Intellectual Output 1

A6: Validation exercises

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APPLICABLE DOCUMENTS

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1. IPinSTEAM project

1.1 The context

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 Objectives

In order to address the lack of IP knowledge resulting in an 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 generate 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 STEAM departments towards giving shape to the integration of IP concepts into STEAM curricula.

1.3 Target groups

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 to 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.

2. National report

2.1 Objectives

The objective of the present report is to present the results of the validation activities performed with representatives of the target group at national level. Each partner will have to engage at least 20 teachers and 5 students to validate the project outcomes, collecting the results of the validation questionnaires for teachers and for students. The aim is to receive valuable feedback towards continuous improvement

2.2 Questionnaire for teachers

Please score the following statements considering the scale:

1 = Completely Disagree; 2 = Disagree; 3 = Neither agree nor disagree; 4 = Agree; 5 = Completely agree.

	1.	***2.***	***3.***	***4.***	***5.***
	General assessment				
The course structure was adequate.					
The topics and contents of the course addressed were relevant					

The contents of the course were consistent with the proposed learning objectives					
The activities and exercises proposed during the lesson plans were adequate to the acquisition of knowledge on Intellectual Property (IP)					
The contents of the lesson plans were relevant/significant for the teaching of IP concepts on STEAM subjects					
The course workload was adequate					
The proposed activities were original					
The proposed activities were adapted to the target-group					
The students were engaged in the course.					
The technologies, materials and resources used were effective.					
My general evaluation of the course is positive.					
Modules assessment					
About Module 1 Design: The objectives of the module and the lesson plan were clear					
About Module 1 Design: The content was organized and well planned					
About Module 1 Design: The contents of the lesson plan were easily applied in the classroom					
About Module 1 Design: The suggested materials to be presented were clear and appropriate					
About Module 1 Design: The duration of the activities was adequate according to the objectives					

About Module 1 Design: The key questions for knowledge testing were adequate					
About Module 2 Trademarks: The objectives of the module and the lesson plan were clear					
About Module 2 Trademarks: the content was organized and well planned					
About Module 2 Trademarks: The contents of the lesson plan were easily applied in the classroom					
About Module 2 Trademarks: The suggested materials to be presented were clear and appropriate					
About Module 2 Trademarks: The duration of the activities was adequate according to the objectives					
About Module 2 Trademarks: The key questions for knowledge testing were adequate					
About Module 3 Copyright: The objectives of the module and the lesson plan were clear					
About Module 3 Copyright: The content was organized and well planned					
About Module 3 Copyright: The contents of the lesson plan were easily applied in the classroom					
About Module 3 Copyright: The suggested materials to be presented were clear and appropriate					
About Module 3 Copyright: The duration of the activities was adequate according to the objectives					
About Module 3 Copyright: The key questions for knowledge testing were adequate					
About Module 4 Patents: The objectives of the module and the lesson plan were clear					
About Module 4 Patents: The content was organized and well planned					
About Module 4 Patents: The contents of the lesson plan were easily applied in the classroom					

About Module 4 Patents: The suggested materials to be presented were clear and appropriate					
About Module 4 Patents: The duration of the activities is adequate according to the objectives					
About Module 4 Patents: The key questions for knowledge testing were adequate					

Please, feel free to add anything you find relevant regarding the modules.

2.3 Questionnaire for students

Please score the following statements considering the scale:

1 = Completely Disagree; 2 = Disagree; 3 = Neither agree nor disagree; 4 = Agree; 5 = Completely agree.

	1.	***2.***	***3.***	***4.***	***5.***
	General assessment				
My expectations regarding the course were met					
The course helped me to understand better the importance of Intellectual Property in STEAM subjects					
The course gave me important knowledge and resources to apply Intellectual Property in STEAM subjects					
The topics and contents of the course were relevant					
The duration of the course was adequate to its objectives					

The proposed activities were original					
I enjoyed to participate in the course					
The teacher(s) was/were knowledgeable on the theme of Intellectual Property application in STEAM subjects					
The teacher(s) was/were available for any clarification					
The technologies, materials and resources used were effective					
I would recommend this course to others					
My general evaluation of the course is positive					
	Modules assessment				
About Module 1 Design: the objectives of the module and the lesson plan were clear					
About Module 1 Design: the content was organized and well planned					
About Module 1 Design: the materials and resources were appropriate					
About Module 1 Design: the duration of the activities was adequate according to the objectives					
About Module 1 Design: I was confident in completing the key questions for knowledge testing					

About Module 1 Design: my evaluation of the module is positive					
About Module 2 Trademarks: the objectives of the module and the lesson plan were clear					
About Module 2 Trademarks: the content was organized and well planned					
About Module 2 Trademarks: the materials and resources were appropriate					
About Module 2 Trademarks: the duration of the activities was adequate according to the objectives					
About Module 2 Trademarks: I was confident in completing the key questions for knowledge testing					
About Module 2 Trademarks: my evaluation of the module is positive					
About Module 3 Copyright: the objectives of the module and the lesson plan were clear					
About Module 3 Copyright: the content was organized and well planned					
About Module 3 Copyright: the materials and resources were appropriate					
About Module 3 Copyright: the duration of the activities was adequate according to the objectives					
About Module 3 Copyright: I was confident in completing the key questions for knowledge testing					
About Module 3 Copyright: my evaluation of the module is positive					

About Module 4 Patents: the objectives of the module and the lesson plan were clear					
About Module 4 Patents: the content was organized and well planned					
About Module 4 Patents: the materials and resources were appropriate					
About Module 4 Patents: the duration of the activities was adequate according to the objectives					
About Module 4 Patents: I was confident in completing the key questions for knowledge testing					
About Module 4 Patents: my evaluation of the module is positive					

Please, feel free to add anything you find relevant regarding the modules.

3. Conclusions

The first Intellectual Output of the IPinSTEAM project comprises the “IPinSTEAM Training Course”, a modular training course aiming to promote key concepts related to IP and ways to implement it in STEAM subjects. This training course is comprised of lesson plans for six STEAM subjects: 3D Printing, Environmental Engineering, Mathematics, Physics, Robotics, and Social Studies, each one comprised of four modules that cover the IP concepts, namely: Design, Trademarks, Copyright and Patents. The main objective of this training course is to raise awareness about relevant concepts on IP and to empower teachers to integrate them to STEAM teaching.

IPinSTEAM partnership performed the validation activities of the IPinSTEAM Training Course with representatives of the target group at national level in order to gather and analyse their valuable feedback regarding this result.

To conduct the validation exercises of the first Intellectual Output in Greece, EA organized and offered comprehensive training seminars, guidance and support to school teachers and students of the target group of the project during the last 3 months of the school year 2021-22, namely in April, May and June. In total 6 sessions were scheduled in order to cover the modules on copyright, trademark, design and patents along with presenting the respective training materials and lesson plans. Afterwards all participants received the whole package of training content (IO1) in translated version (Greek language) and in English. They were also invited to study them at the extent that was possible to them, and also select particular subjects or/and lesson plans that could use in their classroom. They were also given the corresponding validation questionnaires to fill in and provide their valuable feedback once the validation activities are completed.

In total feedback was received from 25 teachers and 10 students which is presented below numerically along with the main findings concluding this report.

3.1 Questionnaire for teachers – Analysis and Results

Teachers were invited to select to study and validate one or more subjects. They were given freedom to select any subject they are interested in. In total all subjects were tested with Robotics and 3D-Printing with 10 cases each, then Physics and Mathematics in 8 and 7 cases and finally Environmental Engineering and Social Studies in 5 and 3 cases respectively. In terms of overall percentage the results are as follows: Robotics: 40%, 3D-Printing: 40%, Physics: 32%, Mathematics: 28%, Environmental Engineering: 20% and Social Studies: 12%

Regarding the general assessment of the training course (IO1), the grand majority of feedback results are very positive, with the standardized statements to questionnaire's questions being answered in great majority with "agree" or "completely agree". The respective average and percentage of standardized answers to each question is as follows:

1 = Completely Disagree; 2 = Disagree; 3 = Neither agree nor disagree; 4 = Agree; 5 = Completely agree.

Q1	**The course structure was adequate.**	4.64	92.8%
Q2	**The topics and contents of the course addressed were relevant**	4.8	96.0%
Q3	**The contents of the course were consistent with the proposed learning objectives**	4.64	92.8%
Q4	**The activities and exercises proposed during the lesson plans were adequate to the acquisition of knowledge on Intellectual Property (IP)**	4.56	91.2%
Q5	**The contents of the lesson plans were**	4.72	94.4%

	relevant/significant for the teaching of IP concepts on STEAM subjects		
	The course workload was adequate		
Q6		4.32	86.4%
	The proposed activities were original		
Q7		4.64	92.8%
	The proposed activities were adapted to the target-		
Q8	**group**	4.2	84.0%
	The students were engaged in the course.		
Q9		4.64	92.8%
	The technologies, materials and resources used		
Q10	**were effective.**	4.72	94.4%
	My general evaluation of the course is positive.		
Q11		4.8	96.0%

With respect to the assessment of each module (Design, Trademarks, Copyright and Patents) the results are as follows:

Module 1: Design

Module 1	Avg.Answer	Avg in %
The objectives of the module and the lesson plan were clear	4.6	92.0%
The content was organized and well planned	4.76	95.2%
The contents of the lesson plan were easily applied in the classroom	4.6	92.0%
The suggested materials to be presented were clear and appropriate	4.48	89.6%
The duration of the activities was adequate according to the objectives	4.72	94.4%
The key questions for knowledge testing were adequate	4.36	87.2%

The overall assessment of “Module 1” is quite positive, with questionnaire statements being answered as high as 4.76 out of 5 (Q2 – 95.2%) and low of 4.36/5 (Q6 – 87.2%).

Module 2: Trademarks

Module 2	Avg.Answer	Avg in %
The objectives of the module and the lesson plan were clear	4.6	92.0%

The content was organized and well planned	4.72	94.4%
The contents of the lesson plan were easily applied in the classroom	4.76	95.2%
The suggested materials to be presented were clear and appropriate	4.6	92.0%
The duration of the activities was adequate according to the objectives	4.24	84.8%
The key questions for knowledge testing were adequate	4.6	92.0%

The overall assessment of “Module 2” is also very positive, with questionnaire statements being answered as high as 4.76 out of 5 (Q2 – 95.2%) and low of 4.24/5 (Q5 – 84.8%).

Module 3: Copyright

Module 3	Avg.Answer	Avg in %
The objectives of the module and the lesson plan were clear	4.6	92.0%
The content was organized and well planned	4.72	94.4%
The contents of the lesson plan were easily applied in the classroom	4.72	94.4%
The suggested materials to be presented were clear and appropriate	4.56	91.2%
The duration of the activities was adequate according to the objectives	4.2	84.0%
The key questions for knowledge testing were adequate	4.64	92.8%

The overall assessment of “Module 3” is also very positive as well, with questionnaire statements being answered as high as 4.72 out of 5 (Q2 and Q3) and low of 4.2/5 (Q5 – 84.0%).

Module 4: Patents

The objectives of the module and the lesson plan were clear	4.6	92.0%
The content was organized and well planned	4.68	93.6%

The contents of the lesson plan were easily applied in the classroom	4.76	95.2%
The suggested materials to be presented were clear and appropriate	4.68	93.6%
The duration of the activities was adequate according to the objectives	4.2	84.0%
The key questions for knowledge testing were adequate	4.68	93.6%

The overall assessment of “Module 4” is also very positive, with questionnaire statements being answered as high as 4.76 out of 5 (Q3) and low of 4.2/5 (Q5 – 84.0%).

In conclusions the overall teacher assessment of all aspects of IO1 is highly positive without any particular concern mentioned in final comments. Therefore we can conclude with confidence that the training course (IO1) is of high quality, with clear structure and well organized, and also more than adequate and appropriate for in school training and implementation.

3.2 Questionnaire for students – Analysis and Results

Validation questionnaires were also handed to students by teachers so that they can provide their feedback as well. 10 completed set of answers were received about the subject of Robotics (6 or 60%) and 3D-Printing (4 or 40%).

The overall general assessment of students is also very positive, with the standardized statements to questionnaire’s questions being answered in great majority with “Agree” or “Completely agree”. The respective average and percentage of standardized answers to each question is as follows:

1 = Completely Disagree; 2 = Disagree; 3 = Neither agree nor disagree; 4 = Agree; 5 = Completely agree.

		Avg.Answer	Avg in %
Q1	My expectations regarding the course were met	4.8	96.0%
Q2	The course helped me to understand better the importance of Intellectual Property in STEAM subjects	4.7	94.0%
Q3	The course gave me important knowledge and resources to apply Intellectual Property in STEAM subjects	4.8	96.0%

Q4	The topics and contents of the course were relevant	4.6	92.0%
Q5	The duration of the course was adequate to its objectives	4.7	94.0%
Q6	The proposed activities were original	4.6	92.0%
Q7	I enjoyed to participate in the course	4.4	88.0%
Q8	The teacher(s) was/were knowledgeable on the theme of Intellectual Property application in STEAM subjects	4.7	94.0%
Q9	The teacher(s) was/were available for any clarification	4.8	96.0%
Q10	The technologies, materials and resources used were effective	4.6	92.0%
Q11	I would recommend this course to others	4.7	94.0%
Q12	My general evaluation of the course is positive	4.8	96.0%

With respect to the assessment of each module (Design, Trademarks, Copyright and Patents) the results are as follows:

Module 1: Design

	Module 1	Avg.Answer	Avg in %
Q1	The objectives of the module and the lesson plan were clear	4.7	94.0%
Q2	The content was organized and well planned	5	100.0%
Q3	The materials and resources were appropriate	4.5	90.0%
Q4	The duration of the activities was adequate according to the objectives	4.2	84.0%
Q5	I was confident in completing the key questions for knowledge testing	4.5	90.0%
Q6	My evaluation of the module is positive	4.7	94.0%

The overall assessment of “Module 1” is very positive, with questionnaire statements being answered as high as 5 out of 5 (Q2 – 100.0%) and low of 4.2/5 (Q4 – 84.0%).

Module 2: Trademarks

	Module 2	Avg.Answer	Avg in %
Q1	The objectives of the module and the lesson plan were clear	4.7	94.0%
Q2	The content was organized and well planned	4.8	96.0%
Q3	The materials and resources were appropriate	4.5	90.0%
Q4	The duration of the activities was adequate according to the objectives	4.4	88.0%
Q5	I was confident in completing the key questions for knowledge testing	4.6	92.0%
Q6	My evaluation of the module is positive	4.7	94.0%

The overall assessment of “Module 2” is also very positive, with questionnaire statements being answered as high as 4.8 out of 5 (Q2 – 96.0%) and low of 4.4/5 (Q4 – 88.0%).

Module 3: Copyright

	Module 3	Avg.Answer	Avg in %
Q1	The objectives of the module and the lesson plan were clear	4.5	90.0%
Q2	The content was organized and well planned	5	100.0%
Q3	The materials and resources were appropriate	4.1	82.0%
Q4	The duration of the activities was adequate according to the objectives	4.3	86.0%
Q5	I was confident in completing the key questions for knowledge testing	4.3	86.0%
Q6	My evaluation of the module is positive	4.5	90.0%

The overall assessment of “Module 3” is also highly positive, with questionnaire statements being answered as high as 5 out of 5 (Q2 – 100.0%) and low of 4.1/5 (Q3 – 82.0%).

Module 4: Patents

	Module 4	Avg.Answer	Avg in %
Q1	The objectives of the module and the lesson plan were clear	4.8	96.0%
Q2	The content was organized and well planned	4.8	96.0%
Q3	The materials and resources were	4.5	90.0%

	appropriate		
Q4	The duration of the activities was adequate according to the objectives	4.2	84.0%
Q5	I was confident in completing the key questions for knowledge testing	4	80.0%
Q6	My evaluation of the module is positive	4.4	88.0%

The overall assessment of “Module 4” is highly positive, with questionnaire statements being answered as high as 4.8 out of 5 (Q1 and Q2 – 96.0%) and low of 4/5 (Q5 – 80.0%).

In conclusion the overall students assessment of all modules of Robotics and 3D-Printing subjects of IO1 is highly positive without any particular difficulties or concerns mentioned in final comments. Students were engaged in the activities and the learning materials Therefore we can conclude that the student learning content developed in IO1 is of high quality, with clear objectives and structure, and also well organized for in-classroom implementation in schools.