



Methods to Include a Creative and Critical Thinking Approach in Education



Erasmus+

Content editors

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Case studies

Project partners: Ars Electronica, Cap Sciences, Chester Beatty, Finnish Museums Association, Heritec, Radiona Makerspace, Steps,

Images

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The Creative School project has been funded with the support of the European Union and the French National Agency for the Erasmus+ Programme (Grant Agreement 2019-1-FR01-KA201-062212). This publication reflects the views only of the author, and the European Union and the French National Agency for the Erasmus+ Programme cannot be held responsible for any use which may be made of the information contained therein.





Table of contents

1. Introduction.....	4
2. Creative and critical thinking in Europe	6
2.1 Summary of analysis of case studies	9
2.2 Glossary of terms	13
3. Good practices on Creative and Critical Thinking.....	15
3.1 Type 1: Museum-School Partnerships and Resources.....	15
3.2 Type 2: STEAM, City Councils and Maker Spaces collaborations	19
3.3 Type 3: Workshops and Creative Spaces	22
3.4 Type 4: Collaborative initiatives	24
4. What have we learnt? Moving from the theoretical to the practical	33
4.1 An analysis of the good practices	33
4.2 Curricula, policies and teacher feedback in partner countries on requirements for delivery of creative and critical thinking skills.....	33
4.3 Understanding the needs of teachers and educators	39
4.4 What has changed in light of Covid-19 for schools and museum engagement?.....	40
4.5 Sharing collected good practices in schools:.....	40
4.6 Recommendations for building a Creative School	41

1. Introduction

The *Creative School* project is a three-year Strategic partnership funded by the Erasmus+ Programme. It builds on the outcomes of two previous Erasmus+ funded projects: the *Creative Museum* and the *Making Museum* projects, which provided opportunities to generate and evaluate knowledge, clarify concepts and ideas, seek possibilities, consider alternatives and solve problems for museum professionals and audiences. Throughout the duration of the *Creative School* project, museum, science, arts and heritage professionals, creatives, digital practitioners and makers will be encouraged to share good practices; learn from each other; explore ways of engaging with teachers and students in schools in the development of learning resources; as well as disseminate the processes and outcomes.

The *Creative School* project aims to use the creative and innovative methods and tools developed throughout the *Creative* and *Making Museum* projects and apply them to the development of learning modules for children and school teachers. More importantly two core ingredients the *Creative School* project wishes to build upon are creativity and critical thinking skills for teachers, educators and students in schools. These skills are central in the education and development of students in schools across Europe.

According to the Organisation for Economic Co-operation and Development, in an increasingly complex world, children need to develop higher level thinking skills in order to find solutions to social, emotional and economic problems, both personally and in the context of the wider world (OECD, 2008). In order to respond to the challenges of the 21st century, children need to be creative, innovative, enterprising and adaptable, with the motivation, confidence and skills to use critical and creative thinking purposefully. The *Creative School* responds to this need by delivering creative and critical thinking educational methodologies into schools through engagement with the cultural sector, specifically museums, galleries and science centres.

The document presents the analysis carried out by the project partners on training and information needs of teachers, educators and children involved in the following pilot activities of the *Creative School* project. As a result of this analysis, a common training plan has been defined, to organise the training materials that will be developed in the second year of the project. Thanks to teachers and educators interviewed during the course of the project as well as their contribution to the project activities; as an outcome it has been possible to define the specific training objectives of each partner.

Chapter 2 of this document describes the state of the art of creative and critical thinking in education in partner countries (curriculum, existing models and practices, policies and teacher education pathways) and on EU policy level and has the objective to serve as a basic ground for further research. This section has been prepared using desk research methods of key national and EU documents, regulations and existing practices, with the objective to provide a broad overview of the information in participating countries. Data and basic information from existing resources (national school curricula, descriptions of subjects for students, available educational materials, study/training programmes for teachers, national school strategies, other legislation) has been collected and analysed in an effective way.

Chapter 3 presents a set of good practices, many of them are based on previous experiences in partner organisations. This step has been fundamental in the provision of a common basis for the development of the Open Educational Resources that will be developed in the second main activity of the *Creative School* project. This analysis has been useful to compare the current situation and trends in partner countries and at European level, set the basis for the exchange of good practices identified and provide a wider European perspective in the field, with the ultimate goal to help EU and national policy makers and key decision makers.

Chapter 4 presents the needs of teachers and educators, and gives partners a deeper insight into the key topics that teachers find important and are currently not sufficiently addressed, as well as key obstacles, fears, impediments, etc. in developing creative and critical thinking skills. This analysis is based on information collated from focus groups and questionnaires for teachers and educators. However, due to travel restrictions during the Covid-19 pandemic, partners organised online and telephone meetings in order to complete this survey.

Finally, Chapter 5 explores a proposed set of Open Educational Resources that will be developed by the *Creative School* project to introduce creative and critical thinking approaches in education. It provides a methodological model for creative and critical thinking, with special emphasis on students aged 6-17 years, which denote important steps in the development of cultural awareness and expression for students. A sample model of an Open Education Resource has been developed to provide project partners with a template for the preparation of additional materials.

Introduction to the present document

The general objective of this Intellectual Output is the analysis of the training and information needs of teachers, educators and children to be involved in the following activities, and the development of a common curriculum to train them for achieving the project goals.

This part will be prepared using desk research methods of key national and EU documents, regulations and existing practices. The purpose is to provide a broad overview and a definitive summation of the information in participating countries. With the method of desk research, partners will collect data and basic information from existing resources (national school curriculums, descriptions of subjects for students, available educational materials, study/training programmes for teachers, national school strategies, and other legislation) in an effective way.

This will give the partners good insights into the key topics that teachers find important and are currently not sufficiently addressed, as well as key obstacles, fears, impediments, etc. in developing creative and critical thinking skills. Based on this analysis an outline of toolboxes for teachers about introducing a creative and critical thinking approach in education, focusing on selected topics and values.

The main beneficiaries of the project include primary and post-primary school teachers, who, through engaging with the project, will become equipped with the skills necessary to facilitate pedagogical strategies for creative and critical thinking. The project also explores the possible mobilisation of digital cultural heritage and engagement with maker spaces models, as tools to create unusual and exciting learning opportunities. Maker spaces are intended as community-operated workspaces, where people with common interests in technology, science, heritage and art, can meet, socialise and collaborate.

2. Creative and critical thinking in Europe

Jenny Siung, Chester Beatty

Definitions

There are many interpretations of creative and critical thinking skills. Pose this question to a group of museum, science centre and cultural heritage professionals and then to a group of makers the answers may vary. The terms have more recently been introduced to the school sector and they too have a number of interpretations stemming from both educational policy and practice.

Creative thinking

As identified in the previous *Creative Museum and Making Museum* projects, creativity is defined as: “The ability to transcend traditional ideas, rules, patterns, and relationships to create new ideas; originality or imagination.” Ref: www.dictionary.reference.com

See Sunderland Bowe, Jo, (author), Siung, Jenny, (ed.), *Analysis of Best Practice, The Creative Museum, creative-museum.net/*, p. 9.

Creativity

In the education sector creativity has multiple interpretations and currently is referred to in curriculum reform. One such interpretation sees it as such:

“Imaginative activity fashioned so as to produce outcomes that are both original and of value.”

Ref: *All our Futures: Creativity, Culture and Education*, National Advisory Committee on Education Creative and Cultural Education, Report to the Secretary of State for Education and Employment the Secretary of State for Culture, Media and Sport, 1999, UK, pp. 28-30.

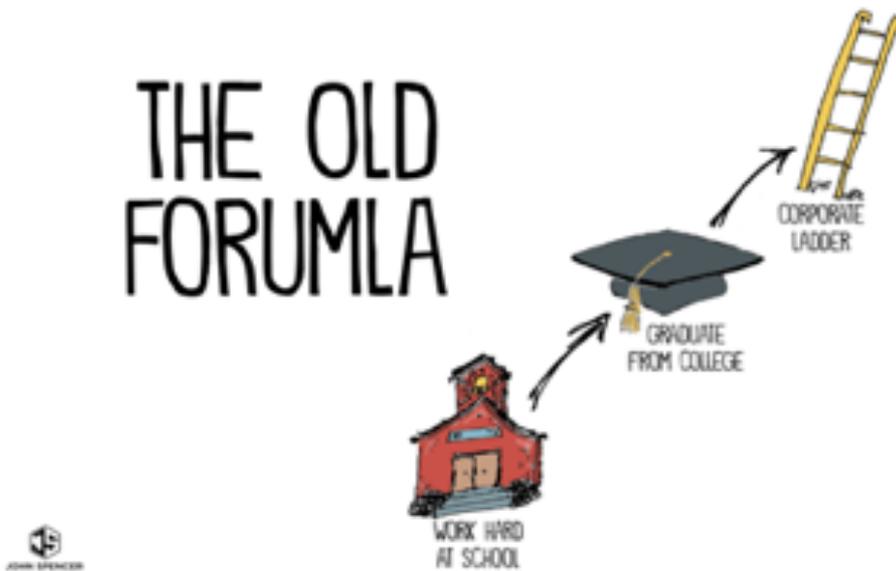
Within the museum sector, professionals, primarily those engaged with learning and audience engagement and collections management, are required to think ‘creatively’ on a day-to-day basis and to look outside the sector for inspiration, collaboration, partnerships and for funding. However, creativity may differ for other practitioners and this was explored and identified when working with science centres, digital, creatives and makers. Creativity is expressed through a number of ways including co-creation, ideation, hackathons or take overs of spaces and co-creating interpretations of ideas in teams as well as Maker Fairs. Many of these terms are new outside of the sector and there is a glossary of terms available see pp 12-13.

Moving from traditional vs creative/critical thinking mind-sets in school

Jenny Siung, Chester Beatty

According to teacher and author John Spencer, many schools recognise the need to prepare students for the future especially in the field of technology e.g. Artificial Intelligence, nanotechnology, 3D printing and code. However the future is difficult to predict with multiple layers of complexity and therefore it is better to prepare students for the present, develop their soft skills where machines lack in this ability to read situations using human emotions. Collaboration and empathy are key skills for students with divergent skills who need to be able to respond to an ever-changing world. Students require to be able to slow down, assess and use creative and critical thinking skills when reading the world around them. Spencer calls this *Vintage Innovation*; a combination of human qualities and abilities with technology and innovation. For many, the linear trajectory our parents and previous generations evolved from school to university and into the corporate work place is no longer relevant.

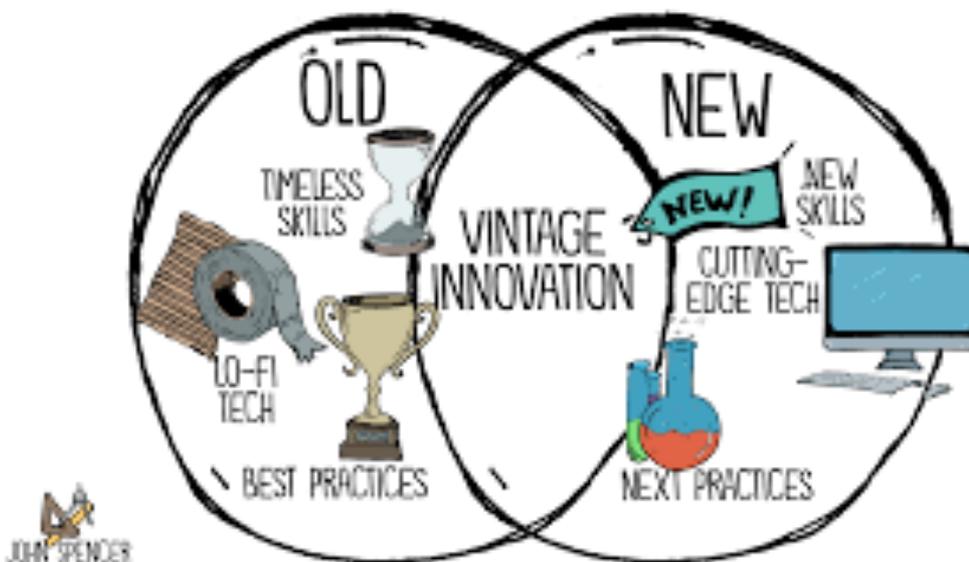
THE OLD FORUMLA



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Now students need to utilise a multitude of skills in order to negotiate the world and classroom. Yet teachers also face challenges; how do they innovate if they lack access to the latest technology? Students and teachers require a combination of old and new learning approaches that complement each other. Spencer sees teachers as innovators with the ability to create new learning opportunities for their students. Teachers need to give students a space to innovate, experiment, express their voice and move away from a restrictive curriculum. This is reflected in the current reform of education in each of the partner countries; from didactic to innovative teaching and learning; from education policy to grassroots; from the margins to the core in collaborative programmes as reflected in the case studies presented in this analysis.

The case studies presented in this report reflect creative and critical thinking both in the classroom as well as the museum and science centre, maker spaces and beyond.



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Critical thinking skills

The simple definition of critical thinking is the ability to solve problems.

In the 21st century classroom the 4 Cs are prevalent in the promotion and development of critical thinking skills.

The 4 Cs - What are they?

- Critical thinking
- Creativity
- Collaboration
- Communication

In the education and school sectors critical thinking is often supported by other key skills such as creativity, communication and collaboration. For example, Junior Cycle Key Skills in Ireland.

Covid Culture

Jenny Siung, Chester Beatty

While writing this analysis, a global pandemic broke out at the end of 2019 and 2020. The new term *Covid Culture* emerged. How can creative and critical thinking lend itself to the *Creative School* project especially during prolonged times of closure of arts, cultural, science, heritage and educational organisations?

Many institutions lost visitors to their cultural sites overnight and quickly had to create new online digital content for audiences. This move from on-site to online particularly for engagement with teachers and students in school includes areas of focus for many organisations:

- Learning from home – online learning
- Working from home
- Preparation for exams
- Health and wellbeing
- Digital platforms
- Support for the sector
- Virtual school trips

Members of the global maker community contributed to supporting the medical community at the height of the pandemic and collectively sought to design ventilators as well as face shields combining STEAM and 3D printing. Some of the members of the *Creative School* project were directly involved including Cap Sciences and Radiona.

Lockdown of schools has had a huge impact on students' progression in learning and their academic year. Some research has been carried out such as the British Council which conducted online surveys in April and May 2020 to find out what the immediate needs and experiences of teachers of English and teacher educators were during the Covid-19 pandemic. Feedback ranged from 51-150 countries with over 9600 teachers surveyed. One report found that for most teachers remote teaching was new for the majority of them yet were confident to carry out their work online. Training was identified as a need to support this yet it was noted there is a gap in digital access for both students and teachers, e.g. poor connectivity and how to maintain prolonged engagement with students to support their learning needs as well as support parents and caregivers as they became critical in the support of students learning from home.

Ref: *A survey of teacher and teacher educator needs during the Covid-19 pandemic, April-May 2020*, The British Council, Teaching English, www.teachingenglish.org.

The support for teachers and students online differs greatly for each of the partner countries. What will the long-term impact of this shutdown be on students? Schools are not built to deal with extended shutdowns and yet this disruption has forced teachers and the education system to explore alternative ways of teaching. How will students make-up for lost time and regression in their learning? Can cultural, heritage, creative and scientific sectors lend to the support of teachers and students in this crisis? As society slowly reopens public spaces and schools what will learning look like in a post-pandemic world? The education sector is faced with new challenges in the management of classroom-based learning. Current discussions include a combination of learning onsite and online teaching known as blended learning. These are just a few issues raised during the course of lockdown and over time creative solutions may address some of these concerns.

2.1 Summary of analysis of case studies

A set of good practices

Jenny Siung, Chester Beatty

A number of case studies were provided by project partners to give an overview of examples across Europe including Austria, Croatia, Finland, France, Ireland, Italy and the UK.

These, as well as additional examples will be discussed, shared and give project partners insight to the current state of creative and critical thinking both in schools and the cultural, heritage, creative and scientific sectors. The project also plans to disseminate these examples as well as collate from partner country's networks across Europe and worldwide. All of this will inspire project partners to discuss and assess the current climate as well as how best to utilise good practice in their own respective organisations and networks. As these are examples, the project acknowledges this list is non-exhaustive.

Five key themes or categories were identified in the analysis of the examples submitted by partners. These are as follows:

Type 1: Museum-School Partnerships and Resources

Workshop, short project or one-off event where schools engage with the collection facilitated by a member of museum staff, educator or specialist. The museum facilitates creative and critical thinking skills in the design and facilitation of these partnerships as a means to inspire learning for both the institution and schools. These partnerships specifically link the curriculum to the museum collection as a means to reflect key skills taught in the curriculum as well as bridge the school and the museum. Resources are often developed as a key outcome of partnerships for teachers and students to access online.

Type 2: STEAM, City Councils and Maker Spaces collaborations, Maker Fairs and Festivals

STEAM combines science, technology, engineering, arts and maths and is prevalent in the educational sector as a means of cross-curricular approaches for both teachers and students. It originates from STEM learning (science, technology, engineering and maths) incorporating the arts. STEAM promotes better problem-solving skills, increased creativity and innovation for students.

Collaboration between city council public libraries and local maker spaces and offer users access to electronics, robotics, 3-D printing, as well as metal-working, woodworking, traditional arts and craft. These are available in library spaces or converted mobile library units.

The Maker culture represents a technology-based extension of the Do-It-Yourself concept, concerned with physical objects and the creation of new devices. Typical interests include engineering-oriented pursuits such as electronics, robotics, 3-D printing, and the use of computer

numerical control tools, as well as more traditional activities, such as metal-working, woodworking, traditional arts and crafts. The first Maker Faire was held in 2006 in San Francisco. See www.makerfaire.com/makerfairehistory.

Type 3: Workshops and Creative Spaces

Spaces within a heritage site, museum, science museum or creative space dedicated to creativity where audiences can participate in creative processes. These can include spaces with specialist facilities and technology such as FabLabs (Fabrication Labs), MediaLabs, Living Labs or Digital Spaces. These are often seen as places for free experimentation.

Type 4: Collaborative initiatives

Invited partners engage with the museum, heritage site or science museum over a period of time, work collaboratively with staff; co-curated exhibition, display, dedicated piece specific to learning. Often the museum and relevant organisation works with an external partner to enable this collaboration. These can be initiated by city councils, city libraries, universities, local networks for regions as well as European-funded projects e.g. Erasmus+.

Table of Case Studies

Type 1: Museum-School Partnerships and Resources	
Waterloo200, Culture24, the University of Kent and the Historical Association, UK	<i>The Age of Revolution</i>
Manchester Museum, UK	<i>Shabtis in School</i>
Ars Electronica, Austria	<i>Create Your World Tour</i>
The National Library, Finland	<i>Finna Classroom</i>
Leeds, UK	<i>Leeds Curriculum</i>
Chester Beatty, Ireland	<i>Chester Beatty Intercultural Schools programme</i>
Istituto centrale per il catalogo unico delle biblioteche italiane, Italy	<i>From an object tell your school</i>
Acs Visconti – Plesso Gianturco, Acs Bonghi, Acs Crispi, Associazione culturale Go Tell Go, Rome, Italy	<i>The body as a research device</i>
Type 2: STEAM, City Councils and Maker Spaces and Maker collaborations	
Dublin City Libraries & Dublin Maker, Ireland	<i>The Maker Bus</i>
FabLab Zagreb	<i>Zagreb Maker Faire</i>
Kontejner, Croatia	<i>Touch Me, Extravagant Bodies and Device_art Festivals</i>

Radiona Makerspace and Technical Museum Nicolas Tesla, Zagreb, Croatia	<i>STEAM in the museum context</i>
Ars Electronica, Austria	<i>CoderDojos</i>
Type 3: Workshops and Creative Spaces	
IVE, Leeds, UK	<i>Creativity Labs</i>
Ars Electronica, Austria	<i>OTELOS Open Technology Laboratories</i>
Ars Electronica, Austria	<i>Machine Learning Studio</i>
Association of museums and centres for the development of scientific, technical and industrial culture (AMCSTI), France	<i>Mediation and criticism</i>
Chester Beatty, Ireland	<i>Creative Labs for Teens</i>
Type 4: Collaborative initiatives/projects	
The School of Classics at the University of St Andrews, Scotland, UK	<i>Through the Glass Darkly</i>
Crafts Council, UK	<i>Make your Future</i>
University of Vienna, Austria	<i>Kinderuniversität</i>
The Playful Learning Center, Faculty of Educational Sciences, University of Helsinki, Finland	<i>Joy of Learning Multiliteracies (MOI)</i>
Aboa Vetus & Ars Nova, Museum of Technology, Humak University of Applied Sciences and Junior Achievement, Finland	<i>Museums as Innovation Platforms</i>
Cap Sciences (Bordeaux), Espace Mendès France (Poitiers), Lacq Odyssee (Mourenx) and Récréasciences (Limoges)	<i>Untangles the True from the False Curieux!</i>
Ministry of National Education, France	<i>Réseau Canopé : Workshops and Resources</i>
Arts Council of Ireland	<i>Creative Schools</i>
Dublin City Arts Office Ireland	<i>Permission to Wonder</i>
UR INSTITUTE Dubrovnik, Croatia	<i>Science Underground Academy</i>
Petit Philosophy (Zadar, Croatia), and partners; STePS (Bologna, Italy), Faculty of Theology, University of Ljubljana (Slovenia), Internet Now! (Athens, Greece), Centre for Integrative Bioethics, University of Split (Croatia)	<i>BEAGLE</i>



Cap Sciences (Bordeaux, France), coordinator; Association Museomix (Lyon, France); Radiona (Zagreb, Croatia); the Finnish Museum Association (Helsinki, Finland); Chester Beatty (Dublin, Ireland); Istituto per i Beni Artistici Culturali Naturali (Bologna, Italy); STePS (Bologna, Italy); Studio Inspired by Coffee (Amsterdam, The Netherlands); Museene i Sør-Trøndelag (Trondheim, Norway) and Heritec (Lewes, UK)	<i>The Making Museum</i>
The Union of Associations MULTIKULTURA (Poland), Foundation Poezja (Poland), Amitié (Italy), CCL – Centre de Conservation du Livre (France), Scierter Espana (Spain), Hellenic Regional Development Centre (Greece)	<i>eMultipoetry</i>
Faculty of Theology, University of Ljubljana (Slovenia), include the following partners: Osnovna šola Valentina Vodnika (Ljubljana, Slovenia); Osnovna šola Šmartno Pri Litiji (Slovenia); Kirchliche Pädagogische Hochschule (Graz, Austria); Association Petit Philosophy (Zadar, Croatia), Friedrich-Alexander-Universität Erlangen-Nürnberg (Germany); Bundesverband Ethik e. V. (Marburg, Germany); STePS (Bologna, Italy); Rambla Abogados & Asesores (Palma de Mallorca, Spain)	<i>ETHIKA</i>
Universidade de Tras-os-Montes e Alto Douro (Portugal) coordinator, Universidad de Santiago de Compostela (Spain), Università degli studi Roma Tre (Italy), University of Western Macedonia (Greece), University of Thessaly (Greece), University College Dublin/National University of Ireland (Ireland), Katholieke Universiteit Leuven (Belgium), UC Leuven (Belgium), Siuolaikini Didaktiku Centras (Lithuania), Vysoka Skola Ekonomicka V Praze (Czech Republic), Academia de Studii Economice Din Bucuresti (Romania)	<i>Crithink Edu - Critical thinking across the European Higher Education</i>
CIEP, a Centre for Education Studies affiliated with the French Ministry of Education include the following partners: Euroclio, a European Association of History Educators, CESIE, a European Centre of Studies and Initiatives, Kazerne Dossin (Belgium); the Shoah Memorial (France); Jewish Historical Institute (Poland), the Holocaust Education Trust Ireland and Institute for Holocaust Education (Austria)	<i>Rethink: remembrance education for THINKing critically</i>
Budapest History Museum (Hungary),: Museums and Library Headquarters of the East Lothian Museums Service (UK), the Memory Archive Cultural Association (Italy), Amitié (Italy), and the Fratelli Alinari Museum of the History of Photography (Italy)	<i>Fotomemoria</i>

2.2 Glossary of terms

Blended learning

A combination of online and onsite learning with teachers and students.

Co-creation

Collaborative making with others.

CoderDojo

A global volunteer-led community of free programming workshops for young people aged 7-17 years.

Digital engagement

Digital engagement in museums has an incredibly broad sphere of activity and is a rapidly expanding area within museum practice. It can include anything from a museum website, social media, online collections, digitisation, interpretation, mobile applications and e-learning tools. Increasingly it has become more about attracting and connecting to modern digitally savvy audiences with their ready-to-hand tools.

Digital making

The making of any product using digital technology e.g. music, games, applications and visual art.

DIY/DWO/DIT

Do-it-yourself/Do-it-with-others/Do-it-together

Hackerspaces / Hackerthons

A hackathon (also known as a hack day, hackfest or codefest) is an event in which computer programmers and others involved in software development and hardware development, including graphic designers, interface designers and project managers, collaborate intensively on software projects. See www.hackdaymanifesto.com and www.medium.com/hackathons-anonymous/wtf-is-a-hackathon92668579601#.5rbabmtdi. Museums host hack days to generate content and new ways of engaging with collections.

Ideation

The making of ideas or concepts.

Incubator

A space to support futuristic thinking and the development of ideas

Makers and Maker Fares

The Maker culture represents a technology-based extension of the Do-It-Yourself concept, concerned with physical objects and the creation of new devices. Typical interests include engineering-oriented pursuits such as electronics, robotics, 3-D printing, and the use of computer numerical control tools, as well as more traditional activities, such as metal-working, woodworking, traditional arts and crafts. The first Maker Faire was held in 2006 in San Francisco. See www.makerfaire.com/makerfairehistory.



Maker Spaces, MediaLabs and FabLabs

The rise of the Maker culture is closely associated with the rise of hacker spaces, FabLabs (Fabrication Labs) and other maker spaces, of which there are now many around the world. Many museums are building specific spaces within their environments dedicated to the type of creativity inspired by maker culture. The Maker Map is a directory of Maker spaces around the world including those located in museums: www.themakermmap.com

Makethon

A makethon is an intense period of design and creativity usually lasting three days. During that time, teams of people with diverse skills are challenged to innovate, design and prototype.

Object based learning

A student-centred learning approach that uses objects to facilitate deep learning.

Open Source

Software of which the code is available for use without restrictions.

STEM/STEAM education

Is an integrated curriculum based on combining Science Technology Engineering Maths (STEM) and Arts included in the same acronym for STEAM.

Think tanks

A policy or research institute that carries out research on specific areas including social policy, political strategy, economics, technology and culture.

Visual thinking strategies

VTS supports learners to respond to an image from their own point of view, using a structured and open ended discussion as the gateway to understanding the image rather than offering information.

Learners are encouraged to think speculatively, to acknowledge and build on what members of their peer group are saying, and to build confidence and competence in their own ideas and evidence building.

Ref: *Permission to Wonder* project Webinar 11 May 2020

Workshop examples

Bio hacking is about optimising one's life and body, through the use of technology, biology, holisticresearch and personal experiments Ref: superhumantalks.com/biohacking/

Biomimicry is a practice that learns from and mimics the strategies found in nature to solve human design challenges ref: biomimicry.org/what-is-biomimicry/

Sound art or sonic art focuses on sound as the main output or element of a creative process.

Circuit bending is the process of using existing electronic items to create other items

Zoetrope a device in the form of a drum when turned gives the illusion of a subject in motion.

Robotics technology, design and construction and operation of robots.

Arduino an open source electronics platform and the software used to programme.

3. Good practices on Creative and Critical Thinking

3.1 Type 1: Museum-School Partnerships and Resources

The Age of Revolution, Waterloo200, Culture24, the University of Kent and the Historical Association, UK

The Age of Revolution project teamed up with ten museum-school partnerships to develop innovative, curriculum-linked digital making projects, based on museum collections. The project provides unique, curriculum-linked resources for teaching and learning about the extraordinary people, events and ideas of this period (1775 – 1848). It aims to encourage and support primary and secondary schools across the UK in teaching and learning about aspects of the period, with a particular focus on developing students' historical, creative, digital and critical thinking skills. The resources centre on a unique online *Revolutionary Collection*.

Digitised items of revolutionary-related themes were carefully selected from museums and galleries across the UK. Each object is accompanied by clear and concise information for teachers alongside fascinating facts to hook even the most uninitiated into this historical period and its legacies. The *Revolutionary Collection* is linked to a suite of learning materials for teachers, with strong links to the history, English, art and design, computing and technology curriculum.

Link: ageofrevolution.org/

Contact: ageofrevolution.org/about/team-partners/

Shabtis in Schools, Manchester Museum, UK

Shabtis are small figures usually found in ancient Egyptian tombs. Imagine what you could do with a real ancient Egyptian artefact in your school? *Shabtis in Schools* is an innovative collaboration between museum curators, educators and teachers that installs single mummy-like funerary figures into schools. The programme aims to:

- Develop new, more collaborative and in-depth ways of working with schools
- Empower teachers to use object-based learning across the curriculum and plan their own collaborative project
- Promote students' cultural capital

Activities in schools range from family and community events; collaged modern-day *shabtis* doing 21st century jobs; and replica *shabtis* made of soap and clay. Students' critical thinking was facilitated through a student project newsletter, heated debates about repatriation with the museum's curator, a child-led exhibition in our *Inflatable Museum*; an immersive flexible activity area and high quality AV equipment, the immersive learning environment where students handle real objects from the museum's collection and create memorable and inspiring learning experiences.

Link: mmhellofuture.wordpress.com/2019/08/29/shabtis-in-school/
youtu.be/z4FFGBciKGM

Contact: Hannah-lee.Chalk@manchester.ac.uk, Learning Manager, Manchester Museum

Create Your World Tour, Ars Electronica, Austria

Ars Electronica offers schools in Austria the opportunity to actively engage students in creative and critical thinking. *Create Your World Tour* takes place within the formal school environment and offers programmes on various topics. A workshop programme is offered in selected schools and institutions that brings the contents and ideas of the Ars Electronica platform u19 – *Create Your World* to schools. The aim of the tour is to offer students and teachers opportunities for alternative learning and teaching and to playfully lay the foundations for new ideas and projects in schools. Students are encouraged to develop alternative learning skills. The tour workshops are usually conducted by regional artists or creative professionals. Teachers can use the workshops as further training with current content. The methodology embodies the idea of peer education by inviting prize winners from Ars Electronica's u19 competition to participate in the workshops and work alongside their peers on similar programmes.



Photo: Florian Voggeneder

VR ars.electronica.art/createyourworld/de/vrs-virtual-real-space-erkenntnispiel/
Music:Lab ars.electronica.art/u19/de/mobile-musiclab/
VR Space ars.electronica.art/u19/de/vrs-der-ferngesteuerte-m
Contact: cyw@ars.electronica.art

Finna Classroom, Finland

Finna.fi is a popular nationwide search service collating digital treasures from Finnish archives, libraries and museums to a dedicated website. The National Library will open a *Finna Classroom* website for teachers on *Finna.fi*. Primary and secondary school teachers can select from customised curriculum packages online for history, social studies, mother tongue, literature, and fine arts. With the help of materials and ready-made assignments, students can become acquainted with a range of topics from prehistoric mystery objects, the history of the Skolt Sámi, to the bear in Finnish art., Students have first-hand access to sources and experience the significance of cultural heritage. The service is suited for teaching multi-literacy skills. Teachers have access to materials specific to different disciplines and subjects. In *Finna.fi* teachers can teach their students safe and ethical information retrieval and management in an inspiring way. Utilising these different materials in lessons deepens a broad understanding of the text, supports critical thinking, and guides students to use diverse sources of information.



Photo: Bernhard Åström, 1921. Svenska litteratursällskapet i Finland. Original CC BY 4.0. Picture modified. https://finna.fi/Record/sls.SLS+1555_SLS+1555_1080.

Link: www.finna.fi
Contact: Taru Kuhalampi, Kansalliskirjasto, taru.kuhalampi@helsinki.fi

Leeds Curriculum, UK

Leeds Museums and Galleries (LMG) have developed a place-based Leeds Curriculum which draws on information and resources from over 40 arts, cultural and community organisations across Leeds, and developed with c.30 primary schools.

The curriculum can be used by primary teachers to teach any primary curriculum subject. The content is linked to the past, but also highlights a contemporary issue in the city today. The stories cover a geographical, chronological and diverse range and co-produced with communities. Each story contains images, films, oral histories, archives, access to accessioned museum objects and resources drawn from arts and cultural providers across Leeds. The stories fulfil the National Curriculum and is accessible on a website hosting free national teaching resources. The curriculum is a strand of the *Leeds Cultural Strategy* programme, and is the first collaborative programme of the *Leeds Cultural Education Partnership*.

LMG offer loans boxes of accessioned museum objects, workshops and continuous professional development reaching c. 80 schools and 9000 children.

Link: mylearning.org/collections/leeds-curriculum

Contact: Kate Fellows, Head of Learning and Access, Leeds Museums and Galleries, kate.fellows@leeds.gov.uk

Chester Beatty Intercultural Schools programme, Ireland

The Chester Beatty Learning and Education Department launched its first intercultural museum programme for primary and post-primary schools in Ireland and Northern Ireland in 2020. The programme aims to equip teachers with tools to help children from diverse backgrounds connect with their community and contribute to their sense of identity, which is central to their development. It provides teachers with easy access to the museum collections, breaking down the challenges of unfamiliar cultures, and empower them to use free learning resources to



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promote creative and critical thinking tools with children in primary and post-primary schools.

Partners of the research and development phase include third level institutions, a support service for schools in Northern Ireland and education consultancy. A number of key outcomes were identified to support students and teachers accessing the Chester Beatty Collection.

Newly designed tours promote creative and critical thinking whereby students are encouraged to share their thoughts to stimulate peer-to-peer learning

Link: chesterbeatty.ie/learning/schools-programme-3/

Contact: Jenny Siung, Head of Education, jsiung@cbl.ie

Justyna Chmielewska, Education Officer, jchmielewska@cbl.ie

From an object tell your school, Digital Museum for Italian Schools, Istituto centrale per il catalogo unico delle biblioteche italiane, Italy

This digital storytelling project was created by students and teachers to reflect the cultural heritage of schools through objects and upload on to an online digital museum.

What are the prerequisites for starting a digital school museum? In Italy there are about 20,000 schools, each of which holds a unique heritage. Schools contain objects that reflect the history of teaching, the school, the region, shared histories and memories. The digital museum is intended for schools, journalists, art historians, craftspeople, tour guides, pedagogy historians and the model can be replicated on a European level.

To-date 5 primary and post-primary schools have participated in the project from 4 regions in Italy. The project has introduced students to multimedia and visual communication tools in the production of audio, video and image galleries. They have competencies to use and reuse digital resources as well as engage in group learning, learn about the school environment, harness creative and artistic competence and the value of cultural heritage.

Link: movio.beniculturali.it/iccu/daunoggettoraccontalatuascuola/it/59/roma-parole-e-immagini-muri-o-ponti

Contact: ic-cu@beniculturali.it



Photo: Portal of the Digital Museum, ICCU

The body as a research device, Acs Visconti – Plesso Gianturco, Acs Bonghi, Acs Crispi, Associazione culturale Go Tell Go, Rome, Italy

This project enables students to become more aware of the complexities of the world they live in by using the five senses. The project was carried out with many schools and divided in two phases:

- Phase 1 involved interactive workshops developing awareness of the environment students live in the city.
- Phase 2 took place in the neighbourhood of the school. Students walked around the area using their 5 senses to make sense of the space.

The Association produced a set of guidelines in Italian to read the urban landscape:

www.schooltraveller.org/suggerimenti-per-leggere-il-paesaggio-urbano-1-il-corpo-come-dispositivo-di-ricerca/. The experience was successfully replicated with teachers in a summer school

about the flipped classroom methodology, many of whom will adopt the methodology in their classrooms. The walking tour becomes a personal experience where each participant interprets the city according to their senses and produces their own creative personal map.

Link: www.citytelling.org/it/66/esplorare-il-territorio-utilizzando-i-cinque-sensi

Contact: associazione@gotellgo.org



Photo: Go Tell Go Association

3.2 Type 2: STEAM, City Councils and Maker Spaces collaborations

The Maker Bus, Dublin City Libraries, Ireland

The Maker Bus is an initiative organised by Dublin City Libraries under the management of Dublin City Council. The bus is a re-used mobile library unit and modified to support a mini mobile maker space for use in spaces such as festivals, schools and family days. Dublin City Libraries offer programmes in science, technology, engineering and maths (STEM) for children and young people. *The Maker Bus* is an extension of this service and delivers STEM sessions off-site. Dublin City Libraries invited local makers to advise on the unit and design its content. The *Maker Bus* delivered workshops to a teacher education course in Dublin City University. Dublin City Libraries has a number of guiding principles:



© Dublin City Libraries

- A space for learning
- The joy of reading
- Libraries are free
- Equality and diversity
- Changing needs and expectations
- Creativity and innovation

It is these key principles that mirror good practice particularly around the area of modifying public library spaces to support creative and critical thinking of its local community.

Link: www.dublincity.ie/main-menu-services-recreation-culture/dublin-city-public-libraries-and-archive

Contact: Angela Cassidy Dublin City Libraries angela.cassidy@dublincity.ie

Zagreb Maker Faire, Croatia

FabLab Zagreb, Croatia was founded to promote new technologies in digital fabrication. It offers 3D scanning, 3D printing, laser, CNC (computer operated cutting machine) and various tools. FabLab has established international cooperation with numerous projects with education as its main focus and activities. FabLab organised the first Croatian Maker Faire in 2019. It was the first time for the *Croatian Maker Faire* to participate in this well-known global event.



Photo: Radiona

Zagreb Maker Faire aims to promote maker culture and STEM. It is free of charge and open to the public with the opportunity to engage with makers and craftspeople. In

2019 over 8000 visitors attended Maker Faire in 2 days and included diverse exhibitors from Austria, Bosnia and Herzegovina, Italy, Slovenia, and Serbia. The exhibitors range from makers, technology to traditional arts and crafts and STEAM oriented exhibitors.

Link: www.zagreb.makerfaire.com

Contact: mfz@fablab.hr

Kontejner: Touch Me, Extravagant Bodies and Device_art Festivals, Croatia

Device_art is an international festival featuring technological devices, machines and robotics in contemporary art. From 2004 the festival has explored and investigated technological devices as an artistic medium through the intersection of different artistic scenes and in the format of a triennial interdisciplinary festival programme in Croatia and internationally. Two examples of this format are *Touch Me* and *Extravagant Bodies Festivals*. *Touch Me Festival* explores the interconnection between art and science through themes that engage and inspire contemporary artists and scientists in the field of biology, chemistry, physics and mathematics. *Extravagant Bodies* is an international triennial art festival initiated in 2007. It looks at social demarcations of normal and pathological, be they concerned with corporeality, appearance, behaviour, sexuality or lifestyle. All of the festivals are located in a number of local museums in Zagreb. The project aims to present new and sometimes controversial practices in the museum context in order to gain and educate new audiences.

Link: www.kontejner.org/en/projekti/touch-me

Contact: kontejner@kontejner.org

STEAM in the Museum Context, Radiona – Zagreb Makerspace and Technical Museum Nikola Tesla, Croatia

This collaboration commenced in 2012 between Radiona, Zagreb Makerspace and Technical Museum Nikola Tesla to open museum practices to maker communities, new media and hybrid arts, as well as develop an education programme on Do-it-yourself/Do-it-with-others/Do-it-together scene. As part of the collaboration, Radiona and the museum have co-developed STEAM education programmes facilitated by local and international makers/artists for all age-groups developing creativity and hands-on skills. A number of master classes are held covering bio hacking, sound art, circuit bending, zoetrope, 3D e-picture books, el3ctro dwarfs, AV hacking, robotics, lighting objects and Arduino.

The *STEAM in Museum Context* has seen an increase in audience participation as well as provide access to creativity in technology and innovation.

The lab has exhibited artefacts made in collaboration with four municipal museums across Croatia. This provided Radiona the opportunity to showcase their work to smaller cities with similar practices in media arts and maker culture in the museum context.

Link: radiona.org

Contact: radiona.org@gmail.com ; info@tmnt.hr



Photo: Radiona

CoderDojos, Ars Electronica, Austria

CoderDojo is a global movement of free, volunteer-led, community-based computer programming clubs for young people. Children can visit a *Dojo* where they learn to code, build websites, create apps or games, and explore technology in a creative and social environment. The first *CoderDojo* was launched at the National Software Centre, Cork in 2011. The initial sessions were immensely popular the founders decided to open source the model; thousands of dedicated Champions and Mentors set up more *Dojos* across the world, making the *CoderDojo* movement a global phenomenon. There are now more than 1,900 verified *Dojos* in 93 countries, with new *Dojos* starting almost every day.



Photo: Philipp Greindl

Common discovery, teamwork, mentoring as well as self-organised learning and experimentation are in the foreground in the *CoderDojo*. Openness, mutual help and the passing on of acquired knowledge are important basic principles. However, the promotion of creativity and the enjoyment of technology is the key priority.

Link coderdojo.com

Contact: info@linz.coderdojo.net

CoderDojo Linz, Austria: Participation in the Linz *CoderDojo* is aimed at children and teens aged 8-17 years. Prior knowledge is not necessary and meetings usually take place on a weekly basis. Children and teens meet with technically experienced mentors who work on a volunteer basis. They guide participants together to programme, develop their skills, encourage them to discover and be creative independently. A key component of *CoderDojo Linz* is all projects must be fun, cool and participants can explore all kinds of subjects ranging from games, electronics, apps or websites - everything is possible



Photo: Otelo Linz

Mentors ensure project content is suitable for children and adhere to good child safeguarding practice. Working with social networks such as Facebook or Twitter is allowed, so that children and young people learn how to use them responsibly with the help of mentors e.g. children aged above 13 years can access Facebook. Participation is free of charge and *CoderDojos* mentors do not receive payment for their mentoring. *CoderDojos* are supported by donations, sponsorship and grants. If children want to do projects that require special hardware e.g. Lego Mindstorms, TinkerForge or software e.g. Minecraft, parents are requested to pay for the costs of hardware and software.

Link: coderdojo-linz.github.io

Contact: info@linz.coderdojo.net

3.3 Type 3: Workshops and Creative Spaces

IVE Applied Creativity Labs for Young Inventors, Leeds, UK

IVE is a progressive training company that places human creativity at the heart of business productivity and innovation. Their *Applied Creativity Labs* (ACL) enable children and young people to work with experts using newly acquired creativity skills to find innovative solutions to real world challenges.

IVE has taken their Creative Leadership Training to schools to enable young people to re-establish their creativity mind-set and actively contribute positively to society. *Applied Creativity Labs* are focused on various aspects of climate change. The *Applied Creativity Lab* process develops mind-set and metacognition to support students to:

- Become effective, independent learners, and provide them new creativity skills that help them think divergently;
- Develop their problem-solving skills;
- Help them think freely and more creatively;
- Develop their resilience, confidence and independence; their team work; their ability to innovate and critical thinking skills

The Labs help young people apply new creativity skills to develop innovative solutions to real world challenges.

Link: www.weareive.org

Contact: Sarah Mumford sarah@weareive.org

OTELOS, Ars Electronica, Austria

Otelos (Open Technology Laboratory) are inspiring community spaces which invite people to share visions and ideas and make them come to fruition. They are primarily designed for economically underdeveloped areas of Upper Austria, as well as schools or urban environments. *Otelo* is a term firmly anchored in Austria's open space scene.

They offer people free space in which openness, the sharing of knowledge and experience are to the fore. *Otelos* are open spaces with a simple community-financed space concept and an organisation based on charity and voluntary work. People are invited to share visions and ideas as well as knowledge and experience.

These collaborations range from high-bed construction, soap boiling, contribution design for user-generated television, 3D printing, organisation of DenkBars (Thinking Bars), revival of old crafts such as turning or blue printing, repair or sewing cafes, project cooking, etc.

The model has encouraged cross-generational learning as well as the inclusion of marginalised groups such as asylum seekers.

Link: otelo.or.at

Contact: center@ars.electronica.art



Photo: Ars Electronica / Martin Hieslmair

Machine Learning Studio, Ars Electronica, Austria

Machine Learning Studio was established in 2019 for Artificial Intelligence (AI) and Machine Learning -related (ML) contents. Workshops and programmes are available for individual learners and schools.

Machine Learning is a branch of artificial intelligence and deals with algorithms that focus on finding patterns in data. In the *Machine Learning Studio*, visitors use computer vision and machine learning applications to explore how machines learn and perceive the environment.

Together with techtrainers, learners build and train self-propelled model cars, programme robots with face recognition and gain insight to how they can teach these devices various activities. The *Machine Learning Studio* provides insight to the hidden inner workings of our learning devices.

A core objective of the *Machine Learning Studio* is to engage students in hands-on training, as well as critical reflection on AI and ML. This is particularly important at a time when rapidly developing technologies are raising new ethical questions. Students are encouraged to reflect on these topics and express their thoughts and debate.

Link: ars.electronica.art/center/de/philolab-kuenstliche-intelligenz/
ars.electronica.art/center/de/exhibitions/machinelearningstudio/

Contact: center@ars.electronica.art



Photo: vog.photo

Mediation and Criticism workshop, Association of museums and centres for the development of scientific, technical and industrial culture (AMCSTI), France

Mediation and Criticism workshop is a project devised by AMCSTI as part of its response to a thematic debate on science, culture and belief.

This workshop focuses on questions of critical thinking, discernment between belief and knowledge, the scientific approach, the construction of beliefs and mediation techniques.

Through meetings and feedback from professionals, AMCSTI has measured the strength and frequency of the questioning of knowledge resulting from scientific work by some people. AMCSTI acknowledges the need for adaptable mediation techniques for facilitators. The *Mediation and Criticism* workshop consists of the following:

- A platform with accessible and available resources;
- Pathways to address these topics and share resources;
- A focus on and clarification of scientific topics;
- A diverse community of stakeholders who contribute to collective reflection by bringing their expertise to the topic.



Photo: Cap Sciences

Photo: Cap Sciences

There are four themes as part of these workshops including *Mediation Techniques, Knowledge and Belief, Beware of your Reasoning* and *Mechanisms of Belief*.

Link: www.atelier-mediation-critique.com

Contact: contact@atelier-mediation-critique.com

Chester Beatty Creative Labs for Teens, Ireland

Chester Beatty's Creative Lab for Teens is an in-house programme for young people aged 12-17 years. It was established in 2014 in parallel with the EU-funded project *The Creative Museum* (2014-2017).

Through this collaboration, the sense of being able to DIY (do-it-yourself) is now a central part of the programme; museum objects are interpreted in a creative, experimental way while developing new skills for participants. It is funded by City of Dublin Youth Service Board which provides support, training and funding for youth work and clubs. *Chester Beatty's Creative Lab for Teens* aims to create a safe-space for unlocking creativity and critical thinking, while promoting self-expression and confidence-building in one's own observations and abilities, as well as encourage peer-to-peer learning. The *Lab* is a space where participants are invited to critically and creatively learn and experience new and old ideas. Teens are introduced to world cultures, as well as work with co-ordinators and invited artists/makers.



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The programme was awarded Best Practice in Education in 2017.

Link: chesterbeatty.ie/learning/young-people/

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Justyna Chmielewska, Education Officer, jchmielewska@cbl.ie

3.4 Type 4: Collaborative initiatives

Through a Glass Darkly, the School of Classics at the University of St Andrews, Scotland, UK

Through a Glass Darkly is a research and engagement project within the School of Classics at the University of St Andrews that promotes creative and critical thinking through engaging with the Bridges Archaeological Collection, housed at the University of St Andrews <https://thebridgescollection.com>. The project, which started in 2016 with funding from the Leventis Foundation, began with the digitisation of nearly all the objects in the collection <https://www.sketchfab.com/bridge>, and the creation of replica artefacts by a local potter. Since then the project has worked with schools, prisoners and groups that may face physical or social challenges. Their research focuses on the impact of object-interaction on memory, learning and well-being. An experiment with the Museum of the University of St Andrews found that providing multiple sensory avenues to exploring and understanding objects results in increased critical thinking and engagement. Their schools programme is designed to build drama and literacy skills through archaeological engagement. Workshops encourage students to think critically about cultural heritage and empower them to present their interpretations through creative means.

Link: thebridgescollection.wordpress.com

Contact: Leah Neiman, Research Assistant, *Through a Glass Darkly*, School of Classics, University of St Andrews, lrn5@st-andrews.ac.uk

Make your Future, Crafts Council, UK

The initiative focuses on 3D making at Key Stage 3 (primary school level for children aged 5-6 years) and has a strong focus on craft as a STEAM discipline with projects designed to draw out the applied science, maths and engineering learning that are encountered when working with materials. The project also engages with the idea that students develop 21st century skills through making with their hands; resilience, creativity, collaboration, etc. *Knit: Design: Research:* Students used freehand loop construction processes to explore the effect of material properties on knitted outcomes. They investigated the production of integrally knitted 3D forms using simple algorithms. Using work produced by small groups, the students collaborated to produce one large textile installation. They needed good communication skills to convey their design intentions and be willing to listen to the ideas of others. The project allowed students to experience risk in their work through the production of work with no prescribed outcome. Through reflection on making students considered how these approaches to design can enhance the sustainability of textiles in general and knitted fabric in particular.

Link: www.craftscouncil.org.uk/what-we-do/make-your-future

Contact: Zoe Dennington z_dennington@craftscouncil.org.uk

Kinderuniversität, University of Vienna, Austria

Kinderuni.at or *Kinderuniversität* (Children's University) is one of the most successful STEM learning activities developed by the University of Austria. Children have the opportunity to experience exciting concepts and meet interesting scientists at lectures in large lecture halls or workshops in small groups. They can experience various aspects of university life from study planners to graduates. At the Vienna Children's University, the doors of the following Viennese faculties are open to children aged 7-12 years for the duration of 2 weeks: University of Vienna, Medical University, University of Technology, University of Natural Resources and Applied Life Sciences, University of Veterinary Medicine, FH Campus and University of Economics and Business Administration.

The motto of the Children's University is: "We are turning the university upside down!"

Link: kinderuni-ooe.at

Contact: KinderUni Upper Austria, info@kinderuni-ooe.at

Joy of Learning Multiliteracies (MOI), The Playful Learning Center, Finland

The Joy of Learning Multiliteracies (MOI) research and development programme is designed to promote multiliteracy among children aged 0-8 years. It entails collaboration with professionals working in early childhood education, pre-school and the initial stages of primary education as well as in libraries and the cultural sector. The Playful Learning Centre, part of the Faculty of Educational Sciences at the University of Helsinki, is responsible for implementing the development programme, which is funded by the Ministry of Education and Culture.

The aim of the MOI programme is to develop models (i.e. learning environments and pedagogies) that can boost children’s multiliteracy and reinforce expertise among personnel working with children educational and cultural institutions. This multidisciplinary development programme addresses cultural and gender-related inequalities. It aims to promote every child’s learning opportunities in the area of multiliteracy.

Link: <http://www.monilukutaito.com/en>
<http://www.monilukutaito.com/en/tag/for-educators/> .
<http://www.monilukutaito.com/en/blog/62/anitaidetta-lasten-kanssa>
<http://www.monilukutaito.com/en/blog/39/orutiedetta>

Contact: Kristiina Kumpulainen, kristiina.kumpulainen@helsinki.fi



Photo: MOI – The Joy of Learning Multiliteracies. CC BY-NC 4.0

Museums as Innovation Platforms, Aboa Vetus & Ars Nova, Museum of Technology, Humak University of Applied Sciences and Junior Achievement, Finland

Museums as Innovation Platforms is a two-year project completed in 2018, coordinated by Aboa Vetus and Ars Nova and implemented together with the Museum of Technology, Humak University of Applied Sciences, and Junior Achievement Finland. The project examined how museums can be utilised as a platform for societal activity. The project developed collaboration between museums, higher education, and innovation education, as well as the professional skills and innovation know-how of young adults. The project examined how museums can be utilised as a platform for societal activity and developed collaboration between museums, higher education, and innovation education, as well as the professional skills and innovation know-how of young adults.

The methods developed in the project have been published in the *Developing and Evolving in Museums – Innovation Workbook*.

Link: www.aboavetusarsnova.fi/en/news/the-developing-and-evolving-in-museums-workbook-will-guide-you-to-innovate-in-museums

Contact: Heini Sorakivi, heini.sorakivi@aboavetusarsnova.fi
 Selina Kiiskinen, selina.kiiskinen@aboavetusarsnova.fi

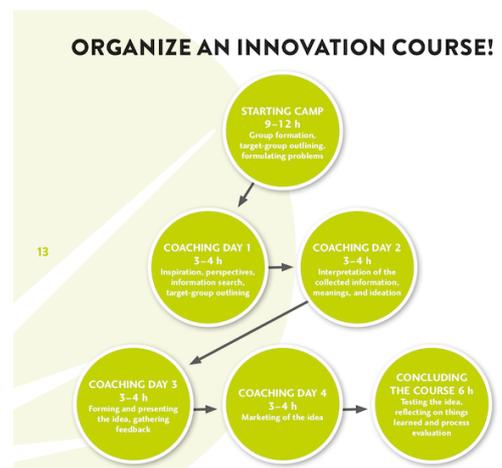


Photo: *Developing and Innovating in Museums – Innovation Workbook*. Ed. Heini Sorakivi. Aboa Vetus & Ars Nova. Humak University of Applied Sciences Publication 90, 2019.

Untangles the True from the False Curieux! France

Curieux ! Untangles the True from the False Curieux! is a new news site aimed to reveal the truth from the false and sharpen curiosity for audiences. It is led by four scientific, technical and industrial cultural centres in New Aquitaine region in the south and southwest of France; Cap Sciences (Bordeaux), Espace Mendès France (Poitiers), Lacq Odysée (Mourenx) and Récréasciences (Limoges). The aim of *Curieux!* is to develop curiosity, creativity and critical spirit of its audience, with particular focus on how to read collective advertising and fake news.

Curieux! leads campaigns and debates on social networks, and considers these platforms the opportunity to enter the world on online debate, integrating its topics, capturing trends and the pulse of society on current issues, integrating communities, challenging preconceived ideas.

Link: www.curieux.live

Contact: contact@curieux.live

Réseau Canopé: Workshops and Resources, France

Réseau Canopé are a series of workshops and resources under the supervision of the Ministry of National Education, Réseau Canopé publishes transmedia educational resources (print, web, mobile, TV) in response to the needs of the educational community in France. *Réseau Canopé* provides support for moral and civic teaching that offers teaching resources, tools and methods.



Photo: Cap Sciences

The aim of the book is to show that all the attitudes and habits that constitute the critical mind can be cultivated whatever the discipline as they are all interdisciplinary. It also takes into account the collective dimension of critical thinking within the institution and its citizens' projects. Intended for teachers, as well as for the educational and management teams of colleges and high schools, it offers concrete answers and various approaches to raise awareness around cognitive issues, ethical, cultural and civilisational of the critical mind, at the level of both class and institution.

Link: www.reseau-canope.fr

Contact: partenariat@reseau-canope.fr

Creative Schools, Ireland

Scoileanna Ildánacha/Creative Schools initiative aims to place the arts and creativity at the heart of children and young people's lives. *Creative Schools* is a flagship initiative of the Creative Ireland Programme. The programme is led by the Arts Council in partnership with the Department of Education and Skills and the Department of Culture, Heritage and the Gaeltacht.

The scheme, which consults young people about the school environment, their experience of arts education and the way in which they learn, is led by a team of Creative Associates, who work with schools to support the development of a creative school plan that is designed to deepen opportunities for artistic expression and enable students to develop their creativity. This initiative will understand, develop and celebrate the arts and creativity in schools. It will establish a



© The Arts Council Ireland

range of collaborative opportunities for schools and develop and strengthen the relationships between schools and the broader cultural and community infrastructure within which they operate.

Link: www.artscouncil.ie/creative-schools/

Contact: Arts Council Paul Collard/Di Fish-Naylor creativeschoolsleads@artscouncil.ie

Permission to Wonder, Sweden, Netherlands, Slovenia, Denmark, Finland, Spain, Ireland

Permission to Wonder is funded by Erasmus + and revolves around visual arts learning and builds on working with schools. The project aims to establish a strategic transnational partnership in Europe that will enable partners from 6 EU countries to develop a structure and methodology for schools to use Visual Thinking Strategies (VTS) as a method in the field of Visual Arts Education.



©The Lab, Dublin City Council Arts Office

“Visual Thinking Strategies (VTS) transforms the way students think and learn. VTS supports learners to respond to an image from their own point of view,

using a structured and open ended discussion as the gateway to understanding the image rather than offering information. Learners are encouraged to think speculatively, to acknowledge and build on what members of their peer group are saying, and to build confidence and competence in their own ideas and evidence building” *Permission to Wonder* project Webinar 11 May 2020.

Link: www.permissiontowonder.com/ and <http://www.dublincityartsoffice.ie/the-lab/vts-projects>

Contact: Liz Coman liz.coman@dublincity.ie

Science Underground Academy, UR INSTITUTE, Dubrovnik, Croatia

Science Underground Academy is described as a boot camp in interdisciplinary, emerging technologies, science and new media art combined with the coolest possible summer vacation programme in Dubrovnik, Croatia. It is a collaborative initiative between the UR Institute, Natural History Museum Dubrovnik funded by the City Council of Dubrovnik since 2014. The goal of *Science Underground Academy* is to tap into the creative potential of scientific and art practices through a coherent story that can bring new and sophisticated technologies closer to the public and more understandable to individuals. It is an intense



Photo: Radiona

educational programme designed to solve multiple problems of formal higher educational systems. The Academy is open to beginners, students and experts in various fields of science and art, and all enthusiasts interested in DIY (do it yourself) experimentation, collaborative work, emerging science and new media art as a hobby or for professional development. It is a programme for anyone who is into unconventional summer vacations in Dubrovnik; a combination of beach and experimentation.

Link: ur-institute.org

Contact: institute@ur-institute.org

BEAGLE, Europe

BEAGLE project was launched in 2018 and focuses on the field of bioethics and values education. It aims to empower education of primary and post-primary school students, teachers and educators by promoting values of critical thinking based on three pillars:



- Ethical values: Ethical issues are observed through the personal values – connection between myself and nature. What can I as a person do?
- Democratic values: Democratic and societal values are dissected through the connection between my society and the nature. What can we do, as a society?
- Environmental values: Bioethical/environmental values are focused on the preservation of biodiversity. How to live in harmony with nature?

The purpose of the project is to develop concrete guidelines for bioethical education that will assist teachers in implementing higher order skills, especially critical thinking. The development of the BEAGLE online archive and bioethical education network will link teachers and educators across an open platform that will optimise the exchange of experiences and encourage faster implementation of innovative methods.

Link: beagleproject.eu

Contact: Pier Giacomo Sola, pgsola@icloud.com

The Making Museum project, Europe



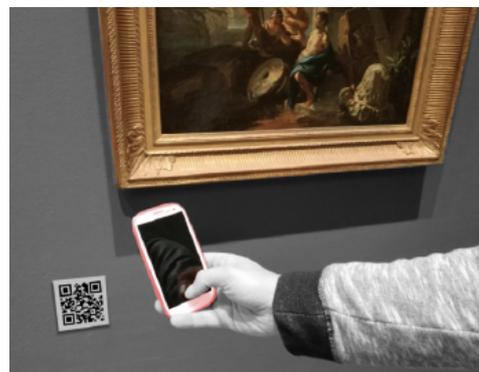
The Making Museum project (completed in 2019), aimed to provide a wider exposure to the output of its predecessor, the Creative Museum project (creative-museum.net) and specifically the Creative Museum Toolkit, which comprises of a series of ideas, actions, methodologies, processes co-designed to enable museum professionals to implement more creative and participatory practices

in their day-to-day work. It also focused on creating new collaborations at local and European level between museum organisations and local communities of makers, innovators, creatives, technologists, and scientists etc., that can bring and disseminate innovation within the museum practices.

One of the project's key activities was the organisation of three *Museomix* (a take-over of a museum by creative, designers, museum professionals, makers, gamers, etc.) events in Caen, Lille and Zagreb. In particular, during the 3-days event in Caen

(www.museomix.org/it//editions/2018/caen-chateau-musee-des-beaux-arts-musee-de-normandie), the Making Museum partners developed the application 'Let them live again'.

The visitors to the Museum of Fine Arts in Caen were presented a symbol near selected paintings indicating to the visitor to engage with the work of art through 'play'. The system allowed visitors to reconsider the meaning of a table, invent a new story, understand the origin of a painting and bring home a memory of the visit experience.



Link: www.museomix.org

Contact: Pier Giacomo Sola, pgsola@icloud.com

eMultipoetry, Europe

eMultipoetry project (completed in 2010) aimed to inspire young Europeans towards poetry and started from the assumption that, in modern society, poetry has lost some of its specific force and vigour. The objective of the *eMultipoetry* project was to develop an innovative form using multimedia technology and introduce multilingual poetry in a way that would widely appeal to young people in Europe.

eMultipoetry was innovative through the development of creative ways of poetic expression, and offered poetry in the form desirable by young generations, e.g. Internet videogames with use of translated lyrics accompanied by readings by the author in original language and visual material presenting cultural heritage. Users could find poems, visual icons, music and cultural heritage from other cultures as inspiration for poetry search, multilingual translation and creative writing.

The project involved educational institutions, software developers, theatre and music groups, radio and TV stations, video games designers, teachers and students.

Link: www.emultipoetry.eu/it/main/

Contact: Pier Giacomo Sola, pgsola@icloud.com

ETHIKA, Europe

The project *ETHIKA* (Ethics and values education in schools and kindergartens), completed in 2017, aims to foster critical thinking skills in children placing it at the centre of a straightforward, easily implementable teaching strategy.

While reflecting on the various challenges of life and searching for meaning, *ETHIKA* advocates a holistic and dialogic approach in personal development. Its teaching material aims to foster critical thinking, dialogue and active participation. In a non-judgmental

atmosphere, teachers and students can explore divergent opinions, discussion of possible choices, find out what is more valuable and learn responsibility.

The most relevant topics addressed by the project are ethics and values education utilising the approach of critical thinking and philosophy with children in order to strengthen the skills of school teachers in this area.

The project has developed a European network of ethics and values education players, including teachers, schools, experts and other organisations. *ETHIKA* has enhanced innovation and internationalisation in the school sector and strengthened cooperation through capacity-building.

Link: www.ethics-education.eu/home/index.htm

Contact: Pier Giacomo Sola, pgsola@icloud.com



Photo: iStockpicture

Crithink Edu Critical thinking across the European Higher Education, European partners

The project aims to improve the quality of learning in universities and across different sectors, which converge in a common need on how better to support the development of Critical Thinking (CT) according to labour market needs and social challenges.

It aims to create opportunity to foster dialogue among relevant actors in a joint industry-university forum, to allow the implementation of a model of CT teaching and learning activities transnationally in the various partners' courses, and to work as a network to promote CT education around Europe.

Crithink Edu project key tasks included to connect higher education institutions, NGO's and companies in order to identify curricular goals and outcomes in critical thinking education; characterise current critical thinking education practices among faculty teaching staff in European higher education institutions; propose a quality assurance criteria for the enhancement of critical thinking education in the higher education institutions; deliver critical thinking training/learning activities for faculty teaching and students from higher education institutions taking in account the proposal of quality assurance criteria for the enhancement of critical thinking education; and disseminate the need of critical thinking education across the European Higher Education curricula.

Link: crithinkedu.utad.pt/en/crithinkedu/

Contact: c/o Professor Caroline Elisabeth Dominguez, crithinkedu@utad.pt



34 Rethink: remembrance education for THINKing critically, European Partners

Recent events and terrorist attacks in Europe have exposed divisions within European society, and in particular a growing tendency to think in terms of 'us' and 'them'. In response a number of European memorial institutions and democracy-building NGOs have designed programmes that promote tolerance and respect towards diversity, while developing media literacy and critical thinking skills.

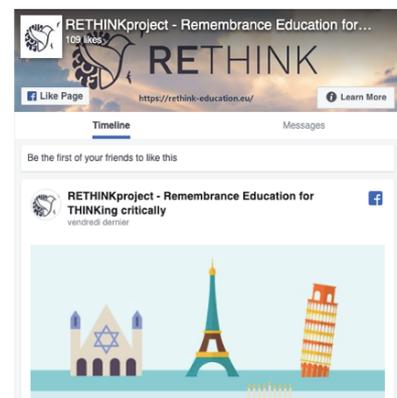
The *Rethink* project aims to support inclusive education by providing educators with innovative tools to challenge prejudices, deepen students' understanding of phenomena such as polarisation and identity, and develop their media literacy and critical thinking skills. Remembrance education, in linking past and present, sheds valuable light on the historical significance of polarised identities, offers insight into European history, and tools to combat intolerance.

The project, coordinated by the CIEP, a Centre for Education Studies affiliated with the French Ministry of Education include the following partners: Euroclio, a European Association of History Educators; CESIE, a European Centre of Studies and Initiatives, Kazerne Dossin (Belgium); the Shoah Memorial (France); Jewish Historical Institute (Poland); the Holocaust Education Trust Ireland and Institute for Holocaust Education (Austria).

Rethink collaborates and delivers a number of outputs:

Link: rethink-education.eu

Contact: The Centre International d'Études Pédagogiques (CIEP)



Critical thinking through visual art, OPA, Croatia

OPA (Association for Promotion of Visual Culture) was established by art teachers, who wanted to meet the needs of all professionals who work in the aspect of education in the visual arts and visual communication field. One of the main goals of OPA is networked with institutions and individuals involved in visual culture.

Through its activities, OPA aims to draw attention to the importance of visual competence in contemporary (Croatian) society and emphasise the need to create a unified policy of visual culture. The need to include visual culture (design, architecture) and critical thinking into the area of formal education.

OPA has been creating a community of teachers and educators working in the areas of critical thinking and creativity in schools creating on this way an ecosystem of competences based on creative thinking.

The organisation has its network of teachers and great access to diverse education based stakeholders – universities, colleges, schools and academies

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Photo: Radiona

Fotomemoria, Europe

The *Fotomemoria* project developed a training scheme enabling participants to process their own family photographic collection as a means to gain insight into social and historical background through the use of images.

Fotomemoria identified the preservation of family memories is not confined to oral and written forms, (like private correspondence, diary, and memoirs). Photographs record family memories and yet the same time lend to the telling of oral histories for future generations. Private photographs serve as an important source of material for local historical research. Recently the traditional structure of families is changing and the connection with family traditions is less relevant. Similarly, the technique of analogue photography is disappearing, while its material products will remain forever (paper pictures, negatives, etc.), and the number of professionals who handle them is relatively small.

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4. What have we learnt? Moving from the theoretical to the practical

Jo Anne Sunderland Bowe, Heretic

The purpose of this chapter is to synthesise how the learning from the case studies and other data gathered from the partners in the first stages of the project, will inform the next phase and intellectual output: the development of teaching materials.

4.1 An analysis of the good practices

The organisation of case studies into different categories was the first step in understanding the different types of work that museums and cultural heritage institutions are undertaking with schools. This activity demonstrated the wide variety of different projects and programmes. The benefit of looking at the case studies in this way, allowed us to reflect on and review the different methodologies adopted. One of the challenges of undertaking an analysis like this is to make assumptions, however by presenting and organising the case studies by categories allowed us to understand some of the shared outcomes and outputs.

The second part of the analysis is to examine the commonalities that presented themselves in the case studies. These are described here as ‘emerging themes’ which will help inform the next stage of the project.

Emerging themes:

- **Challenge:** allow pupils to challenge thoughts, ideas and opinions and to be challenged;
- **Digital:** use technology where appropriate to support the pupils learning and programme outcomes.
- **Explore:** create a space for pupils to self-develop in order to become independent learners;
- **Experiment:** encourage experimentation
- **Innovation:** create opportunities for prototyping to create an understand of the creative processes;
- **Objects:** use objects as a stimulus, to scaffold projects and mediate discussions.
- **Play:** create opportunities to play;
- **Pupil-centred:** ensure that pupils are active-agents in their own learning processes;
- **Relevance:** engage with themes and ideas which interests participants;
- **Voice:** allow space for the pupil’s voice to be heard in a respectful environment.

4.2 Curricula, policies and teacher feedback in partner countries on requirements for delivery of creative and critical thinking skills

At the beginning of the project we asked partners to provide a summary of the role of creative and critical thinking in the curriculum.

From November 2019-March 2020 project partners organised several meetings with teachers, educators and education experts. Staff who attended these meetings comprised of teachers, educators, academic advisors, university lecturers and researchers, project managers and direction staff. Collated feedback from these meetings from Austria, Croatia, France, Finland, Italy, Ireland and the UK is available in this section.

The project partner MCA, also requested members involved in digital heritage education to contribute to the discussion. It was agreed that developing critical thinking skills is an important

opportunity for schools, since they can teach students how to take better decisions and apply their knowledge in a rational way in order to achieve the best results.

Partners to explored the following four main questions:

- How can the *Creative School* project support teachers in knowing better and organising pilot lessons using creative and critical thinking approaches?
- What themes are more interesting for school purposes?
- How is it possible to involve schools, teachers, and other educational institutions?

Austria

Curriculum and policy

In Austria, there is no existing definition of creative and critical thinking. The terms are used across disciplines, sectors and stakeholders (from policy institutions over private organisations to individual experts) without a common definition.

The federal ministry of Education, Science and Research in Austria published a report 'Denken lernen, Probleme lsen' (Himpsl-Gutermann, Brandhofer et al., 2018) as part of the national initiative to strengthen the digitalization strategy in the educational system and described creative and critical thinking as a core requirement for effective learning and not a learning methodology itself: 'The 4Cs of 21st century learning are four competencies identified by the United States-based Partnership for 21st Century Skills (P21) as the most important skills required for 21st century education: critical thinking, communication, collaboration and creativity. It is not a learning method, but a prerequisite for effective learning. These 4 Cs can be supplemented by a 5th component ""Computational Thinking"" for informatically oriented education.'

Feedback from teacher consultation

Due to the Covid-19 lockdown, the originally planned focus group where feedback was to be collected from teachers from the school targeted was unable to occur. Instead feedback was collected from teachers during informal phone conversations.

With the current extra workload of adapting lessons and learning new digital tools, teachers emphasised that what they required most, was dedicated time to learning and developing critical thinking approaches that could be integrated into their classrooms. While teachers welcomed the idea of a 'toolkit' of best practices, it was often brought up that in-person training would need to accompany such a toolkit, not only to have support in understanding the toolkit, but more specifically to have a dedicated block of time to learning these new teaching strategies.

Technology was the dominant interest in our discussions on learning critical thinking. This was probably due to the context of Ars Electronica, however the significant need for students to use critical skills when using technology and managing their data was highlighted. Teachers also stated that linking topical events with technology developments would capture the attention and imagination of their students.

Croatia

Curriculum and policy

The definition of creative and critical thinking in Croatian education system is newly implemented. Creative thinking as a process for new ideas, diverse perspectives and opportunities, on the creation of new and valuable ideas and objects for analysis, elaboration, combining, refining and applying

existing ideas, objects and activities in new ways. It involves the development of innovative and original objects and processes using new technologies, implying that children and young people can develop and share new ideas with others and implement common ideas in collaborative work. Critical thinking is defined as systematic analysis and relevance assessment, validity of information and reasoning on which idea and perspective are based, as well as autonomous and responsible design and expressing one's own opinions based on the arguments. Includes open review, comparison, evaluating and concluding on different (and own) opinions and perspectives, taking into account context, circumstances, personal and social value.

Feedback from teacher consultation

Croatian teachers underlined that they need support in knowing better and organising workshops and education practices by using creative and critical thinking approaches within a systematic framework of possibilities and tools. It is important working in collaboration with teachers on new programmes and building their own capacities – inviting them to partake in specialised makerspace workshops, as well as tailoring the program according to the schools schedule with an aim to organise a new framework of interdisciplinary education for teachers and its transfer to the students. A special interested arose around specifically designed programmes for pupils as a quarterly cycle. One more suggestion concerns the creation of public events within cultural centres, libraries and museums with a critical thinking approach applied to traditional arts and contemporary practices.

The proposed interdisciplinary approaches include the cultural history of science, vocational education in the cultural context, practices for better online education, use of motoric skills, enhancing social and emotional intelligence through education, the role of maker practices in schools (how to set up a school makerspace or creative space), interactivity, and capacity building of teachers.

To involve the school class into the *Creative School* project several ways can be followed: organising a workshop, study visit or education program in school, makerspace or museum; building a network of involved teachers; contacting NGO's and Association of teachers and starting a joint collaborative practice; founding formal or informal network of schools and teachers; organising Open Days in the makerspace with schools visiting the space; starting a joint project of creating with toolboxes on critical thinking and creativity; merging together, through a collaborative project, stakeholders with a different background.

Finland

Curriculum and policy

There is no one agreed or official definition in Finland. Different educational sectors have their own definitions. Creative and critical thinking are not always combined in Finland. In general it seems that creativity is combined with innovation and critical with problem-solving and these both are considered as essential skills in the future. In formal education there are national core curriculums that guide the curriculum work locally. Creativity as well as creative and critical thinking are very important in the curriculums and mentioned in the contents of each subject and as a learning method as well. But there is no combined definition for creative and critical thinking.

In Finland in general it is believed that creative and critical thinking is essential in STEAM learning. The new national core curriculums (2014-2019) introduced transversal competences. These epitomise the aims of education and reflect the competences needed in all spheres of life. It is believed that cross-curricular problem solving aims to develop the learner's critical thinking, application of knowledge and skills, risk-taking ability, willingness to experiment, willingness to work

together, and perseverance in finding new perspectives and solving problems creatively. b) See part a. c) Maker culture and Steam education. Maker@STEAM Research Community at the Faculty of Educational Sciences, University of Helsinki, <https://www.helsinki.fi/en/researchgroups/maker-culture-and-steam-education>, 2. STEAMOK, <https://www.monialaiset.fi/english>.

Feedback from teacher consultation

The discussion involved teachers from high school (history and social studies) and also a teacher of Finnish language and music in a primary school. Teachers were from four different regional areas in Finland. After presenting the *Creative School* project, the participants were requested to detail how the development of students' creative and critical thinking is currently involved in their teaching.

This happens in different ways: learning tasks that develop critical attitudes, for example: asking (critical) questions; keeping in mind empathy; organising debates; using pictures, for example Finna.fi service; using drama in education; asking students to think about how knowledge is constructed; asking students to present their mental processes in a creative way; using historical films with a historical topic; using stories of individuals.

Concerning the question about the kind of educational material that can be useful to promote creative and critical thinking in teaching, the feedback received underlined the following issue: digital format; simple to use and with concise instructions; no need to download applications; quick to assimilate; using images and videos, also augmented reality and virtual reality especially in the future; adopting a gameplay solution; using digital storytelling and personal stories; participatory; active involvement of the student for producing knowledge; no need for special tools.

The teachers underlined that learning objectives are different in primary, secondary and upper secondary school and it is not always possible to make use of materials implemented in another level. Phenomenon-based learning is a good starting point for learning materials used by different age groups. In this way, the material can be adapted to the needs of each age. One of the teachers brought up the idea of historical empathy as a phenomenon, and all the other teachers agreed that it would be an interesting starting point for the OER. It allows almost any particular theme to be addressed with students.

France

Curriculum and policy

The development of critical thinking is at the centre of the mission assigned to the French education system. In France and nowadays, one of the major ambitions of the school is to train students in the decoding of the real and thus to lead them towards a progressive construction of an enlightened, autonomous and critical mind. Teaching critical thinking enables students to become aware of epistemic vigilance but it also leads them to become citizens. The presence of critical thinking in many curricula is greatly enhanced by the attention paid to media and information education.

The development of critical thinking is at the heart of the mission of the French education system. One of its major ambitions is to train students in school to decipher reality and lead them towards the progressive construction of enlightened, autonomous and critical thinking. Teachers are asked to be reflexive about this learning and the forms it should take yet at the same time they do not have the proper tools and methodologies to teach it. There is a strong recurrence of the word 'critical thinking' in the school programmes of cycles 2, 3 and 4, yet there is no definition of this concept in the Bulletin Officiel. Furthermore, the transmission or teaching of critical thinking is not addressed in teacher education.

Feedback from teacher consultation

Art can be a means to arouse the target's questioning, and can be used as a medium to transfer a creative and critical approach. The interdisciplinary aspect of the project is very important especially in combined art and sciences project.

In order to involve classes, schools and schools networks, teachers and educators think it is necessary to use a collective approach, e.g. to involve a group of teachers already running an interdisciplinary project (and not working on an isolated project involving only one teacher). Results should be disseminated between different classes and schools. The key challenge is to find out how stimulate students curiosity and interest with them and their peers.

Usually, students are not encouraged to improve their critical thinking skills in spite of the national education programme. Within the framework of the *Creative School* project, an interdisciplinary action can bring creativity to the classroom in a creative context.

Ireland

Curriculum and policy

There are a number of definitions from the Department of Education & Skills (DES) regarding policy to encourage reforms in the Irish Education system: no official definition is provided by the DES, yet creativity and critical thinking is referred to in the following reports:

- Key Skills for the Junior Cycle. Creativity is imagining, exploring options and alternatives; implementing ideas and taking action; learning creatively; stimulating creativity using digital technology¹
- STEM Policy 2017-2026 for schools refers to creativity and critical thinking with the following key skills using their skills and content knowledge to creatively solve problems: imagining, questioning and exploring; collaborating with others; engaging in inquiry and analysis; innovating, designing and making; testing and modifying their solutions to complex problems

Feedback from teacher consultation

The Chester Beatty Learning and Education Department initiated a research and development project and built the foundation of an intercultural museum programme for primary and post-primary schools. The Education Department worked with intercultural education support organisations for teachers, third level education departments for primary and post-primary teachers as well as a heritage consultant. Pilot schools tours using object based learning and visual literacies were adopted in the design of these tours. They were tried and tested with 6 schools and evaluated. Continuous development for teachers training was piloted with trainee teachers, teachers in Northern Ireland and the Republic of Ireland. Participants were introduced to the Chester Beatty museum collection. Teachers were encouraged to use visual literacies and object-based learning as well as hands-on visual art activities they can use in the classroom with their pupils.

The tours and training looked at themes that are relevant to a more holistic type of learning that supports creative and critical thinking skills for both teachers and pupils. Themes of interest include: journeys, fashion, how things are made, sacred, fantasy and imagination. There are support materials available for teachers and pupils for pre and post-activities. Themes of interest also include History, Religious Education, Art and Design/Visual Art, Geography, STEAM, Literacy and Mindfulness.

¹ Junior Cycle Key Skills; www.curriculumonline.ie/Junior-cycle/Key-Skills

Italy

Curriculum and policy

The importance of critical thinking has long been emphasised in several documents of the Italian Ministry of Education, as an important element of the learning process. This applies in different areas: active and critical participation; development of the ability to think in an informed, critical and creative way; collect and process information in a critical and systematic way; manage own responsibilities; treat mathematics as a language for conceptual construction, logical deduction and development of critical thinking; acquire a critical attitude towards the information acquired during a scientific experiment; consciously exercise all forms of communication; develop a “multiple” vision of the world and other people.

The importance of the creative dimension is also underlined as an element to improve communication between students, making them more open to dialogue, breaking down the barriers between teachers and students, improving group relations, creating a relaxing and pleasant environment, ready to approach the learning new things.

Creative and critical thinking is one of the new priorities of the Italian educational system, even if there is not a common approach and the way to implement them in the curriculum is still strongly depending on the strategy of the single school and the interest of the single teacher. It is not common yet to involve experts and associations focusing on these topics within the school, even if some examples can be found in almost all the schools.

Feedback from teacher consultation

Due to the mobility restrictions caused by Covid-19 pandemic, the planned focus group was replaced with a virtual meeting with the participation of teachers of the School of Art "Arcangeli" in Bologna, which has been identified as a potential school for the planned pilot action.

Creative and critical thinking is one of the new priorities of the Italian educational system, even if there is not a common approach and the way to implement them in the curriculum is still strongly depending on the strategy of the single school and the interest of the single teacher. It is not common yet to involve experts and associations focusing on these topics within the school, even if some examples can be found in almost all the schools.

Some workshops have been organised together with ONGs and Research Institutes focusing on 20th century History, on very specific topics, such as European Union, constitutional rights, topical issues. Also Art History can be very interesting, since a key learning objective is the capacity of critical analysing of a piece of art: what is art? Why I do not understand modern art? etc. Workshops as the ones proposed by the *Creative School* project have not been organized yet. Until now some desktop researches have been run, in cooperation with external bodies (e.g. the role of women together with the Women Documentation Centre, organisation of a sculpture exhibition together with the Zauli Museum in Faenza. All these activities have been then presented to other students through performances and workshops.

UK

Curriculum and policy

Education in UK is devolved across the different home nations. There are different Education authorities for England, Wales, Scotland and Northern Ireland. National Curriculum in this document refers to the National Curriculum of England.

In the National Curriculum in England, critical thinking appears under a broader banner of “thinking skills”. These thinking skills are subdivided into 5 areas: information-processing; enquiry skills;

reasoning skills; creative thinking and evaluation skills. Each skills has their own definition with the framework. The skills are embedded in the teaching of the National Curriculum.

This is summarised in the following report from 2005:

‘The teaching of thinking skills is an explicit part of the National Curriculum in England and Wales, and contributes directly to Department for Education and Skills (DfES) initiatives such as Teaching and Learning in the Foundation Subjects (DfES, 2004a) and Leading in Learning at Key Stage 3 (DfES, 2005) which emphasise the importance of thinking skills approaches for the promotion of effective questioning and extending pupils’ oral responses in classrooms, as well as the potential contribution to assessment for learning. Thinking skills are also an important part of the developing Primary National Strategy aims (DfES, 2004b). However, thinking skills do not form a discrete and explicit programme of study and appear unevenly in the different subjects of the National Curriculum, which makes it challenging for schools to ensure progression in their teaching.’²

Feedback from teacher consultation

The *Creative School* project can support teachers and trainee teachers through Continuing Professional Development (CPD), training videos and modelling sessions using critical and creative thinking approaches. This can be done through pilot activities, providing nicely designed and easy to use resources and signposting best practice. Pilot lessons should have clear learning outcomes and be easy to adapt for individual circumstances and to accommodate differentiation.

In English primary schools, curriculum is usually taught as a topic e.g. Coasts, My Local Area, the Romans and the approach should be cross-curricular and inter-disciplinary. This is of greater value than a subject which addresses one theme or idea. Teachers embed learning opportunities through the 6-week term via a learning journey across all subjects which has clearly laid out learning outcomes.

CPD opportunities are the most beneficial ways of reaching teachers. Teachers suffer from information and data overload, particularly during these challenging times. However, in England teachers are given a number of INSET (in service) days for CPD and enjoy attending twilight CPD events as they are social and an opportunity to learn. In the local area of the Creative School British partner, there is a schools partnership involving 5 primary schools and 1 secondary school which will be used to share and disseminate project outcomes. In the nearest city (Brighton) there is a teacher network for uploading resources and sharing CPD opportunities. Another key area is ITT (Initial Teacher Training) and PGCE (Postgraduate Certificate in Education) courses. In the heritage sector in particular, value is given to partnership with local universities and training providers to support trainee teachers in using cultural heritage, museums and galleries.

4.3 Understanding the needs of teachers and educators

Based on a synthesis of the material collected so far, these are the recommendations we can take moving forward.

What to do teachers need?

- **Clear methodologies:** Teachers need to be supported in having concrete and practical methodologies to implement creative activities on critical and creative thinking;

² Higgins S, Hall E, Baumfield V, Moseley D (2005) A meta-analysis of the impact of the implementation of thinking skills approaches on pupils. In: *Research Evidence in Education Library*. London: EPPI-Centre, Social Science Research Unit, Institute of Education, University of London: <https://eppi.ioe.ac.uk/cms/Default.aspx?tabid=339>

- **Support for evaluation:** Teachers do not know how to evaluate students on critical and creative thinking therefore there is a need to develop a methodology for evaluation;
- **Developing competences:** Teachers need skills-set (competency framework) based on soft skills or competences students can acquire developing their own creative and critical thinking.

4.4 What has changed in light of Covid-19 for schools and museum engagement?

This analysis was produced during the pandemic at a time when schools and museums were closed; as a result cultural institutions have been re-examining delivery of their content, predominantly to online methods. In a broad sense this is described a 'digital transformation' of engaging with audiences, which could take the form of VLE (virtual learning environments), online sessions where museum educators deliver live into the classroom via an online platform, digital resources to support collections (YouTube, online tours, downloadable materials). Whilst schools and museums have started reopen, it has become apparent that it will take some time for the pattern of school visits to return to 'normal'. Several organisations have come together to survey on a national or international scale the needs of teachers. At the time of writing, the NEMO (Network of European Museums Organisations) report was not available. However the following reports show some interesting insights for the partnership as we move into the next phase of the project; in the UK a National Survey has been conducted by a partnership of organisations including the Arts Council and Bridge Network. The survey is a useful reflection on what has happened during lockdown in the UK but also an indicator of future opportunities and collaborations between schools and the cultural and heritage sector³. In particular the respondents (mostly teachers) cited curated cultural learning resources and partnerships with cultural partners as their strongest desire going forward. In the same report, both primary and secondary teachers requested support for creativity across the curriculum. Another survey by the University of Leicester with museum educators 'Schools Visits post-lockdown' suggests that there will be an increase in activities in the future with digital components and blended learning.⁴ One of the key findings of the report says that: 'There is increased appetite for digital components in post-lockdown school visits. On average, we can expect 3 additional digital components post-lockdown than we had pre-Covid. More likely to be added are home activities, virtual tours, live lectures, online collections, bitesize talks, and social media' As in the other national survey Teachers Resources again figure prominently. This corroborates the evidence from the partners from their own research and feedback in schools.

4.5 Sharing collected good practices in schools:

We also asked partners how the good practices and case studies could be shared in schools. In summary, the collected good practices can be effectively used classes by:

- introducing a new online set of educational tools for critical and creative thinking;
- providing challenge and interesting ideas for engaging with heritage;
- creating an online database of shared knowledge;
- creating cross-curricular / interdisciplinary approaches to topics and themes;

³ Full report: <https://weareive.org/wp-content/uploads/2020/08/National-Schools-Survey-Summary-of-findings-final-Edited-MB-1.pdf>

⁴ University of Leicester (2020) Schools visit post lockdown report: https://leicester.figshare.com/articles/School_Visits_Post-lockdown_The_Role_of_Digital_A_Survey_Report/12661649/1

- demonstrating good practice in design and format of resources;
- delivering clear learning outcomes.

4.6 Recommendations for building a Creative School

Critical thinking relates to pupils (in reality to all of us) thought processes: how they take decisions, how they use their personal ideas, and how they act to solve problems. Through critical thinking students will become problem-solvers, tending to apply the same thinking processes to identify and implement the solutions to their own problems. This process works for any kind of problem - large or small. Experimenting their creativity, the students will become active learners. To reach this result they must nourish their senses, body, intellect and mind.

The Open Education Resources (OER) developed by the *Creative School* project should consist of a CRAFTED educational toolbox, with the following characteristics:

- **Cross-curricular and inter-disciplinary:** Embedding creativity and critical thinking across the curriculum;
- **Respectful:** There is a transformative learning experience when children and young people are encouraged to share their voices, opinions and personal experiences when exploring collections in an open, holistic and safe environment;
- **Adaptable:** Each teacher should be able to work with the resource and adapt it according to the needs of the school cycle (primary, middle school or post-primary school);
- **Flexible:** Provide flexible methods of evaluation that allow teachers to find their way around and construct their own evaluation grid. The overall objective is to determine the students' ability to follow and complete a project;
- **Thinking routines and strategies:** Learners should be encouraged to think speculatively, to acknowledge and build on what members of their peer group are saying, and to build confidence and competence in their own ideas and evidence building
- **Electronic/Digital:** OER should be in digital format; simple to use and with concise instructions; no need to download applications; quick to assimilate; using images and videos, also augmented reality and virtual reality especially in the future; adopting a gameplay solution; using digital storytelling and personal stories; participatory; active involvement of the student for producing knowledge; no need for special tools.
- **Differentiated:** Allow for teachers to interpret and adapt the resources for student's learning needs.