Culture, Media, and Sport – DCMS) division of CI into nine segments to carry out research activities related to the project. According to this division, the CI sector is composed by the following categories:

- Museums, galleries and libraries;
- Music, performing and visual arts;
- Advertising and marketing;
- Architecture;
- Crafts;
- Design (product, graphic and fashion design);
- Film, TV, video,radio and photography;
- IT and computer services, software and web/mobile development;
- Publishing.

The DigiCulture project also intends to investigate the Tourism sector as one of the industrial categories in which the development of workers' digital competences can contribute to improve employees' career opportunities and social inclusion. This decision was made because of the strong connection between the tourism sector and some of the categories of the CI, such as Museums, Advertising and Design.

Context for a definition of Digital Competences: the DigComp 2.1 Framework

DigiCulture project partners have agreed to use a specific model of digital skills classification and definition, DigComp 2.1: *The Digital Competence Framework for Citizens with eight proficiency levels and examples of use*. The Framework defines 5 digital competences dimensions, as follows (Table 1):

I.   Information and data literacy;
II.   Communication and collaboration;

III.   Digital content creation;
IV.   Safety;
V.   Problem solving.

DigComp is a tool for improving European citizens' digital competence. The first edition was published in 2013 and it has been a reference point for many learning and training initiatives aimed at developing digital competence at European and Member State level. DigComp was developed by the Joint Research Centre (JRC) of the European Commission as a scientific project based on the participation and active contribution of a large number of stakeholders and policy makers from the fields of industry, education and training and labour market. The second version of the framework was published in 2016 (DigComp 2.0 – *The Digital Competence Framework for Citizens. Update Phase 1: The Conceptual Reference Model*) and contains updates on areas, descriptors and titles of competences. The third and final version of the Framework was published in 2017; it defines 21 digital competences as follows:

Table 1 DigComp 2.1: *The Digital Competence Framework for Citizens with eight proficiency levels and examples of use. Retrieved from* http://publications.jrc.ec.europa.eu/repository/bitstream/JRC106281/web-digcomp2.1pdf_(online).pdf

Digital competences dimensions	Sub-skills	Definition
1. Information and data literacy	1.1 Browsing, searching and filtering data, information and digital content	To articulate information needs, to search for data, information and content in digital environments, to access and navigate between them. To create and update personal search strategies.
	1.2 Evaluating data, information and digital content	To analyse, compare and critically evaluate the credibility and reliability of sources of data, information and digital content. To analyse, interpret and critically evaluate the data, information and digital content
	1.3 Managing data, information and digital content	To organise, store and retrieve data, information, and content in digital environments. To organise and process them in a structured environment.
2. Communication and Collaboration	2.1 Interacting through digital technologies	To act through a variety of digital technologies and to understand appropriate digital communication means for a given context.

	2.2 Sharing through digital technologies	To share data, information and digital content with others through appropriate digital technologies. To act as an intermediary, to know about referencing and attribution practices.
	2.3 Engaging in citizenship through digital technologies	To participate in society through the use of public and private digital services. To seek opportunities for self-empowerment and for participatory citizenship through appropriate digital technologies.
	2.4 Collaborating through digital technologies	To use digital tools and technologies for collaborative processes, and for co-construction and co-creation of data, resources and knowledge.
	2.5 Netiquette	To be aware of behavioural norms and know-how while using digital technologies and interacting in digital environments. To adapt communication strategies to the specific audience and to be aware of cultural and generational diversity in digital environments.
	2.6 Managing digital identity	To create, and manage one or multiple digital identities, to be able to protect one's own reputation, to deal with the data that one produces through several digital tools, environments and services.
3. Digital Content Creation	3.1 Developing digital content	To create and edit digital content in different formats, to express oneself through digital means.
	3.2 Integrating and re-elaborating digital content	To modify, refine, improve and integrate information and content into an existing body of knowledge to create new, original and relevant content and knowledge.
	3.3 Copyright and licences	To understand how copyright and licenses apply to data, digital information and content.
	3.4 Programming	To plan and develop a sequence of understandable instructions for a computing system to solve a given problem or perform a specific task.
4. Safety	4.1 Protecting devices	To protect devices and digital content, and to understand risks and threats in digital environments. To know about safety and security measures and to have a due regard to reliability and privacy..

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	4.2 Protecting personal data and privacy	To protect personal data and privacy in digital environments. To understand how to use and share personally identifiable information while being able to protect oneself and others from damages. To understand that digital services use a "Privacy policy" to inform how personal data is used.
	4.3 Protecting health and well-being	To be able to avoid health-risks and threats to physical and psychological well-being while using digital technologies. To be able to protect oneself and others from possible dangers in digital environments (e.g. cyber bullying). To be aware of digital technologies for social well-being and social inclusion.
	4.4 Protecting the environment	To be aware of the environmental impact of digital technologies and their use.
5. Problem Solving	5.1 Solving technical problems	To identify technical problems when operating devices and using digital environments, and to solve them (from trouble-shooting to solving more complex problems).
	5.2 Identifying needs and technological responses	To assess needs and to identify, evaluate, select and use digital tools and possible technological responses and to solve them. To adjust and customise digital environments to personal needs (e.g. accessibility).
	5.3 Creatively using digital technologies	To use digital tools and technologies to create knowledge and to innovate processes and products. To engage individually and collectively in cognitive processing to understand and resolve conceptual problems and problem situations in digital environments.
	5.4 Identifying digital competence gaps	To understand where one's own digital competence needs to be improved or updated. To be able to support others with their digital competence development. To seek opportunities for self-development and to keep up-to-date with the digital evolution.

The DigiCulture project considers DigComp 2.1 to be a useful theoretical approach to the definition of digital competences. The DigiCulture *Conceptual Framework of Digital Competences for Culture and Creative Industries* was planned and created after taking into consideration the DigComp Framework.

Partners involved in the Conceptual framework realization

The DigiCulture partners involved in the design and creation of the *Conceptual Framework of Digital Competences for Culture and Creative Industries* are the following:

- University of Roma Tre, leader of the activity;
- Universitatea Politehnica Timisoara;
- Aalborg Universitet;
- Universitaet Graz;
- Dublin City University.

The other project partners (Asociatia Timisoara Capitala Culturala Europeana, JME Associates Ltd and Nacionaline Distancinio Mokymo Asociacija) are involved in other aspects of the implementation of the framework.

Expected outcomes

By developing the *Conceptual Framework of Digital Competences for Culture and Creative Industries*, the project partnership aims to share best and most effective practices, methodologies and educational tools for the promotion of digital skills in CI adult employees. The expected outcomes of the research activities presented in this document are the following:

- To define the theoretical basis of the DigiCulture project;
- To identify the digital competences most promoted in CI adult education contexts;
- To identify the pedagogical and operational indicators for the creation of effective educational interventions in the promotion of digital skills for Creative Industries workers;
- To select content and digital competences to be promoted in the DigiCulture Course.

Research questions

To define the focus of the project main activities, the DigiCulture Partnership is identifying a set of research questions to be explored during the whole duration of the project:

1. Which learning approaches can enhance the development of digital competences in CI Adult employees?
2. Which digital competences can support the social inclusion of adults involved in CI sector?
3. How should adult learners' digital competences be developed to ensure real improvement of CI employees' career opportunities and social inclusion?
4. Which teachers and educators' practices can best promote learners' digital and transverse skills development?

State of the Art on Digital competences promotion in Creative Industries sector

Methodology

From November 2018 to January 2019, a first set of indicators (*Draft to Conceptual Framework of Digital Competences for Culture and Creative Industries*) was provided to partners involved in the output for the production of the *State of the Art on Digital competences promotion in Creative Industries sector*.

Partners involved in the activity selected one of the DigComp 2.1 five dimensions, as follows (Table 2):

Table 2 Partners assignment of the DigComp 2.1 five dimensions for the production of the "State of the Art on Digital Competences promotion in Creative Industries Sector"

Digital competences dimensions identified by DigComp 2.1 (2017)	Sub-skills, identified by DigComp 2.1 (2017)	Partner assigned
Information and data literacy	1.1 Browsing, searching and filtering data, information and digital content; 1.2 Evaluating data, information and digital content; 1.3 Managing data, information and digital content.	University of Roma Tre
Communication and Collaboration	2.1 Interacting through digital technologies; 2.2 Sharing through digital technologies; 2.3 Engaging in citizenship through digital technologies; 2.4 Collaborating through digital technologies; 2.5 Netiquette; 2.6 Managing digital identity.	Universitaet Graz
Digital Content Creation	3.1 Developing digital content; 3.2 Integrating and re-elaborating digital content; 3.3 Copyright and licences; 3.4 Programming.	Dublin City University
Safety	4.1 Protecting devices; 4.2 Protecting personal data and privacy; 4.3 Protecting health and well-being; 4.4 Protecting the environment.	Aalborg Universitet

Problem Solving	5.1 Solving technical problems; 5.2 Identifying needs and technological responses; 5.3 Creatively using digital technologies; 5.4 Identifying digital competence gaps.	Universitatea Politehnica Timisoara

The partners then began a review of the *State of the Art on Digital competences promotion in Creative Industries sector*. The review can be considered as an international analysis aimed at highlighting the potential role of digital skills promotion in 21st century learning and in lifelong training of people who work in the fields of communication, elaboration and production of artistic and cultural heritage.

The methodology used for the development of the review presents four main activities, as follows:

1. *Searching Criteria identification;*
2. *Research and selection of papers for analysis;*
3. *Review, data extractions and papers analysis;*
4. *Summary of results and production of the report.*

Searching Criteria identification

The criteria needed to be applied for the analysis of papers by each partner involved are summarized in the Table 3. Some of these criteria were important not only for searching, but also for selecting or rejecting papers. For instance, if the paper was not directly relevant to the group of skills in CI adult education assigned to the partners involved, it was not included in the list of papers to analyse.

Table 3 Searching criteria for the literature review

Journals	Peer-reviewed publications (journal and/or reviewed/edited books)
Years	(Include the years of the papers)
Database	ERIC and/or other databases from our universities
Keywords for searching	- (add selected skills group) - adult education - Creative Industries sector (1- Museums, galleries and libraries; 2-Music, performing and visual arts; 3- Advertising and marketing; 4- Architecture; 5-Crafts; 6- Design (product, graphic and fashion design); 7-Film, TV, video, radio and photography; 8- IT, software and computer services; 9- Publishing; 10- Tourism) - Interventions / strategies / practices

Main focus (content)	- Practices fostering (add selected skills group) development in CI adult education context

Research and selection of papers for analysis

The research was carried out only on Peer-reviewed publications. The databases used for the research were the following: Scopus, ResearchGate, Google Scholar, and other university databases. All the articles identified in the databases have undergone a first process of revision by each partner: the researchers involved, through the reading of the papers, identified whether the articles found were in line or not with research objectives and areas of study. The exclusion criteria were the following: absence of methodological consistency and/or no reference to the creative industries sector.

Review, data extractions and papers analysis

All the selected papers were analysed and evaluated by each partner through a content analysis procedure (Table 4). Each article was analysed by one of the researchers of the partner. After a first analysis, an internal review process between the members of the research group was carried out, in order to resolve any doubts about the evaluation of the articles within the analysis tables.

Table 4 presents the assessment indicators used for the content analysis procedure.

Table 4 Categories used for articles' content analysis

Dimensions	Categories for the analysis
Type of study	Qualitative Quantitative
Type of educational programme	Ex. formal context, training, informal context, refresher course, etc.
Skills under investigation	Refer to the skills identified by DigComp 2.1 (2017)
Activities foreseen (if relevant)	
Teaching strategies (if relevant)	Ex. Problem solving (inquiry), Lecture discussions (argumentation), etc
Learning material (including tasks) described (if relevant)	
Evaluation of learning (exam) (if relevant)	

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Learning results (are the aims reached?)	In terms of skills developed
Reported difficulties	
Brief overall evaluation of the paper in terms of originality, significance, quality, clearness, relevance	● Original: the paper explores a new idea, project or issue; discusses existing research with promise of new insight, discusses new research; or presents new ways of considering existing information ● Significant: the paper raises and discusses issues important to improving the effectiveness and/or sustainability of education efforts, and its contents can be broadly disseminated and understood ● Quality: claims are supported by sufficient data; claims draw upon relevant literature; and limitations are described honestly ● Clear: the intended outcomes of the paper are easily understood ● Relevant: the paper addresses one or more of the themes of the "Conceptual Framework of Digital Competences for Culture and Creative Industries" (1. Potential role of competences, within the context of 21st century learning; 2. Potential role of digital resources in cultural and CI adult education).

Summary of results and production of the report

The data resulting from the analysis of the selected articles have been used for the elaboration of this research report. Particular attention was paid in the identification of the most useful educational interventions for the promotion of the digital dimensions and skills, in accordance with the research carried out. Each partner produced a Report on identification and analysis of paper, taking into consideration the following structure (Table 5).

Table 5 Structure for the partners' report

Partner:

Results and review

Information and data literacy

The results of the Literature review led to the identification of 20 scientific publications about the Information and data literacy dimension promotion for Creative Industries adult workers. A first review process was carried out on these 20 articles through the complete reading of them, in order to identify if they were properly in line with the research activity and DigiCulture project objectives. This pre-selection process led to the elimination of 10 scientific publications (see Reference and papers selected chapter). Only the remaining 10 were analysed through the content analysis procedure (Table 4).

The articles selected for the analysis of the effective educational interventions in the Information and data literacy dimension promotion for Creative Industries adult workers were found in the following research databases (Table 6):

Table 6 Databases used for "Information and data literacy" dimension

	ResearchGate	Scopus	Google Scholar	Academia.edu	Total
No. Scientific paper	3	3	3	1	10

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Most of the articles refer to educational practices for workers in the Museums, galleries and library category (5 articles out of 10); 2 articles refer to the Design area (product, graphic and fashion design); 1 article refers to the Architecture area and 1 to the IT, software and computer services area. Another article does not report the area of work of the adults involved in educational activities.

Formal education is the most frequent educational context in the articles analyzed (7 papers out of 10).

Taking into consideration the sub-skills of the Information and data literacy dimension (Browsing, searching and filtering data, information and digital content; Evaluating data, information and digital content; Managing data, information and digital content), the research papers were divided according to the following table. Two papers highlight the promotion of two sub-skills at the same time (Abasi & Taylor, 20017; Poce, Agrusti & Re, 2017).

Table 7 Number of papers identified for each sub-skill of the Information and data literacy dimension

	Browsing, searching and filtering data, information and digital content	Evaluating data, information and digital content	Managing data, information and digital content	Browsing, searching and filtering & Evaluating data, information and digital content	Evaluating & Managing data, information and digital content
No. Scientific paper	2	4	2	1	1

The educational activities presented in the analysed papers are varied. Most of them are linked to the creation or evaluation of digital products, promoting activities of visual programming, 3D design, archiving, MOOCs (Massive Open Online Courses) and OERs (Open Educational Resources) production and evaluation, digitalization. These results are in line with the purpose of promoting digital skills through educational pathways. Discussion activities and critical analysis of the digital products are included in many educational pathways described in the papers, especially in relation to the promotion of the subskill Evaluating data, information and digital content (5 scientific papers out of 10).

The use of certain educational activities is always to be considered in relation to the context of the Creative Industries sector of reference: digitalization and archiving concern the Museums, galleries and libraries and IT, software and computer services categories; 3D design refers to the Architecture area, the visual programming to the Design area (product, graphic and fashion design).

Only the activities of construction and evaluation of open resources, such as MOOC and OERs, could be used in other educational contexts and creative industry sectors, as they are not specifically related to the Museums, galleries and library sector which the articles analysed refer to (Carvalho & Ribeiro Matos, 2018; Mu.Sa, 2017; Poce, Agrusti & Re, 2017). In the same way, the didactic tools are in line with the student's field of work and the designed didactic activity.

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The educational activities proposed within the papers also aim to promote digital and transversal skills, such as Communication (4 articles), Critical thinking (2 articles), Team working (3 articles), Management (2 articles).

The promotion of the Information and data literacy dimension is also associated with Creativity, Collaboration skills and the transversal attitudes of Motivation and Curiosity (1 article).

Communication and collaboration

The first results included a huge amount of data (over 10000 results across all the search combinations), which were further refined and narrowed down. By observing the bibliographic data of the articles in Zotero, a first selection was done by eliminating duplicates, checking again date of publication, observing the focus of the article based on its title, authors, journal, etc. This selection was further refined by a quick review of the abstracts of the articles, which led to a more focused and smaller pool of data. The final set of literature analysed includes around 35 articles, which have the potential to be of use for the DigiCulture project (see *Reference and Papers selected chapter*).

In terms of skills presented in the articles the results varied significantly. There were also articles overlapping with themes in other categories of the Digital Competences 2.1 framework, and among these most-well represented skill groups were *Data Literacy* and *Digital Content Creation*. Most of the time it was a combination of those skill groups (*Interacting through digital technologies, Sharing through digital technologies, Collaborating through digital technologies*). On the other hand, the research group also found papers that implemented sub-skills of the *Problem-Solving* dimension. The most underrepresented skill group was *Safety*.

Most of the articles had a Qualitative approach to their studies. They tried to question reasons, opinions and motivations, and did exploratory research to develop or quantify different hypotheses. Frequently they evaluated the results via interviews or questionnaires and did a comparison to other studies.

Quantitative studies ware rare and the ones we found all had one big restriction and that is limited numbers of participants. On top of that we would have to add, that the evaluation aspect of the qualitative research also connects to this problem. It seems that the trend is going to small qualitative research groups instead of a huge number of quantitative research studies. The reason for this might be time, money and availability of suitable participants.

In terms of CI Adult Education, multiple papers and studies had their focus on this topic, but mostly in terms of Higher Education, University and Students. The focus of the projects, on the other hand, lies on professionals in the creative industry. This was a major reason for the exclusion of papers concerning teaching in HE, and thus the reduction of the final pool of data analysed.

In many cases, papers were also focusing on how libraries or museums can use technology to engage with their visitors or to increase digital literacy among their patrons. Since the focus is on skills within the cultural sector workforce, rather than the use of the cultural sector to improve skills among the general population, this group of articles has also not been analysed.

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Digital content creation

The framework adopted throughout this process was broadly realist, and the research group conceptual lens was to analyse policy, process and protocol as generative, reflecting and shaping both global and local realities. In keeping with both variance and process-based forms of research (Maxwell and Mittapalli, 2003: 154-55), quantitative, survey-based data are often compelling, but are also typically embedded within wider structural processes. It is not the case that what could be termed 'policy' at national, local or organisation level, is a neutral concept, or that it should be read uncritically, as it reflects a multi-fractal, multi-perspective attempt to define and delineate the shape of the cultural sector as a governmental or organisational concern.

The group have consequently defined the research scope of this review quite broadly, and attempted to encompass the views of an array of stakeholders, including national, local and organisational aspects. This has additionally involved focusing primarily on theoretical examples of how the above concepts, such as the nature of digital content, are defined and operationalised, rather than a focus on empirically-minded, social research, as understanding the former is a prerequisite to studying the latter. When analysing a field such as culture, it is required to account for these diverse groups and priorities, including the role of government policy, organisational culture and social changes more widely. Several reports, such as that on museum policies, contain detailed, rich analysis of the processes of content creation and curation, the views of individual staff, and the role of technology in the same. The collection, though dealing with a relatively-small body of (primarily) research reports, focuses on these policy domains. They are viewed as both highly-indicative of but equally sensitive-to these wider social, technological and economic changes which are viewed highly important in conceptualising the key issues to be addressed.

Safety

The ERIC database was queried 45 times using the keywords shown in the table below. Relevant tags (shown below) were applied to narrow the search results when more than 100 articles were found.

Table 8 Key words for the literature review carried out on "Safety" dimension.

Search Terms	Tags

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adult education Safety creative / creative industry / museum / gallery / music / advertising / architecture / craft /photography / publishing / tourism / libraries / visual arts / fashion design / radio / software / film privacy personal data protect health / well-being environment device intervention / practice / strategy	[Safety Education] [Since 2010] [Adult Education] [Intervention] [Privacy]

The search found 553 papers which were filtered by scanning the title which initially led to 37 papers found. Abstracts from the 37 papers were read which narrowed down the number of papers to 0.

Conclusions

The research of the 45 papers carried out by the partners has been analyzed in a comparative way for the creation of the present document. Basic descriptive and content analysis highlight useful information for the realization of effective educational paths in the field of promotion of digital skills for the CI sector.

As far as the type of educational programme was concerned, the papers analysed are mainly from formal educational contexts (Figure 1). 9 out of 45 studies described university learning activities and 5 explore the results of formal training courses. The small number of educational experiments in informal contexts reveals the limited willingness and/or possibility of informal educational institutions to experiment and disseminate research results in the field. The creation of learning paths for the promotion of digital competences in the CI sector, the creation and dissemination of tools to evaluate the learning process effectiveness and the implementation of Open Digital Badges to validate the competences and knowledge acquired could promote experimentation in the field of informal education.

Type of educational programme

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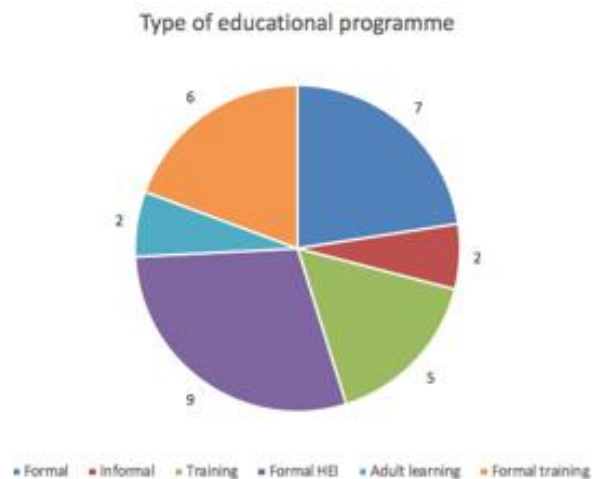Erasmus+ Programme
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Figure 1 Educational Contexts presented in the literature review

In terms of Digital dimensions promoted, 13 papers out of 45 describe the realization of learning paths for developing *Information and data literacy* skills (see Figure 2). 8 experimental educational activities are aimed at promoting both *Information and data literacy* and *Communication and Collaboration* dimensions. The *Digital content creation* and the *Problem-solving* dimensions are the less represented group of skills in the paper analysis. As regards *Information and data literacy* dimension, the most promoted skill is *Managing data, information and digital content* (7 papers, including 4 of the formal education context).
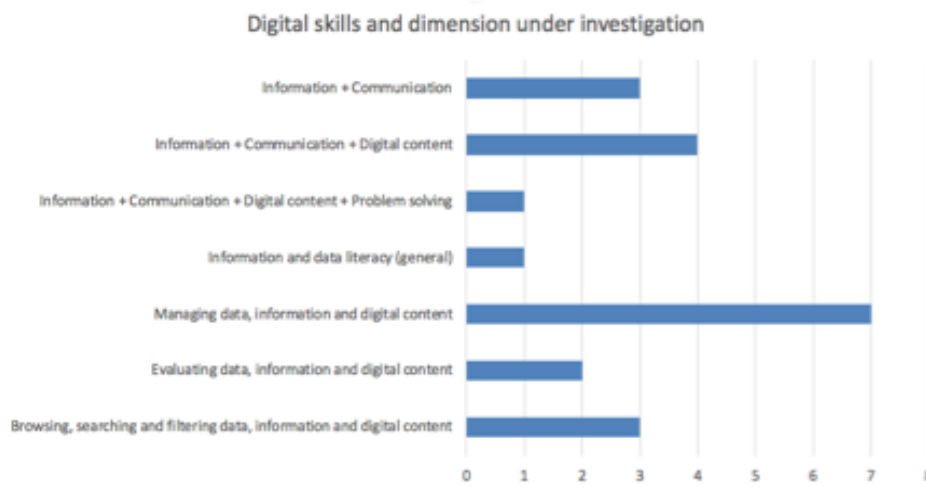
Figure 2 Digital skills and dimension under investigation

As regards the teaching strategies (Figure 3) used in the learning contexts, not all the papers declared these specific characteristics. E-*learning* and *critical thinking methodologies* are the most common teaching strategies used (6 papers for each of them). *E-learning activities* and Inquiry based learning approach are always linked to *Information and data literacy* dimension. *Critical thinking methodologies* are developed by argumentation (1), explanation and demonstration (2), analysis and synthesis (1), problem solving (1) and discussion (1) activities and tasks, in presence and at distance. *Collaborative* activities are presented in only 2 papers related to *Managing data, information and digital content* skill.

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Teaching strategies

Figure 3 Teaching strategies

The learning materials used in the experimental education activities analysed are in line with the Digital competences promotion (see Figure 4). 10 papers declared to have used Digital media, website and software in their learning paths: 2 researchers state that Open classroom and Online Chat software or media were used by learners, 1 during *collaborative learning* activities and 1 for *e-learning* activities. MOOCs were used in 3 papers, for managing digital data, evaluating them and collaborating with other learners during the experience.

Learning materials

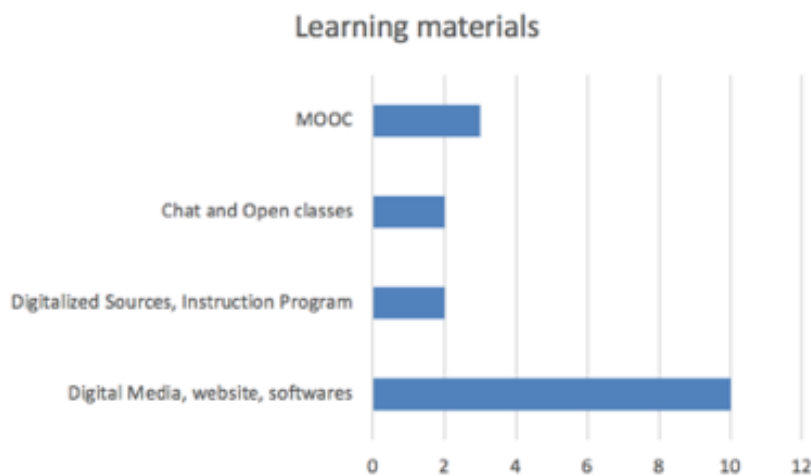Figure 4 Learning materials

The evaluation aspect of the papers under analysis is the most under-representative characteristic (Figure 5). Only 11 papers declare the evaluation tools and methodologies used in the explained learning experience. This shows the need to design and disseminate more tools for the evaluation of learning pathways, teaching tools used and the teaching methodologies used.

![Digital Culture logo]

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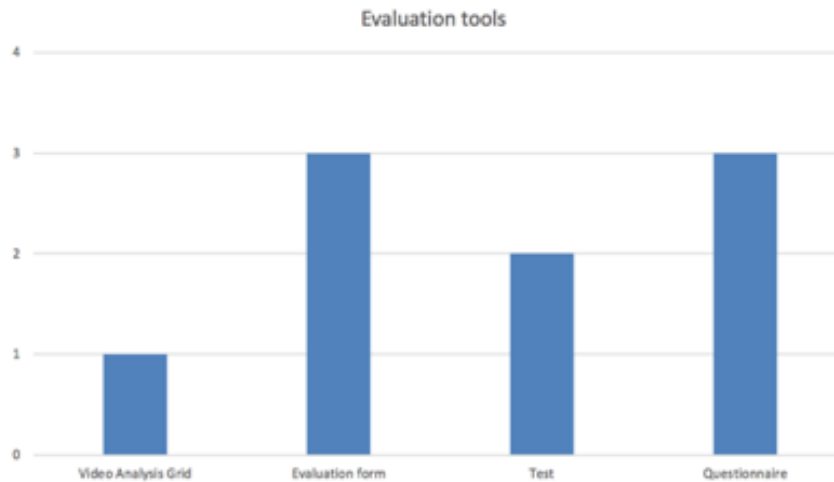
Figure 5 Evaluation tools

The absence of specific evaluation information limits the replicability of the learning and teaching experiences analysed. In general, questionnaires and surveys (3 papers) are used to evaluate the learning experience (2 papers), and not the digital skills development, or to do a first analysis of the context (1 paper). Other evaluation tools, like assessment grid, are used also in collaborative evaluation activities (peer assessment, 1 paper) to assess the quality of Digital content produce within the learning path. Standardized tests are also used to assess specific content and knowledge acquisition (1 paper).

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Findings: Digital Competences for Culture and Creative Industries

This section of the document will provide the reader with an overview of most effective practices, methodologies and educational tools for the promotion of digital skills in CI adults employees.

Information and data literacy

The educational interventions aimed to promote the *Information and data literacy* dimension have different characteristics. As far as educational strategies are concerned, e-learning activities are the most used in the articles analysed (4 out of 10 articles): this is probably due to the fact that is easier for workers to attend courses remotely, so as to combine work and training activities. The Learning by doing methodology is considered useful within the learning path presented in the papers (2 articles out of 10), together with the Cooperative learning (2 articles out of 10) and the Peer-tutoring methodology.

Other teaching strategies include Problem-solving and Discussion activities. The reference to interdisciplinary knowledge is also an educational intervention that seems to be effective in the evaluation of software and digital products: considering the context of digital tools construction allows the students to develop a greater awareness and a deeper analysis of the tool itself.

	Learning by doing	Lecture discussion	Digital simulation	Problem solving	E-learning	Cooperative learning	Interdisciplinary approach
No. Scientific paper	2	2	1	1	4	2	1

The reference to specific pedagogical models within the papers for the development of certain didactic methodologies is really useful: Eilenberg's method (Knight, 1999) (analysis, transformation, synthesis) is appointed as the framework of reference for HCI (Human-Computer Interaction) activities and for classroom argumentation activities; Polya's model (1945) (Understanding the problem; Planning a solution; Carrying out the plan; Checking the results) is instead used for the construction of Problem solving activities.

The evaluation of digital competences, in particular of the *Information and data literacy* dimension, is extremely complicated from a pedagogical point of view and it is generally poorly developed. Even if the educational pathways directly nominate digital skills and sub-skills, these are never evaluated through appropriate assessment tools.

Some articles (3 out of 10) report how to evaluate the knowledge acquired during the course through the use of standardized tests, or how to evaluate the technical skills promoted. As regards the quality of learning products, an article presents the assessment indicators of the digital product made by the students

of the course: *Functionality; Efficiency; Liability; Portability; Usage; Maintenance*. For what concerns the assessment of digital tools and data, only 2 papers present in detail the analysis of the tool used by students during their activities. These results limit considerably the consideration of the efficacy of the proposed educational interventions.

As regards the difficulties encountered in the educational pathways, the information is limited. The only suggestion given, maybe too generic from a pedagogical point of view, is the correct and careful planning of each educational activity, in order to allow a learning experience as effective as possible.

Communication and collaboration

2.1 Interacting through digital technologies: This subskill was well presented in most of the articles that were found. Most of the studies/projects/methods/courses implemented the theme of interaction between, for example, study participants. A big keyword on this sort of topic was social media. Many articles like *Re-configuring inclusion, decolonising practice: Digital participation and learning in Black women's community-led heritage* by Rachel Clarke and Rosie M. Lewis saw the possibilities and impacts social media has on our society and tried to implement, for example, the network aspect into their studies. On the other hand, not one article in the review stated problems or difficulties on this sort of area which is also visible in the lack of articles for the skill group *Safety*. Social media, and its interactive possibilities created mostly a quite positive resonance.

2.2 Sharing through digital technologies: This subskill was also well presented, most of the time in combination with 2.1. One of the biggest topics that were mentioned was the use of open-access databases or collaboration projects with shared knowledge frameworks. For example, in the article *Design Features of a Professional Development Program in Digital Literacy* by Renee Hobbs and Julie Coiro, the aspect of sharing data and information between participants of the study was very important and supported to promote data literacy.

2.3 Engaging in citizenship through digital technologies: This subskill was well represented in the article search. Nevertheless, the only article (that the research team evaluated) who mentions this topic was: *Re-Configuring Inclusion, Decolonising Practice: Digital Participation and Learning in Black Women's Community-Led Heritage* by Clarke, Rachel and Lewis, Rosie M. which did not suit the project, because it lacked the link to the creative industry aspect of our project.

2.4 Collaborating through digital technologies: As well as 2.1 and 2.2, this subskill category was also most common and well presented in the article search. Frequently, there was a combination of those three categories like in the article *Digital Games and the Hero's Journey in Management Workshops and Tertiary Education* by Carsten Busch, Florian Conrad and Martin Steinicke. In their study they tried to promote data literacy for adult learners using the gamification approach. The participant had to share, play, modify and present games (gaming data) and had a learning experience modelled after the concept of Monomyth (Campbell, 1949 – change process implementing a three acts structure).

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2.5 Netiquette: This category was the most underrepresented one in the article search. The research team had to implement other literary databases like Google Scholar and UNIKAT to reach a sufficient number of articles to work with. In the phase of pre-selection most of the literature was discarded, because the abstracts showed they had no practical input for the DigiCulture project. Overall it can be stated that the aspect of Netiquette is underrepresented in the scientific discussion. The main opinion is, that setting up specific rules or guidelines in terms of how a community interacts online is important, but we found no hands-on methods on how to do this.

2.6 Managing digital identity: After 2.5, this sub-skill group was also underrepresented in terms of implementation in articles. Not one paper (the team evaluated) included this topic. Even after disabling the most important descriptor (adult education) the team did not come up with sufficient results. That was an interesting insight because it connects with the missing aspect of critical reflection in 2.1 (for example in terms of social media use).

Digital Content Creation

How exactly is content created in a digital context? In a sense, the actual process of content creation is mediated through several competing prisms or levels, including the social, economic and political. On the practical elements of the process of creation itself, Abbasi, Panayriota and Lampros (2017: 46-47) attempt to sketch a roadmap in a study relating to five creative industries, and point to an array of issues which confront those who wish to do so. These range from the practical, such as how exactly to provide bespoke, technological solutions (which are typically beyond the direct capacities of any one particular group or organisation) to structural (and often legal) challenges, such as archiving, data protection and the exploiting the potential affordance of technological advances within the cultural sector. The exact method through which digital technologies may be adapted or developed may often appear unclear. A recent ERASMUS + Report, on the Museum sector (EUROPA, 2017) points to the importance of a wider concept of 'digital confidence' (p. 31), and the often-lacking nature of skills development within this specific area, in addition to a dearth of staff with a clear understanding of the potential of digital content and dissemination in the wider cultural sector. Further, the Digital Cultures report (2017: 12), analysing a British context, suggests that specific types of competencies, namely a shift towards marketing, live-streaming and sales as priorities upon which an increasingly in-organisational emphasis has been placed. Decreases are visible in the importance of posting content and in providing educational content, interestingly (ibid), perhaps suggesting a broader commodification of how technology is viewed as a means of cultural dissemination and that many organisations are primarily concerned with technology as a means of assisting sales or revenue, rather than to enable the effective creation of content.

The degree to which individuals or organisations may foster a culture of content creation is largely mediated in these physical, material and social relations. It is to a foremost of these, the opportunities and hindrances posed by copyright law, to which we turn now.

3.1 Copyright and digital rights management

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A core issue which clearly hangs over any form of cultural content creation in a digital context is the question of ownership, copyright and dissemination. Much digital content is embedded within a wider legal and ethical minefield (Sims, 2017), with a tension relating to both copyright as an inhibitor to content creation on the one hand and a lack of awareness of the legal obligations and expectations on the part of organisational staff on the other. Who fundamentally 'owns' cultural content, given that many cultural industries are primarily concerned with historical or legacy forms of culture may be key, including questions of dissemination and manipulability. Given that an increasingly-large role of intellectual property as a source of income and wealth has proven particularly pervasive in the cultural sector (Flew, 2015: 6).

The first category relates to how digital rights management and copyright law more broadly may inhibit cultural innovation and content dissemination. Though digital technologies may make the creation of forms of content considerably easier (and indeed stopping inappropriate dissemination is a new priority), they also open questions as to whether such resources are shareable or accessible, given the above-mentioned processes and questions of ownership. This question has a core economic dimension (ibid: 15). These debates have plagued the educational sector for many years (Weller, 2014) , and questions of underlying or residual ownership in the provision of content are not easy to resolve. On the one hand, many cultural sectors (European Commision, 2010) have what could be termed 'orphan works', which are ripe for dissemination (Bakshi et al, 2013: 73). In contrast to this broader, good-focused sector, the 'creative sector' (as defined in the European Commision, 2010: 5) has a lesser, more tangential cultural focus, tending to be primarily with functional, rather than cultural goals.

The second category can be explored using the specific case of museums, for example, the general lack of awareness relating to in particular manipulation rights has led to the establishment of www.rightstatements.org, a collaborative project aiming to education the public on the copyright status of a wide array of digital and heritage projects. This project is highly encouraging, and point to a means by which both professional and public engagement with issues of copyright may be promoted. This underlying educational purpose may be a means through which both organisational and cultural forms of understanding may be evoked relating to this important issue, and the limited training and standardisation apparent on this topic would appear critical to consider.

Safety

No papers were found which describe practices fostering safety development specifically for creative industry adults. 5 papers were found showing interventions teaching adults on the sub-topics of Protecting personal data, Protecting the environment, Protecting health and well-being and Privacy, but none of the papers focus particularly on communicating to the creative industry.

Papers found directed towards the creative industry mainly tend to focus on fostering development in creative thinking and knowledge sharing.

Digital Competences for the promotion of social inclusion

The role of Digital Competences in Lifelong Learning perspective

The idea of learning cannot be defined anymore merely as knowledge acquisition: learning means to acquire new competences and skills which are developed and benefited from all over one person's life. The idea of Lifelong Learning allowed the development of new research methods and approaches in which the learner's education is conceived a wide, complex and social process.

Digital competence is one of the eight competences required to the European citizens at the end of their compulsory school path in a Lifelong Learning perspective. Moreover, it is a pivotal transverse skill for employers. As Günther H. Oettinger states, «the lack of digital skills is already hampering innovation and growth in Europe. Not just for ICT companies but for organisations in all sectors – private and public. We must remove this obstacle to make sure Europeans get the jobs they deserve and our businesses have access to a large pool of digital talent»[1]. Ansip highlights that «Allowing more people to develop digital skills is like giving a ticket to the digital economy. We cannot build the Digital Single Market in Europe without addressing the digital skills gap. The launch of the Digital Skills and Jobs Coalition is a milestone in our joint effort to increase everyone's digital skills in Europe»[2]. The promotion of Digital competences in today's workers is essential for the European economy development.

The acquisition of digital competence does not solely derive from the ability to use digital tools: technologies evolve and change daily and people must be able to apply their own digital skills to deal with more recent and diverse tools.

Furthermore, thanks to the new technologies and, in particular, to the tools provided by the Web, users have a wide range of information which everybody can produce, regardless of their specific and sectoral skills. Such a freedom increases the risk connected to the authoritativeness of the sources and contributes to the spreading of a kind of culture that lacks depth, since it is based on the rapidity and momentariness of data (Poce, 2015). Students and adults must learn to use ICTs to find, keep, assess, produce and share data and information, by communicating with other people on the Web as well as through the use of specific digital tools.

The inclusion of new technologies in pedagogically rigorous didactic paths supports the users and allows them to learn how to critically use technology and digital tools. At the same time, it supports the development of other transversal skills, like communication, collaboration, creativity and critical thinking.

In Lifelong Learning perspective, Digital skills acquisition allows people to acquire new knowledge and develop ever-changing abilities, having the opportunity to continuously training themselves in the field of education and reducing the possibilities of exclusion from the labour market.

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[1] Commissioner for Digital Economy and Society. The reference is available at http://europa.eu/rapid/press-release_IP-16-4081_en.htm

[2] Vice-President for the Digital Single Market. The reference is available at http://europa.eu/rapid/press-release_IP-16-4081_en.htm

Digital Competences development and social inclusion promotion

The acquisition of Digital competences in strictly related to social inclusion. The knowledge that can be acquired through digital tools and the abilities that can be promoted within digital context are strongly connected with the visitors' knowledge about the society they live in and its history. Thanks to the study and understanding of the phenomena characterising the environment surrounding them, people come into contact with the culture of the territory itself, thus increasing their understanding and acquiring skills useful to actively participate to social life. In fact, only by being aware of the social, cultural and physical relations existing in one's own environment one can aim at becoming aware of one's own choices and ideas (De Vecchis, 2011).

The lack of digital skills produced social, cultural, age, gender and geographical exclusion. In terms of CI sector, the employers' inadequacy of digital competences causes fewer employment and entrepreneurial opportunities, low competitiveness of enterprises, limited use of social and economic services. As a result, they cannot participate in the social, culture, artistic life of the county they live in. Moreover, the superfluous knowledge of the territory and the country in which people live, depending on the lack of participation in the social, cultural and economic life, leads to their worrying exclusion from active citizenship, with dire consequences such as emargination and, sometimes, social tensions.

Therefore, the development of learning pathways focused on promoting the skills needed for certain economic areas is crucial for the political and social participation of workers as citizens. The construction of learning path based on specific knowledge, abilities and objectives, designed in line with determined educational needs and learning contexts, are essential conditions for the learning effectiveness in terms of competences and skills promotion.

Digital Competences in Culture and Creative Industries Adult Education context

In reviewing a selection of policy documents, it is clear that as noted by Preston and Kerr (2001: 111), that the political process across Europe has focused on the opportunities that new multimedia products will generate increased wealth and opportunities for many «high-level, grey-matter jobs». This awareness of the potential benefit and pragmatic gains of a society which promotes the development of such cultural products is largely built on the implicit assumption that links cultural activity to economic growth, thus providing solid strategic and economic reasons to do so (European Commision of Competitiveness Report, 2010). Despite these benefits and a macro-level promotion of such, an integrated strategy geared towards the creation of content has largely evaded policy-makers. Indeed, a general trend appears to be on the one hand an increasing acknowledgement of the importance of digital skills on the one hand, and their relative absence on the other (see Digital Culture, 2017).

There is an obvious argument that the exact degree to which any governmental body can shape culture or content creation, but perhaps the state as a facilitator is a much more appropriate and less-ambitious target. This may emerge particularly as one of the core dynamics shaping the growth and influence of digital technology within the cultural sector is the increasingly pervasive power of the consumer (Bhargava and Klat, 2016: 113). This does not, however, resolve the central paradoxes inherent in the cultural sector,

between the definitional issue of what content fundamentally is, and the role of a state as an intentional actor in promoting the development of cultural materials, practices and indeed products.

In this context, the need to design and realise educational paths for digital skill promotion addressed to workers in the CI sector is still fundamental. Through specific actions and initial education experimentation, the DigiCulture project intends to develop a learning path addressed to the CI education sector. The results of this first experiment will be useful at national, international and European level to define possible future actions and learning interventions.

Transversal and Digital competences within the context of 21st century learning

The overview of the State of the Art of Digital competences promotion in CI sector, presented in this document, shows a limited attention by experimental educational research in the field of CI Education. In particular, despite the pivotal educational need to promote digital skills in CI workers, a limited number of scientific papers on the subject provide few information on the most effective learning methodologies, tools and paths for achieving these learning objectives. Researchers and educators, especially from informal educational contexts, should develop more empirical research activities in the field and define, together with companies and stakeholders in the cultural sector, the profiles required by the labour market and useful for the promotion workers' social and economic inclusion.

As shown by the analyses carried out, the promotion of digital competences in the CI sector takes place mainly for the *Information and data literacy* dimension. A strong connection between *Information and data literacy* and *Communication and collaboration* group of skills is underlined by the learning activities of the papers analysed: the construction of learning pathways promoting both digital dimensions seems to be effective in terms of promoting competences. The *Managing data, information and digital content* skill should be fostered especially at basic level, in order to encourage the promotion of more complex skills such as *Digital content creation* and *Communication and collaboration*.

Digital competences are often associated with other 21st century skills, such as *Communication, Collaboration, Critical thinking* and *Problem solving*: the design and realization of learning paths aimed at promoting different transverse competences fostering the learners' cultural and social inclusion and support the active citizenship in Lifelong learning perspective. Collaborative activities, also online, should be useful in this context.

The use of Digital materials is pivotal for the promotion of Digital competences within the 21st century learning context: different kind of OERs, also for evaluation activities, software and social media should be selected in a coherent way in order to design an effective learning path in terms of knowledge, abilities and skills.

The learning path evaluation should be designed with the support of different tools and activities, also collaborative ones, with the aim of assessing and monitoring the overall education experience of learners.

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Reference and papers selected

Information and data literacy

Scientific paper analysed

Abasi, A. R., Taylor, M. C. (2007). Tackling the issues and challenges of using video data in adult literacy research. In Australian journal of Adult Learning, 47(2), 289-307.

Bawen, D., Vilar, P., Zabukovec, V. (2005). Education and training for digital librarians: A Slovenia/UK comparison. In Aslib Proceedings, Vol. 57 Issue: 1, pp. 85-98.

Carvalho, A., , Ribeiro Matos, A. (2018). Museum Professionals in a Digital World: Insights from a Case Study in Portugal. In Museum International, December 2018, 36 – 47.

Lawson, K.G. (2005). Using eclectic digital resources to enhance instructional methods for adult learners. In OCLC Systems & Services: International digital library perspectives, Vol. 21 Issue: 1, pp.49-60.

Mu.Sa Sector Alliance – Greece, Portugal, Italy - (2017). "Museum Professional in the Digital Era. Agents of Change and Innovation" - Report.

Padilla, S., Orzechowski, P. M., Chantler, M. J. (2012). Digital Tools for Creative Industries. In Digital Futures 2012, October 23-25, 2012, Aberdeen, UK.

Poce, A., Agrusti, F., Re, M. R. (2017). MOOC design and heritage education. Developing soft skills and work-based skills in higher education students. In Journal of e-Learning and Knowledge Society, v.13, n.3, 97-107.

Selvaggi, A., Pesce, F., Surace, R. (2017). Museum of the future: Digital skills for change and innovation in Italy. This paper is part of the Mu.Sa. – Museum Sector Alliance Projects - research.

Smeureanu, I., , Isaila, N. (2014). Adult Users' Familiarisation With Graphical Interface Elements For Digital Competences Acquiring. In Social and Behavioral Sciences, 131, 517 – 520.

Stavric, M., , Wiltsche, A. (2007). Didactical integration of analog and digital tools into architectural education. In International Conference on Computer-Aided Architectural Design,CAADfutures´07 - Sydney, Australia, 11/07/07 - 13/07/07.

Communication and collaboration

Scientific paper analysed

Amado, C., Pedro, A. (2017). Development of a Framework for MOOC in Continuous Training. International Association for Development of the Information Society (IADIS) International Conference on E-Learning (Lisbon, Portugal, Jul 20-22, 2017).

Black, J., Browning, K. (2011). Creativity in Digital Art Education Teaching Practices. Art Education, 64 (5), pp. 19-24.

Blummer, B. (2007). Promoting the Development of Online Learning Communities for Library Professional Organizations. Journal of Web Librarianship , 1 (4), pp. 29-50.

Bromage, A., Clouder, L., Thistlethwaite, J., Gordon, F. (2010). Interprofessional E-Learning and Collaborative Work: Practices and Technologies. Information science reference. Hershey: New York.

Busch, C, Conrad, F and Steinicke, M. (2013). Digital Games and the Hero's Journey in Management Workshops and Tertiary Education. The Electronic Journal of e-Learning, Volume 11 Issue 1, pp. 03-15.

Candice, K. (2011). Europeana: Think Culture. Journal of Web Librarianship, 5(3), pp. 256-261.

Catherine Gilbert (2011). Coaching in the Library: A Management Strategy for Achieving Excellence. 2nd ed. By Ruth F. Metz. Chicago: American Library Association, 2011. 103 pp.

Clarke, R., Lewis, R. (2016). Re-configuring inclusion, decolonising practice: Digital participation and learning in Black women's community-led heritage. Journal of Adult and Continuing Education 22, 2 (October 2016), 134-151.

Coakes, E. (2006). Storing and sharing knowledge - supporting the management of knowledge made explicit. The Learning Organization 2008. 13(6): p. 579-593.

Cuesta, E. M. (2005). The Electronic Librarian. Acquisitions Librarian, 17(33-34): 53-62.

Fristrup, T., Grut, S. (2016). Lifelong learning for active ageing in Nordic museums; archives and street art. Studies in the Education of Adults, 48(2), pp. 210-224.

Gilje, Ø., Groeng, L. M. (2015). The Making of a Filmmaker: Curating Learning Identities in Early Careers. E-Learning and Digital Media, 12(2), pp. 212-225.

Hallam, S., Creech, A. (Eds) (2010). Music Education in the 21st Century in the United Kingdom: Achievements, Analysis and Aspirations. London: IOE.

Hamilton, M. (2011). "I'm Fascinated but I Don't Have the Confidence". Adults Learning, 22(6), pp. 28-31.

Hobbs, R., Coiro, J. (2016). Everyone Learns From Everyone: Collaborative and Interdisciplinary Professional Development in Digital Literacy. Journal of Adolescent & Adult Literacy, 59(6), pp. 623-629.

Hobbs, R., Coiro, J. (2019). Design Features of a Professional Development Program in Digital Literacy. Journal of Adolescent & Adult Literacy, v62 n4, pp. 401- 409.

Holz, D. (2007). Technologically Enhanced Archival Collections: Using the Buddy System. Journal of Archival Organization , 4(1-2), pp. 29-44.

Howard, K. (2010). Programming Not Required: Skills and Knowledge for the Digital Library Environment. Australian Academic & Research Libraries , 41(4), pp. 260-275.

Kodama, C., DiScala, J., Weeks, A. C., Barlow, D. L., Jacobs, L., Hall, R. (2016). Lilead Fellows Program: An Innovative Approach to Professional Development for School Library Leaders. Knowledge Quest, 44(4), 54-59.

McShane, I. (2011). Public libraries, digital literacy and participatory Culture. Studies in the Cultural Politics of Education , 32(3), pp. 383-397.

Myers, E. (2009). Photography Education in a Web 2.0 Classroom. Knowledge Quest , 37(4) pp. 36-39.

Peters, K. (2007). m-Learning: Positioning educators for a mobile, connected future International Review of Research in Open and Distance Learning 8(2).

Pike, P. D. (2011). Using Technology to Engage Third-Age (Retired) Leisure Learners: A Case Study of a Third-Age MIDI Piano Ensemble. International Journal of Music Education, 29(2), 116-123.

Romero, J. S. (2010). Library Programming with LEGO MINDSTORMS, Scratch, and PicoCricket: Analysis of Best Practices for Public Libraries. Computers in Libraries, 30(1), pp. 16-19.

Ryba, K., Selby, L., Brown, R. (2004). Developing Mental Imagery Using a Digital Camera: A Study of Adult Vocational Training. Down Syndrome Research and Practice, 9(1), pp. 1-11.

Saiki, D. (2010). Interacting Online: A Content Analysis of Museum Education Websites. Journal of Learning Design, 4(1), pp. 52-62.

Saravani, S. J., Haddow, G. (2011). The Mobile Library and Staff Preparedness: Exploring Staff Competencies Using the Unified Theory of Acceptance and Use of Technology Model. Australian Academic and Research Libraries, 42(3), pp. 179-190.

Selvaraj, S. A. (2016). The Quest for Really Useful Knowledge: An Institutional Ethnography of Community Adult Education in the Digital Age. ProQuest LLC, D.Ed. Dissertation, The Pennsylvania State University.

Souza, J. (2011). Youth, Musical Education and Media: Singularities of Learning Mediated by Technology. Action, Criticism, and Theory for Music Education, 10 (1), pp. 94-113.

Spence, J. (2005). Small organisations and cultural Institutions – a digital future? Program: Electronic Library and Information Systems, 39(4), pp. 366-380.

Transforming Lives through Learning (2014). Computing and Digital Media: A Subject-Based Aspect Report by Education Scotland on Provision in Scotland's Colleges on Behalf of the Scottish Funding Council. Scotland: Education Scotland Publication.

Valencia-Garcia, R., Garcia-Sanchez, F., Casado-Lumbreras, C., Castellanos-Nieves, D., Fernandez-Breis, J. T. (2012). Informal learning through expertise mining in the social web. Behaviour & Information Technology, 31(8), pp. 757-766.

Yang, K. H. (2014). Participatory photography: can it help adult learners develop agency? International Journal of Lifelong Education, 33(2), 233-249.

Digital Content Creation

Scientific paper analysed

Title	Authors	Journal	Year	Keyword	Main content focus

Digital Media,Nation States and local cultures: The case of Multimedia content.	Preston, P. and Kerr, Aphra.	Media, Culture and Society	2001	Digital Culture, Policy	Critical review of concept, role of culture and national-level organisation in promoting culture
Technology roadmap for the creative industries	Abbasi, M., Panayiota V., Lampros, S.	Creative Industries Journal.	2017	Policy, Digital Culture, ICT Roadmap	Theoretical Report
Museum Professionals in the Digital Area: Agents of change and innovation		EUROPE Erasmus + Report	2017	Museums, Cultural Industry, Innovation and Technology	Report, Qualitative Research Project
Digital Culture 2017	NESTA	British Council for the Arts Report	2017	Report, Digital Culture, Skills and compotencies	Trends report, Quantitative Survey
The Future of Museums in the Digital Age: New Models of Access and Use of Digital Collections	Bertacchini, E. and Morando, S.			Digital competencies, collection maintenance, usage of digital assets,	Research paper, Social trends report

Copyright and the future of digital culture : application of the first sale doctrine to digital copyrighted works				Copyright, Digital Rights Management	
Content democratisation: How the internet is fueling the growth of creative industries	Bhargava, J., Klat, A.	PwC working report.	2016	Working paper, theoretical paper, future trends, digital culture	Working report
Rights, ethics, accuracy, and open licenses in online collections	Sims, N.	Scholarly Communication.	2017	Digital Rights Management, Open licencing, cultural content	Theoretical Paper
Copyright and Creativity: An Ongoing Debate in the Creative Industries	Flew, T.	International Journal of Cultural and Creative Industries	2015		Theoretical Paper
A Manifesto for the Creative Economy	Bakshi, H., Hargreaves, I, Mateos-García, J.	Nesta Report	2013		
Unlocking the potential of cultural and creative industries		European Commission Green Paper	2010		Green Paper

Other References

Polya, G. (1945). How to solve it. Princeton: Princeton University Press.

Knight, T. (1999) Applications in architectural design, and education and practice, Report for the NSF/MIT Workshop on Shape Computation, MIT Cambridge.

Maxwell, J. and Mittapalli, K. (2010). Realism as a stance for mixed methods research. In Tashakkori, Abbas and Teddlie, Charles (Eds.) 'SAGE Handbook of Mixed Methods Research'. Thousand Oaks: SAGE. PP 145-168.

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