# Intellectual Output 1

## A1: Rationalization Phase – Qualitative & Quantitative verification

Deliverable: IO1.A1.1 Country report

IPin STEAM

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INOVA+
Authored by: Alexandros Koukovinis
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## REFERENCED DOCUMENTS

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## APPLICABLE DOCUMENTS

| ID | Reference | | Title |
|---|---|---|---|
| 1 | | | |
| 2 | | | |

**Contents**

# 1. Introduction

## 1.1 The scope of the project

On the point of creativity and innovation being the roots of European cultural and socio-economic growth, respecting others' work becomes a far-reaching need both for professional and personal development of individuals (EUIPO, 2017). On the other hand, nowadays that online sharing of information is rife, one cannot help but wonder whether people are aware of proper ways to attribute others' ideas along with the necessity to reap the benefits of intellectual potential given the fact that most innovations are now highly related to technology.
Au contraire, the absence of Intellectual Property (IP) protection of educational materials and innovations – with online learning only deteriorating the situation – reveals a significant problem in many European countries. In fact, while uncontrolled access is given to educational resources across the Web, the majority of learners are not aware if IP is implemented in their work as well as ways to protect their own intellectual property (Evans, 2016).
On the grounds that STEAM comprises continuous innovation, invention, discovery and understanding of technical knowledge that lead to (commercial) products, the protection of inventions becomes more and more complex (National Inventor Hall of Fame, 2019). Conceivably, this reveals the rationale behind the lack of IP in school education. In particular, recent research has depicted the knowledge and implementation gaps related to IP, resulting in lack of knowledge about working definitions of IP in the field of Arts. In conjunction with the fact that most European countries are not in position to capture the relevance of IP in STEM, the need to integrate IP in STEAM curricula becomes even more significant (Office for Harmonization in the Internal Market, 2015).

## 1.2 The project objectives

In order to address the lack of IP knowledge resulting in inefficient implementation of IP in the world of inventions, the IPinSTEAM project aims at promoting IP strategies in schools and more specifically in STEAM education under the prism of confronting this issue from its roots. To achieve generating awareness about Intellectual Property across European educational institutions, the project will develop an innovative ICT-enabled training package focused on the needs of K-12 STEAM teachers.
Towards that purpose, the project will develop and validate training materials tailored to the real needs of school teachers, educational institutions and STEM departments towards giving shape to the integration of IP concepts into STEAM curricula.

## 1.3 The project target group

The **direct target group** of the project involves STEAM teachers, mainly primary school and lower secondary school teachers (ages up to 12). They will learn the key concepts of Intellectual Property along with useful information and guidelines about ways to efficiently implement IP strategies in STEAM-related subjects and integrate them into their curricula. By all means, all school STEAM departments can be regarded as direct target group of the project.
The **indirect target audience** of the project comprises:
- Students up to 12 years old
- Schools and educational institutions teaching STEAM-related subjects
- Law schools and departments
- Policy makers responsible for the design and implementation of actions relevant to ICT strategies for educational purposes
- Other institutions or organizations that are active in school education
- Authorities or organizations that can organize specific actions in order to contribute in the development of high-quality education
- Networks, voluntary associations and other NGOs that are active in school education
- Research communities active in the broader field of lifelong learning

- E-learning enthusiasts

# 2. National state of play

## 2.1 The scope of the report

The objective of the present report is the diagnose and analyze the current situation of the project target group with regards the implementation of Intellectual Property aspects in STEAM teaching. Documentation on the main findings will result in the identification of the actual needs of K-12 teachers based on their level of IP knowledge and the skills required to properly integrate relevant concepts into their curricula. Consequently, the goal is ultimately the formulation of a complete training package covering their needs in terms of bridging the gap between the current state of play and the desired situation.

## 2.2 Main findings

### 1. Which are the most commonly taught STEAM subjects in your country's school curricula?

For the project defined target group, the corresponding curricula in Portugal is distinguished in 1st cycle (ages 6-10) and 2nd cycle (ages 10-12). Accordingly, the STEAM subjects that are being taught in these ages are:

- Mathematics, Environmental/Social studies and Artistic expression, in the 1st cycle.
- Mathematics, Natural sciences and Visual education, Technology education and Music, in the 2nd cycle.

Moreover both cycles have weekly hours where the class is working under projects/clubs and these hours can possibly be related to STEAM (it is up to every school to define the concepts worked on).

| Mathematics | |
|---|---|
| 1st cycle | Numbers and Operations |
| | Geometry and Measurement |
| | Organization and Treatment of Data |
| | Problem solving, reasoning and communication |
| 2nd cycle | Numbers and Operations |
| | Geometry and Measurement |
| | Algebra |
| | Organization and Treatment of Data |
| | Problem solving, reasoning and communication |
| Environmental and social studies | |
| 1st cycle | Acquire knowledge of yourself, developing attitudes of self-esteem and self-confidence |
| | Valuing its identity and roots, respecting the territory and its order, other peoples and other cultures, recognizing diversity as a source of learning for all |
| | Identify natural, social and technological elements of the environment and their interrelationships |
| | Identify events related to personal and family history, local and national, locating them in space and time, using different cartographic representations and units of temporal reference |
| | Use simple scientific processes to carry out experimental activities |

| | |
|---|---|
| | Recognize the contribution of science to technological progress and the improvement of quality of life |
| | Manipulate, imagine, create or transform simple technical objects |
| | Mobilize cultural, scientific and technological knowledge to understand reality and to solve everyday situations and problems |
| | Assume attitudes and values that promote civic participation in a responsible, supportive and critical way |
| | Use Information and Communication Technologies in the development of research and presentation of papers |
| | Communicate your ideas properly, through the use of different languages (oral, written, iconographic, graphic, mathematical, cartographic, etc.), basing them and arguing against the ideas of others. |
| Artistic education | |
| 1st cycle | Visual arts |
| | Dramatic Expression / Theater |
| | Dance |
| | Music |
| ICT | |
| 2nd cycle | Safety, responsibility and respect in digital environments |
| | Investigate and research |
| | Collaborate and communicate |
| | Create and innovate |
| Natural sciences | |
| 2nd cycle | Understand how nutritional exchanges between living beings occur; |
| | Understand the way in which life is transmitted in humans and plants; |
| | Explore how microorganisms can cause aggression in humans; |
| | Assume attitudes and values that defend the implementation of measures that aim to promote the sustainability of living beings; |
| | Plan and implement practical investigations, based on systematic observation, modeling and laboratory / experimental work, to answer problems related to the vital processes of living beings. |
| Visual education | |
| 2nd cycle | Appropriation and Reflection; |
| | Interpretation and Communication; |
| | Experimentation and Creation. |
| Technological education | |
| 2nd cycle | Technological processes |
| | Technological resources and uses |
| | Technology and society |
| Musical education | |
| 2nd cycle | Experimentation and creation; |
| | Interpretation and communication; |
| | Appropriation and reflection. |

2. **What teaching skills do STEAM teachers regard as the most important?**

As seen in a national research conducted under the CREATEskills project that INOVA+ was coordinating, teaching STEM subjects through a project based methodology or cooperative work is essential to develop a critical thinking in students, develop social skills, and the care and respect for our cultural heritage and environment.
This is a transversal opinion, since most parents, teachers and students agree on the importance of STEM for life.
Teachers do not have adequate training to implement and are not motivated to implement STEM subjects in an experimental methodology, or even developing group work, project based learning, cooperation work.
Most of teachers and school directors find that training and motivating teachers to implement new methodologies of work/STEM subjects, is essential.
there seems to be a common opinion that the most “hands on the job” are the techniques the better they are, such as experiment activities, focused field trips, group work, etc.
School directors in Portugal consider schools are not well equipped to implement STEM subjects, or there are some classes that are well equipped but they are occupied with other classes (from 7th to 12th year students), so children from primary education (1st to 6th year) don’t have a vacancy to use these classes. Laboratories and equipped laboratories are missing specially in the first years of school.

3. **What is the level of awareness of Intellectual Property concepts in your country? How IP is implemented (sections, purposes and target groups)?**

Portugal joined in 1975 the World Intellectual Property organisation. Since 1918 Portugal has issued Laws for the protection of the Intellectual Property, which are frequently amended in recent years in order to match the European Law Framework.

In Portugal intellectual property covers industrial property – patents, models, trademarks, logos, trade secrets, designations of origin and geographical indications – and the also encompasses copyright and related rights.

Related to the existing and applicable cases:
**(a) Inventions (e.g. patents, supplementary protection certificates, rights in trade secrets, confidential information and/or know-how);**

- Trademarks
- Logotypes
- Company names

**(b) Brands (e.g. trade marks, cause of action in passing off, rights to prevent unfair competition, association marks, certification marks, hallmarks, designations of origin, geographical indications, traditional speciality guarantees);**

- Appellations of origin and Geographical indications
- Copyright and related rights
- Rights to prevent unfair competition

**(c) Other creations, technology and proprietary interests (e.g. copyright, design rights, semiconductor topography rights, plant varieties, database rights, rights in trade secrets, confidential information and/or know-how).**

- Copyright and related rights
- Database rights
- Topography of semiconductor products
- Designs or models
- Domain names
- Plant varieties
- Trade secrets

Regarding to the implementation, and more in specific about the duration, below is the summary:

- Patents: patents expire **20 years** as from date of application.
- Utility models: 6 years as from date of application. Renewable twice for 2-year periods (total term shall not exceed 10 years).
- Trademarks: 10 years as from date of application. Renewable for equal periods without limitation.
- Logotypes: Same as trademarks.
- Company names: Unlimited, subject to the effective use of the company name.
- Appellations of origin and Geographical indications: Unlimited.
- Topography of semiconductor products: 10 years as from date of application, or the date in which the topography was, in the first time, exploited in any territory, if this occurred before.
- Design or model: 5 years as from date of application; renewable totally or partially, by equal periods of 5 years, up to a total term of 25 years.
- Domain names: Registered for periods of 1, 3 or 5 years and renewable for equal periods without limitation.
- Copyrights: In general terms, the author's rights expire 70 years after the author's death, despite the work having been published or disclosed posthumously.
- Related Rights: In general terms, 50 years after the first public execution or transmission;
- Trade secrets: Unlimited.

**IP in education**

IP and copyright exist and are integrated in other curricular instances, from primary to upper secondary general level. Patents are mentioned in the context of economics, and copyright in ICT. It is also referenced through entrepreneurship, and plagiarism is discussed at all three levels of education. There are numerous entry points for IP education at all levels. From the start of education on, students are taught respect for copyright and to avoid plagiarism. They know their rights and duties through ethics classes and get entrepreneurship and citizenship education and are trained to acquire media literacy. At primary education level, they learn about citations practice and creativity. At lower secondary level, students learn ethical principles of intellectual work, producing own personal and creative texts. Correct use of sources and a correct citation practice as well as data protection are important. Discussions

about concepts of intellectual property and copyright applied to software (ICT), infringements, ownership and about free/commercial and creative commons are encouraged.

Finally in Portugal, there is the “Grande C” creativity contest for schools, designed by the Portuguese Association for the Management of Private Copying (AGECOP), endeavours to build literacy on copyright and related rights surrounding the overall strategy to protect intellectual property, and to promote greater awareness regarding the need to protect creativity in the digital environment. Its mission is to engrain the values of creation and preservation of cultural diversity, contributing to the education, awareness and literacy of the younger audience.

4. **Is copyright implemented in STEAM? If yes, how and in which subjects?**

Not implemented in a direct way in Portugal for curricula referring to students of age up to 12 years old

5. **Are trademarks implemented in STEAM? If yes, how and in which subjects?**

Not implemented in a direct way in Portugal for curricula referring to students of age up to 12 years old

6. **Are patents implemented in STEAM? If yes, how and in which subjects?**

Not implemented in a direct way in Portugal for curricula referring to students of age up to 12 years old

7. **Is design implemented in STEAM? If yes, how and in which subjects?**

Not implemented in a direct way in Portugal for curricula referring to students of age up to 12 years old

## 3. Conclusions

STEAM education in Portugal is existent in the school curricula for ages up to 12 years old, with the complexity gradually and logically raising according to the age of the students. This curricula though, does not include the notion of Intellectual Property education in connection to STEAM and thus the national area will benefit greatly from IPINSTEAM project.
Looking to the wide picture, we notice that the curricula of other subjects does include IP education so thinks are hopeful that a smooth transition to the inclusion of such aspects in STEAM is possible. That is strengthened by the fact that Portugal has a well-defined regulatory framework and various initiatives that connect school education with IP knowledge, which can prove inspiration and good practice for the IPINSTEAM iintervention.

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